
Thesis submitted for the degree of
Doctor of Philosophy
at the University of Leicester

by

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January 1997
To my wife, son and daughter
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Abstract


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As in most other developed countries, the growth of the public sector has become an important issue in the economic and political debate of Korea in recent years. In 1953 the public sector was relatively small compared to other developed countries, but since the end of the Korean War, the public sector has grown dramatically. Over the last four decades, governments have exerted an enormous influence on the level and allocation of scarce resources in the economy. Especially, since the early 1960s, government involvement in the economy has increased rapidly to promote export and economic growth.

Although the public sector has played an important role during the Korean modernisation process and public expenditure has grown rapidly, few studies have been carried out to explain the sustained growth of public expenditure in Korea. This thesis seeks to explain the nature and causes of the growth of government expenditure in Korea for the period of 1953-1991.

This thesis reviews nine alternative theories of government growth which attempt to explain the observed phenomenon of the rising trend in public expenditure. After reviewing theories of public expenditure growth, we analyse the applicability of these leading hypotheses on public expenditure behaviour with data taken from Korea during the period 1953-1991.

Our empirical study shows that Wagner's hypothesis of expanding state activity is more reliable than Peacock and Wiseman's displacement effect hypothesis in explaining the Korean case. Moreover, our empirical research indicates that the income effect, the relative price effect and the lagged dependent variable are the main causes of the expansion of government expenditure in Korea over the study period.
Contents

List of Figures ...........................................................................................................iv

List of Tables .............................................................................................................v

Introduction .................................................................................................................1

Chapter 1 Theories of Public Expenditure Growth .............................................5
  1.1 Historical Development Models .................................................................5
    1.1.1 Wagner's Law .......................................................................................5
    1.1.2 Peacock-Wiseman's Displacement Effect ......................................12
    1.1.3 Development Model .........................................................................17
  1.2 Public Choice Models ..............................................................................22
    1.2.1 The Median Voter Model .................................................................22
    1.2.2 Redistribution of Income and Wealth ...........................................28
    1.2.3 Fiscal Illusion ....................................................................................31
    1.2.4 Bureaucracy .....................................................................................36
    1.2.5 Baumol's Model ..............................................................................47
    1.2.6 The Political Business Cycle ............................................................55

Chapter 2 Public Expenditure; Definition and Measurement ..........................64
  2.1 Introduction ...............................................................................................64
  2.2 What is Public Expenditure? ...................................................................66
  2.3 Measuring the Size of Government .........................................................70
    2.3.1 Forms of Government Expenditure ...............................................71
    2.3.2 Absolute Versus Relative Measures .............................................74
    2.3.3 Real Versus Nominal Measures .....................................................78
  2.4 OffBudget Activities ...............................................................................83
    2.4.1 Public Enterprises .........................................................................84
List of Figures

1.1 Total Evaluation Function and Alternative Total Cost Functions ...........40
1.2 The Political Business Cycle ..............................................................57
2.1 The Unified Budget System in Korea ....................................................90
3.1 Public Expenditure as a Share of GNP, 1953-1991 ................................107
3.2 Different Measures of Government Spending as a Share of GNP........107
3.3 The Growth of GeCon85, GeTra85, GeCap85 ......................................108
3.4 The Growth of Indexes of Government Expenditures and GNP ..........108
3.5 Functional Composition of Central Government Expenditure ............123
3.6 Economic Classification of Central Government Expenditure ............123
3.7 The Financing of Total Government Expenditures ..............................124
5.1 The Displacement Effect Various Possible Formulations ....................170
5.2 The Development of GeGov / Population in Korea ..............................184
5.3 The Development of GeGov / GNP in Korea .....................................184
List of Tables

1.1 The Effect of Macroeconomic Conditions on Popularity Function ..........62
2.1 Composition of Korean Public Expenditure, 1971-1991 .........................69
2.2 Public Expenditure Ratio in Korea, 1971-1991 .....................................75
2.3 Government Consumption Expenditure and GNP in Korea .................82
2.4 Korean Public Enterprises by Type (1991) ...........................................86
2.5 Public Enterprise Value Added Share in GDP ......................................87
2.6 Consolidated Operation of Central Government in Korea ...................91
2.7 Total Tax Exemptions in Korea .........................................................97
2.8 Composition of Korean Public Expenditure (II), 1971-1991 ...............101
2.9 Korean Public Expenditure Ratio (II), 1971-1991 ..............................101
3.1 Measures of Public Sector Size ..........................................................105
3.2 Average Growth Rates of Public Expenditures and GNP in Korea, 1953-1991 .................................................................110
3.3 Functional Composition of Central Government Expenditures, 1953-1991 .................................................................117
3.4 Economic Classification of Central Government Expenditures, 1953-1991 .................................................................122
4.1 Dickey-Fuller Joint Hypothesis Test ......................................................147
4.2 Unit Root Tests in Levels .....................................................................153
  A. No Time Trend in Model  .................................................................153
  B. Time Trend in Model  .................................................................153
4.3 Unit Root Tests in First Differences .....................................................154
  A. No Time Trend in Model  .................................................................154
  B. Time Trend in Model  .................................................................154
4.4 Cointegration Tests ..............................................................................157
4.5 Comparison of Summary Results for the Different Lag Lengths ..........163
  A. DickeyFuller Joint Hypothesis Test (II) ...........................................163
  B. Cointegration Tests (II) .................................................................163
5.1 Identified ARMI Model with Trend in Korea, 1961-1991 ...................187
5.2 Results of the Test for the Displacement Effect due to the Two Political Crises in Korea, 1953-1991 (Long-Run) .............................................. 190
5.3 Results of the Test for the Displacement Effect due to the Two Political Crises in Korea, 1953-1991 (Short-Run) .............................................. 193
6.1 Dependent Variables Applied to Explain Absolute Government Growth in Korea, 1963-1991 ........................................................................ 223
6.2 Independent Variables Applied to Explain Absolute Government Growth in Korea, 1963-1991 .................................................................. 225
6.3 Structural and Economic Determinants (1963-1991) .................. 228
6.4 Election and Bureau Voting (1963-1991) ................................. 229
6.5 Interest Group (1963-1991) ............................................................. 230
6.6 Fiscal Illusion (1963-1991) ............................................................... 231
6.8 Centralisation of Power (1963-1991) ............................................ 233
Introduction

Since World War II, the public sector in developed economies has grown rapidly. Whether measured in absolute levels of expenditure or relative to the economy, all industrialised countries have experienced substantial growth of the public sector. A number of theories have been used to account for the growth in public expenditures. Many authors have tried to explain the observed phenomenon of the rising trend in government expenditure. By using a variety of theoretical and statistical tools, political scientists and economists have attempted to identify and explain the nature, causes and consequences of government growth.

Wagner's Law, Peacock and Wiseman's displacement effect hypothesis, Baumol's disease, election and bureau voting, and the political business cycle are the most frequently cited explanations for the growth of the public sector. Many researchers have examined the empirical verification of these hypotheses and found mixed results. Some authors have found evidence for the hypothesis, while others have not found conclusive support for the hypothesis.

As far as empirical studies on public expenditure growth are concerned, most studies have concentrated on developed countries. Although the public sector played an important role during the development process, few studies have been carried out to explain the sustained growth of public expenditure in developing countries. Partly due to the lack of long-run reliable data, empirical studies on government expenditure growth in developing countries have been neglected.
Like other developing countries, few studies have been devoted to explain the time-pattern growth of public expenditure in Korea. The aim of this thesis is to explain the sources of the growth of government expenditure in Korea for the period 1953-1991. For the whole study period, we try to explain the expenditure development in Korea, both in absolute terms and relative to the economy.

Chapter 1 reviews the literature concerning the growth of public expenditure. Since the literature in this field is so immense, this is not an exhaustive review (see Larkey, Stolp and Winer (1981)). Instead, we attempt to provide an overview of the literature on government growth. Two classes of models are discussed briefly in this chapter. The first classes of models are historical-development models. Historical-development models attempt to explain how government expenditure has behaved and grown over the long-term: i.e., they are concerned with the time-pattern of public expenditure development. The second classes of models can be described as microeconomic or public choice models. Public choice models emphasise the political decision-making process and include the relevant aspects of the institutional structures that ultimately give rise to public expenditures.

Chapter 2 deals with some measurement problems which mainly arise when we investigate the changes in the level and size of government activity over time. Several different measures have been commonly used to explain the growth of the public sector in the economy. Different measures of the size of the public sector would lead to different conclusions about the size and growth of the public sector. Due to multidimensional nature of public sector activities, we cannot express all the various forms of government activities in a single aggregate measure.
Chapter 3 describes the historical background of the growth of the public sector in Korea during the period 1953-1991. Using recently available data, this chapter attempts to explain the growth of public expenditure at both the aggregate and individual programmes in Korea since 1953. By examining the changes in the structure of government expenditure, we can explore the changing role of the public sector during the Korean modernisation process. This chapter provides a framework that will be examined in the next chapters.

Chapter 4 examines the validity of Wagner's Law in the Korean economy. As shown in chapter 3, Korea seemed to be a good case study to test the Wagner hypothesis because the pressures from rapid industrialisation and urbanisation contributed to the expansion of government expenditure. In this chapter, by employing a recent advanced econometric technique (cointegration analysis), we examine the empirical verification of Wagner's Law on data taken from Korea for the period 1953-1991.

Chapter 5 investigates the merits of the Peacock and Wiseman hypothesis as an explanation of the growth of public expenditure in Korea. Like Wagner's Law, the Peacock and Wiseman hypothesis remains one of the most frequently cited explanations for the growth of public expenditure. This chapter examines the displacement effect on government expenditure in the context of social disturbances caused by the two political crises in Korea. By adopting recent time-series modelling technique (ARMA technique), we attempt to explain the movement of the time-series behaviour of government expenditure in Korea over the period 1953-1991.

Chapter 6 illustrates how econometric analysis can be used to test the various hypotheses of public expenditure growth. At the first section, we discuss six
different explanations of government growth. At the second section, we examine the empirical evidence of the source of government growth in Korea. Through this discussion, we attempt to identify the important determinants of the growth of government expenditure in Korea for the period 1963 to 1991.

Finally, we provide a brief summary of our study and some concluding remarks. We also suggest some related issues which may provide the basis for further research.
Chapter 1  Theories of Public Expenditure Growth

1.1 Historical-Development Models

1.1.1 Wagner's Law

One of the earliest attempts to explain the growth of government spending was that undertaken by the mid-nineteenth century German political economist, Adolph Wagner (1835-1917). Writing in the process of a period of rapid urbanisation and industrialisation, Wagner recognised a tendency for the growth of the public sector in a number of Western industrializing countries. Although some other scholars before Wagner had mentioned the growing importance of government activities, he was the first economist who recognised a positive relationship between the process of economic development and the size of the public sector, and translated such observation into general theory. Based on his empirical observations about expenditure growth, Wagner formulated "the law of expanding state expenditures" and it is now known as "Wagner's Law".

Despite its importance, very little of Wagner's work has been translated into English. Only three extracts from Finanzwissenschaft (first published in 1883 in Leipzig) have been translated and published in Musgrave and Peacock (1958).

Based on his empirical studies, Wagner inferred that public expenditure would
inevitably increase of a faster rate than national output in a progressive state. According to his own words, Wagner's Law can be summarised as follows:

The "law of increasing expansion of public, and particularly state, activities" becomes for the fiscal economy of the law of the increasing expansion of fiscal requirements. .... That law is the result of empirical observation in progressive countries, at least in our Western European civilisation; its explanation, justification and cause is the pressure for social progress and the resulting changes in the relative spheres of private and public economy, especially compulsory public economy. Financial stringency may hamper the expansion of state activities, causing their extent to be conditioned by revenue rather than the other way round, as is more usual. But in the long run the desire for development of a progressive people will always overcome these financial difficulties (Wagner in Musgrave and Peacock (1958), p.8).

From the above summary, it is clear that Wagner put forward a causal relationship between the level of economic development and the growing role of the state where "the pressure for social progress" requires an expansion of government activity. Also he seems to recognise the universality of the law in Western developing countries.

Wagner saw three main reasons why government activities would increase over time (see Bird, 1971, p.2). Firstly, Wagner thought that the process of industrialization would bring not only the growing complexity of society but also the growing needs for public regulative and protective activities. As a result of the increased complexity of society in the process of development, the state needs to expand administrative, legal and other protective services. Consequently public spending would increase from the continued increase in defence expenditure or from the growth of government expenditure on domestic
economic activities. This growth of public expenditure would also occur as a result of the increase in population density and urbanisation.

Secondly, Wagner foresaw a relative expansion of “cultural and welfare” expenditures, most particularly for education and redistribution of income. He felt that as a result of social progress citizens are more concerned about distributional issues and these desires would lead to a more equitable distribution of income. Wagner and many subsequent authors assumed that these government activities constituted superior goods with the income elasticity of demand greater than unity. Therefore, as real income increases in the economy, public expenditures for these services rise more than proportionately.

Thirdly, Wagner noted that technical progress and scale economics of production would create a number of private monopolies and that would make government ownership preferable to private. He contended that the increasing scale of technologically efficient production would lead the government to undertake certain economic services of which the private sector could no longer supply. For example, railroad construction required heavy capital investments and could not be provided through private accumulation.

Since the publication of English translations of Wagner's Law, many researchers have examined the empirical verification of the law. Partly due to the vagueness of his own ideas and partly because of the limited translation of his writings, Wagner's Law has been subjected to varying interpretations. Although Wagner's original ideas were broad and his visions were concerned with the historical development of public economy, subsequent researchers have interpreted the law in narrow terms. This is particularly the case as a result of Bird (1971). In his paper, Bird states that "as per capita income rises in industrializing nations, their public sectors will grow in relative importance. ... Wagner's vision

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1 For a recent review article of Wagner's Law, see Gemmell (1993).
of the rise in state activity - and the (assumed) accompanying rise in government expenditures as a proportion of national income... " (pp.70 - 71). This interpretation is concerned with the income elasticity hypothesis: the elasticity of government expenditure to GNP needs to be significantly positive.

Since the mid 1960s, many researchers have adopted two basic statistical approaches to test the validity of Wagner's Law: (i) time-series or (ii) cross-section analysis. The first approach has examined the growth of government expenditures and growth of national income in a given particular country over time. On the other hand, the second approach has examined government expenditure patterns across a number of different countries with different levels of development at the same point in time.

Early studies of Wagner's Law predominantly employed a cross-section approach. For example, Martin and Lewis (1956), one of the earliest analyses of the growth of government expenditure, were concerned with cross-sectional comparisons of government activity at different levels of economic development. During the 1960s, Gupta (1968) and Musgrave (1969) have also used cross-section data. Especially, Musgrave (1969) found that cross-section evidence for high income countries did not support Wagner's hypothesis, and wrote that "the evidence remains puzzling and in need of further explanation..." (pp. 122-124). In the 1970s, Diamond (1977 b) examined the applicability of Wagner's law to Less Developed Countries (LDCs) by analysing the relationship between the relative size of the public sector and per capita income. He divided the comprehensive sample of forty-one developing countries into three subgroups (Africa, Asia, South and Central America) and estimated the income elasticity of public expenditures for those three groups. Empirical results were disappointing and he did not find support for the law in LDCs. Rather he notes that government expenditure in LDCs is influenced by political and ideological factors which cannot be explained
by empirical analysis. In the 1980s, Abizadeh and Gray (1985) also examined the validity of Wagner’s Law with pooled time-series, cross-section data for 53 countries grouped into poor, developing, and developed countries. Although most previous empirical studies have employed a single independent variable to reflect the level of economic development, they have included additional industrialisation measures (such as agricultural ratio, openness and the development of financial intermediaries) in their model. They found that Wagner’s Law only applied to the developing countries. Wagner’s Law was not relevant for highly developed and underdeveloped countries.

Due to the non-availability of long-term time-series data, cross-section analyses have been used to test Wagner’s Law. However, these cross-section tests of Wagner’s Law have been criticised because Wagner's thesis is essentially a dynamic law describing the growth of government over time within a country. Especially, Bird was critical about cross-section studies and noted that “there is nothing in any conceivable formulation of Wagner's law which tells us country A must have a higher government expenditure ratio than country B simply because the level of average per capita income is higher in A than B at a particular point in time. ... Inferences drawn from international cross-section comparisons ... are thus completely irrelevant” (Bird, 1971, p.10).

Time-series studies of Wagner’s law have been carried out for the United States, the UK, Germany, Canada and many other countries.

After examining the early empirical studies of the law, Bird (1971) concludes that "it appears that Wagner's law holds in aggregate terms for most periods of all countries mentioned, and... the evidence, such as it is, must be considered mildly favourable to Wagner's law" (p.8). For developing countries, Goffman and Mahar (1971) have studied the public expenditure behaviour of six Caribbean countries and have found that Wagner’s law could not adequately explained the growth pattern of government expenditures in these countries. Rather, as determinants of
public expenditures in developing countries, they have suggested the importance of other factors such as the demonstration effect and the rapid changes of political philosophy.

It was Gandhi, V.P. (1971) who suggested the five different versions of Wagner's law that have been empirically examined. Although the validity of these studies remains controversial, subsequent researchers have examined several different formulations of Wagner's hypothesis. In particular, Mann (1980) has undertaken an econometric test of Wagner's law for the case of Mexico with six different versions, and found weak support for Wagner's hypothesis. Although Mann's study has suffered from numerous econometric problems, subsequent researchers have concentrated on a test of Wagner's Law with these six alternative formulations.¹

Until the early 1980s, most researchers have used nominal values to test Wagner's Law. If the relative prices between the private and public sector remain unchanged, the choice will not make any difference. But due to the relative price effect, the income elasticity of government expenditures estimated by nominal ratio would result in biased outcomes.

Beck (1979, 1982, 1985) have argued that since the price of public goods has been rising more rapidly than the price of private goods, the real size of the public sector has declined in some industrialised countries. This hypothesis was endorsed by Pluta (1981). Using similarly weighted government expenditure data for twenty developing countries, Pluta (1981) also finds the declining real public sector size in some developing countries. They note that test of Wagner's Law using nominal values is liable to produce biased outcomes.

Recently, Ram (1987) has overcome these problems by using real income data for 115 countries during 1960-1980. By using the Summers-Herston data, Ram

¹ Problems of time-series econometric tests for Wagner's Law will be discussed in more detail in Chapter 4.
calculated the elasticity of government expenditure to GDP and found that "the cross-section results seem to refute Wagner's hypothesis, but in time-series analysis the hypothesis seems to be supported in about 60 per cent of the countries and rejected in the other 40 percent" (p.203). More recently Gemmell (1990), using more updated real income data during 1960-1985 for 117 countries, tests Wagner's law. Compared with Ram's study, Gemmell finds only about 7 per cent support for Wagner's law. He argues that Ram's study is biased because of the omitted variables such as the relative price or population effects.

Although Wagner's Law contained many insights about the growth of public expenditure during the process of development, his model has suffered from many criticisms on the theoretical foundations.

In the first place, Wagner's model was framed to explain the growth of public expenditure on the historic context of nineteenth century Europe, especially a newly united and urbanised Germany. Wagner's observations occurred in a period of technical progress, rapid urbanisation and a democratisation of society. Therefore, Wagner's model cannot explain the growth of government during periods of static and declining growth of economies. In particular, as argued by Peacock and Wiseman (1961), Wagner did not take war into account.

Secondly, as pointed out by Bird (1971) and Afxentiou (1982), Wagner's law was formulated within his teleological view of how the state ought to operate as the economy developed. Wagner assumes that the process of social development leads inevitably to the growth of the public sector not as the result of individual and organisational choices. Therefore, Wagner supports the organic theory of the state which embodies a general-will of its own preference. From this perspective, the state has its own preferences, and it is somehow superior to those of the individuals who make up the state. Due to this kind of view, Wagner's model did
not contain a theory of public choice and Wagner ignored the collective decision making process.

Thirdly, it has been argued that Wagner's model is a demand side explanation of the growth of public expenditure. Although Wagner was aware of the problems of financing public expenditures, his argument was largely confined to the demand side for public goods and services. We need to incorporate supply side explanations into Wagner's model.

1.1.2 Displacement Effect

While Wagner attempted to generalise the behaviour of government spending by examining the growth pattern of public expenditure during the process of development, Peacock and Wiseman (hereafter P-W) adopted an inductive approach to explain the growth of public expenditure in the UK. In contrast to Wagner's demand side approach, P-W introduce the supply side into the public expenditure determination process and treat the growth of government spending as the direct result of social disturbances - most notably by war. P-W reject Wagner's theory of the organic state and emphasise the political nature of the decision making process, namely that 'governments like to spend more money, that citizens do not like to pay more taxes, and that governments need to pay some attention to the wishes of their citizens' (P-W 1961, p.xxxiii). Before the modern public choice theory was well established, P-W tried to analyse the growth of government expenditure in the UK with a public choice perspective.
By looking at the time-pattern of British public expenditure over the period of 1890-1955, P-W observed that public expenditure in the UK grew in discrete steps rather than continuously and the pattern of growth was characterised as a discontinuous series. Especially, during the period of social upheaval, the pattern of government expenditure would be disturbed. After the disturbance is over, public expenditure does not fall to the pre-disturbance level. Rather public expenditure is displaced upwards and remains on a much higher plateau level. P-W referred to this upward shift in public expenditure as the "displacement effect". Their own definition of the displacement effect is as follows:

"When societies are not being subjected to unusual pressures, people's ideas about tolerable burdens of taxation, translated into ideas of reasonable tax rates, tend also to be fairly stable. — There may thus be a persistent divergence between ideas about desirable public spending and ideas about the limits of taxation. This divergence may be narrowed by large scale social disturbances, such as major wars. Such disturbances may create a displacement effect, shifting public revenues and expenditures to new levels. After the disturbance is over new ideas of tolerable tax levels emerge, and a new plateau of expenditure may be reached, with public expenditures again taking a broadly constant share of gross national product, though a different share from the former one" (P-W, 1961, p.xxiv).

From these P-W's arguments, we can find that the major explanation of the displacement effect lies in the concept of the tolerable burden of taxation. According to P-W's view, people can have ideas about the desirable level of public expenditure which are quite different from their ideas about tolerable burden of taxation. In normal times, people's ideas about desirable burdens of taxation tend to be fairly stable. However, during the period of crisis, people would accept new ideas of tolerable tax levels, and generally become
more tolerant to a higher level of taxation. This rising level of taxation results in a further shift in the level of public expenditure - a new plateau of public expenditure.

In P-W's view, there are two aspects of the displacement effect. On the one hand, there is an inspection effect. Wars and social disturbances impose new obligations on governments and this leads to more emphasis upon the collective provisions of public services such as payments of pensions, debt interest and other social service benefits which were not identified before. On the other hand, P-W also argued another effect, called the concentration process. This process relates to the tendency of the concentration of power over public expenditure in the hands of central government. P-W view the period of social upheavals as increasing pressures for the process of public expenditure centralisation.

In their original study of public expenditure growth in the UK, P-W simply plotted the growth pattern of public expenditure against time and did not attempt to test the statistical significance of their displacement hypothesis. As they wrote "our speculations were not always stated in unambiguous fashion from the point of view of testing and our general empirical method was the visual inspection of charts" (P-W, 1979, p.13). Subsequent researchers, however, have employed econometric techniques to test the validity of displacement effect. As Tussing and Henning (1979, 1991) point out, statistical tests of the displacement hypothesis fall into two groups; the first group has tested parameter stability across sub-periods and the second group has used time and dummy variables.

Gupta (1967), the first to devise statistical tests for the P-W hypothesis, examined the displacement hypothesis by testing whether significant shifts had
occurred in the absolute level of public expenditure for periods of time before and after social upheavals (especially War and the Great Depression). He interprets the displacement effect as implying the possibility of an upward shift as well as change in income elasticity of public expenditure after social disturbance. He finds significant differences in both slope and intercept parameters before and after disturbances. In contrast to Gupta, Pryor (1968) adopted a simple dummy variable technique to test the displacement hypothesis. To capture the effect of time on public expenditures, he includes time as an explanatory variable in his model. On the basis of his empirical studies, he concludes that "the displacement which occurred was entirely due to increases for defence and war related purposes" (Pryor, 1968, p. 445).

Diamond (1977), a colleague of P-W, reviewed the displacement literature and criticised those previous empirical tests of the hypothesis. According to his own words; "the Peacock-Wiseman analysis of displacement can be interpreted as a theory of the "structural break". Thus the ceteris paribus assumption that tastes, preferences, and institutions remain constant is denied" (p.396). Later, this interpretation is also asserted by P-W and P-W state that "they ignore supply considerations and/or they use econometric techniques appropriate to the evaluation of marginal changes. ... The P-W displacement effect is a theory of structural breaks. ... It is the changes in these parameters that constitute the 'break' " (P-W, 1979, p.16).

Since P-W and their colleagues have revised their original view of the displacement hypothesis as a structural break or structural theory, many subsequent researchers have examined the hypothesis by studying whether the values of the parameters of the relevant expenditure functions will be changed between the periods before and after the social disturbances. Most recent
empirical studies\textsuperscript{3}, using econometric techniques, have produced somewhat conflicting results about the existence of displacement effect generated by the crisis. This lack of evidence for the displacement effect casts doubt on the general applicability of the hypothesis to explain the time pattern of public expenditure in many countries. Furthermore, there have been many criticisms about the precious meaning and validity of the displacement effect hypothesis.

If the P-W hypothesis is concerned solely with the shifts in public spending caused by the World Wars, then the hypothesis does not seem to be useful in explaining the growth pattern of government expenditures in certain post-war periods. Since government expenditure has grown substantially during the past half century in many western developed countries, the P-W hypothesis cannot be used to explain the growth of government spending in the 1960s and 1970s in western countries.

In addition to this problem, there has been great confusion about what is meant by a "displacement". As Diamond (1977) points out, different researchers have different views of what a 'displacement' is and how to define a 'social upheaval'. Originally, P-W (1961) considered war as the most pronounced form of social upheaval. Subsequent researchers, however, have extended the concept of social disturbances to include other types of the crisis such as; the Great Depression (Gupta (1967), Bonin et al. (1969)), a non-global crisis (Nagarajan (1979)), the world-wide recession of 1974-5 (O'Hagan (1980)), internal revolution (Bahl, Kim and Park (1986)), and even two oil crises (Nomura (1991)). Those different interpretations of the hypothesis have led to great confusion when trying to test for the hypothesis and have produced conflicting evidence of the displacement effect.

\textsuperscript{3} See, for example, Tussing and Henning (1979), Tussing and Henning (1991), Henrekson (1993)
1.1.3 Development Model

This approach to the growth of government is best represented by the works of Herber (1967), Rostow (1971) and Musgrave (1969). Those authors distinguish between several stages of economic growth and examine the changing role of the public sector during the process of development. The concern of those studies is to explain the relationship between public expenditure and the level of economic development. For them, the process of economic development is a major determinant of the observed tendency of public expenditure growth.

Herber (1967) argues that since Wagner's law is concerned with industrializing countries, the discussion of the hypothesis should be restricted within the limits of such progressive nations. Further, he suggests that the relative size of government may even fall depending on the particular stage of economic growth.

Herber proposes a three-stage theory of public expenditure growth. He distinguishes between three stages of development; i) the pre-industrial stage, ii) the stage of industrialisation, iii) the post-industrial stage. According to his view, subsistence goods such as food, clothing and housing which are provided by the private sector would be more vital to the consumers than public goods at the pre-industrial stage. Thus, in the first stage of economic development, the real output of the private sector tends to increase by a larger amount than the output of public goods.
In the second phase, when the economy enters an industrialisation stage, Wagner's law comes into effect. Public expenditures play an important role at this stage and the public sector provides social infrastructure overheads such as communications, transportation, education and other investments in human capital. Since these social capital items are provided by the public sector, there would be a more than proportionate rise in government spending (income elasticity of public expenditures is greater than unity).

Finally, the economy enters the third stage of development, the post-industrial phase. Government has already provided those economic goods which it could supply with an efficiency advantages, and society may be resisting a "too large" public sector. Thus, for Haber's view, the relative size of government is expected to decline during the post-industrial stage.

Although Haber's stage theory seems to be inspired by the Rostow's stage hypothesis, Haber's model of public expenditure growth is different from and even contradictory to Rostow's model.

Haber's stage - 1 seems to include Rostow's first two pre-take-off phases. In Rostow's model, the public sector plays an important role at the early stages of development for providing some minimum essential social infrastructure to develop the economy from pre-take-off into the middle stages of economic growth. Since public capital formation is of particular importance at those stages and public sector investment as a percentage of the total investment is found to be high, there would be a more than proportionate rise in government expenditure.

In the third stage, Herber expects that the proportion of government expenditures to GNP tends to fall in the post-industrial period. In contrast, Rostow's claims are that after the economy enters the maturity stage the appropriate structure of public expenditure will be changed from expenditure on infrastructure to increased expenditures on education, health and social welfare.
services. Beyond the drive to maturity, the economy reaches the stage of high mass-consumption. In this stage, government must deal with welfare and growth problems and public expenditures for those items (such as income maintenance programmes and policies designed to redistribute welfare) will grow significantly relative to other items of public expenditures and also relative to GNP. Thus, in Rostow's model, the relative size of government is expected to increase during the post-industrial stage.

Like Herber and Rostow, Musgrave (1969) proposes a development model of public expenditure growth. Musgrave's model, however, seems to be the most prominent one because he suggests a more detailed model which can explain the changing role of the public sector during the development process. 4

To explain the different budgetary function at each stage, Musgrave distinguishes between three stage of development and also disaggregates government expenditures into public consumption, investment spending and transfer payments. With regard to public investment expenditure, he argues that the relative share of public sector investment would increase at the early stage of development because a high level of capital formation is needed to increase productivity in the economy and public expenditures on infrastructure (such as transportation and irrigation facilities) are of particular importance at low level of development. In the middle stage of development, the public sector continues to supply social overhead capital but at this stage public investment is complementary to private investment. Especially, at later stages of development, the ratio of total investment to GNP rises, while the relative share of public investment falls. Musgrave also emphasises the role of public financing because the private saving rate is very low at the early stage of development.

4 For a more detail discussion of Musgrave's model, see Gemmell (1993).
On public consumption expenditure, Musgrave claims that as the economy develops, more resources need to be devoted for government consumption expenditure because government consumption goods satisfy secondary needs as opposed to private expenditures. He argues that as private consumption increases it would require complementary public services to provide adequate facilities and that the growing complexity of economic organisation would also create another kind of public activity. Thus, Musgrave suggests that a larger public goods share would emerge over the development period.

Finally, Musgrave examines the changing share of transfer payments during the development process. According to his view, the ratio of transfers to GNP would fall as per capita income rises if the purpose of redistributitional policy is to reduce absolute poverty. If, however, transfer policies seek to reduce relative inequality rather than absolute poverty, the relative share of transfers would remain unchanged over the development process.

In addition to these economic factors, Musgrave also suggests social condition and political factors as the major determinants of public expenditure development. Although he admits the importance of those non-economic factors, Musgrave (1969) argues that the impact of those factors is not predictable like economic factors and writes "The theory of expenditure growth remains a fascinating but somewhat elusive problem. Even if economics factors only are considered, it is difficult to arrive at an expenditure law. ... Disaggregation is needed as hypotheses differ with regard to capital, consumption, and transfer outlays, and the weights of these components are subject to change, so that the overall pattern is left in doubt" (p.122).

Development models are trying to explain the changing pattern of evolution of public expenditures during the course of development. Herber, Rostow and Musgrave have tried to establish certain hypotheses about the behaviour of public
expenditure which can be deduced from examination of a large number of different stages of development. Their views contain a lot of insights in explaining changes in the relative size of government and variations in the mix of public services during the process of development. However, there have been few empirical studies as to why the relative size of public expenditure should rise or fall during the development process. Most of development models have not been tested properly.
1.2 Public Choice Models

1.2.1 The Median Voter Model

Whilst historical-development models outlined in the previous section were useful studies to find out the determinants of government expenditure, they were with few exceptions devoid of any appreciation of the theory of political process. Although these studies have contributed to the explanation of public expenditure, they have been criticised for employing *ad hoc* models with little basis on the theory of public choice. They have, however, pointed to the influence of per capita income, urbanisation, demographic change and population growth. These early studies ignored some important variables which are assumed to be the major determinants of government expenditure in public choice theory.

Public choice theorists apply the same behavioural assumptions of economics (the rational choice paradigm of human behaviour) to the analysis of political phenomena. By examining the demand side of the public expenditure equation and the supply side of the behaviour of government, public choice economists have attempted to develop a credible model of the determination of public expenditure. Based on the public choice methodology, they claim that demand and supply of public policies can be mediated through political institutions. In contrast with the neo-classical approach which assumes the role that perfect competition has played for markets, the public choice perspective emphasises the political decision-making process as an essential component of the government expenditure equation. In public choice analysis, politics and institutions do
matter in determining the level of public expenditure, so that public choice models include the relevant aspects of the institutional structure within which public expenditure decisions are taken. Thus public choice models provide a solid foundation for the analysis of public sector behaviour and also produce testable hypotheses which are most easily translated into an empirical verifiable form. Since public choice models provide a foundation for a theory of political structure, we can use them to judge the desirability of different fiscal institutional designs.

One of the most solidly established models in the public choice theory is the median voter model of Downs (1957) and Black (1958). In the simplest version of the model, if voters have single-peaked preferences about different levels of government expenditures and if political parties provide their proposed levels of expenditures to maximise the probability to win the election, then public expenditure would be the median of the various expenditure levels most preferred by the median voter - in this case the median voter is the decisive voter. Therefore, in the simple median voter model, the most important determinant of the level and size of government expenditure is the preference of the median voter.

Although there had been several early attempts to use an explicit public choice model (such as Bowen (1943) and Downs (1957)), it was the work of Borcherding and Deacon (1972) and Bergstrom and Goodman (1973) that provided an empirically verifiable model of public expenditure. Based on the public choice approach, they develop a more specified expenditure equation - the median voter demand function. The model of Borcherding and Deacon and Bergstrom and Goodman has most widely been used for empirical analysis of public
expenditure. Attention has been given to the estimation of the median voter’s demand function.5

Following the work of Borcherding and Deacon (1972) and Bergstrom and Goodman (1973), the demand function of public expenditure can be written in the following form:

\[ G^* = a T_m^b Y_m^c U_i \]

where \( G^* \) is the quantity demanded of public services, \( T_m \) is the median voter’s tax price of public goods, \( Y_m \) is after tax income of the median voter, \( U_i \) is the error term and \( a, b, \) and \( c \) are parameters.

In this function, demand depends on the median voter’s income and tax price. Since the median voter cannot be identified directly, many studies assume that the median voter has the median income. The tax price is calculated by multiplying the price of unit cost of government services by the tax share of the median voter. Since public output (\( G^* \)) can not be measured directly, we need to calculate the variable on the basis of public expenditures. But due to the scale economies or diseconomies in production and the degree of publicness of collective goods, public expenditures are not a simple linear transformation of public output. The more people join to consume a given public service, the lower will be the level of service consumed by median voter. To evaluate the degree of publicness of public goods, Bergstrom and Goodman (1973) examine the following "crowding" parameter.

\[ G^* = G N^{-d} \]

5 For a recent review article of the median voter model, see Holcombe (1989).
where $G$ is a total quantity of public good, $N$ is the size of population and $d$ is the crowding parameter. If $d$ is zero, $G$ represents a pure public good. On the other hand, if $d = 1$, then it is a pure private good. Intermediate values ($0 < d < 1$) imply quasi publicness or quasi privateness in consumption.

With these qualifications, we can derive the following public spending equation:

$$G^*P^* = a P^* (tP^*)^b Y_m U_i$$

where $P^*$ is the price of a unit of public services.

Although the variables $G^*$ and $P^*$ are not directly measurable, the product $G^*P^*$ (public spending per taxpayer) is observable; it is public expenditure. The price of $P^*$ of a unit of $G^*$ is equal to $PN$, where $P$ is the price of a unit of $G$. After substitutions are made and taking a logarithmic transformation, we can write a government expenditure function for the median voter:

$$\log E = a + (1+b) \log P + b \log t_m + d (1+b) \log N + c \log Y_m + U_i$$

where $E$ is the level of public expenditure (i.e. $G^*P^*$).

From the above equation, per capita public spending (in real term) may be written as:

$$\log (E/N) = a_0 + a_1 \log (Y_m/Y) + a_2 \log t_m + a_3 \log P + a_4 \log N + U_i$$

where $Y_m/Y$ is the median level of income relative to average incomes.
From these public expenditure equations, we can estimate the coefficients econometrically; the price elasticity of demand (b), the income elasticity of demand (c) and the congestion parameter (d).

We can also identify the following explanations for the relative growth of government expenditure:

i) per capita income increase and the income elasticity of public expenditure is greater than unity

ii) redistribution of income will raise the median relative to the mean ( a₁ > 0 )

iii) changes in tax structure may result in a decrease in the tax burden of the median voter ( a₃ < 0 )

iv) due to the Baumol effect ( a₃ < 0 )

v) due to low publicness of public goods ( a₄ > 0 )

Many researchers have estimated public expenditure equation by using a variety of data sets and there have been a wide range of values reported in the literature. According to Rubinfeld's study (1987, p.608), estimates of the price elasticity of demand are generally very low, lie between -0.2 to -0.4. The income elasticity of demand for public goods varies from about 0.4 to 1.3 but most are substantially less than 1. The empirical results of estimating the median voter model are not conclusive; in some cases, the evidence is consistent with the model but in many others, the results are inconsistent with the hypothesis. For example, many early studies have found support for the median voter hypothesis; examples are Pommerehne and Schneider (1978, p.389)⁶, and

⁶ The resulting equation in the Pommerehne and Schneider model is

\[ \log (E/P) = -11.09 + 1.29 \log Y_m - 0.70 \log tm - 0.63 \log P \]

\* (6.97) (10.84) (7.93)
Inman (1978). In contrast, Jackson (1990) has tested the model using time series data for the UK, France, Canada and the USA and has found disappointing results.

Although the median voter model provides many useful insights in explaining the growth of public spending, it has suffered from a number of criticisms. First, there is the problem of identification of the median voter. Given some strong assumptions such as identical tastes, monotonic relationship between income and public spending, the median voter is the person in the community occupying the house of median value or receiving the median income (Bergstrom and Goodman, 1973). However, if the demand function for public goods is not monotonic or if voters have different tastes, then we cannot identify the median voter in this way. The actual identity of the median voter still remains a serious problem for the empirical testing of the model.

Second, the problem in the estimation of the demand function for public goods arises if public expenditures are financed by distortionary taxes. On the method of finance, Borcherding and Deacon (1972) simply assume that public goods are financed by non-discriminatory taxes and the tax share of the median voter is $1/N$ where $N$ is the number of population. However, Wildasin (1989) argues that when public goods are financed by distortionary taxes, these tax distortions lead to errors in the estimation of the demand function. According to his criticism, if there exists a marginal cost of public funds, the estimated coefficients of the elasticity will be biased and will not reflect the median voter demand. In these circumstances, the true tax price is not just the tax share of the median voter. It must include the welfare cost of distortionary taxes.

Third, the most important limitation of the model is that the median voter model is clearly only a demand-side model in the public sector. The simple median voter model implies that the public sector produces what the median voters want. Many writers have criticised that the median voter model as being too simple a
framework for the analysis of complex political institutions. The model ignores the supply side of the public sector, especially the role of politicians and bureaucrats. This approach of the political decision-making process is still, however, the subject of disputes. As pointed out by Jackson (1990, 1993), we need to extend the median voter model to include some important aspects of political institutions to develop a complete supply and demand model of the public sector.

1.2.2 Redistribution of Income and Wealth

In the early 1970s, the median voter model was accepted in public choice as descriptive for the analysis of public sector demand. By the end of that decade, however, it has been criticised by many writers. These writers argue that the median voter model ignores the redistributinal aspects of government activities. Especially, since government spending for redistribution has increased rapidly in western industrialised countries, they looked at the expansion of the public sector by focusing the role of the redistributive function of government. They argue that since public expenditure reflects the activities of the welfare state and is also an instrument of redistribution policy, a more credible model of the determination of public expenditure must analyse government's redistributive activities.

Although their study is weakest in its empirical aspects, Aranson and Ordeshook (1981) criticised the median voter model and emphasised the role of redistribution policy in the expansion of the public sector. For example, they make
the following statement: "This redistributive effect of government activities, and especially of regulation, is crucial for modelling the associated political processes. ... The regulatory preference of the median voter now becomes entirely irrelevant, and legislative activity - committee politics - prevails both empirically and theoretically" (Aranson and Ordeshook, 1981, p. 82). As Aranson and Ordeshook point out, public choice theorists need to analyse the redistributive motive of government activity for providing the basic explanation of the growth of public expenditure.

Meltzer and Richard (1978, 1981, 983) develop a more elegant model which emphasises voter's demand for redistribution as an important determination of the growth of government. They assume that all government expenditures have a redistributive component. The voters whose incomes are below the median will vote for an expansion of public spending because they benefit if income above the mean are taxed and public services are distributed to them. Therefore if the median voter's income falls relative to the mean, then the size of government increases. In their model, government grows when suffrage is extended in a country because the extension of the franchise increases the number of voters below the median income who benefit from income redistribution. These new voters will support candidates who favour more redistribution. In the Meltzer and Richard model, increased inequality of income and the extension of suffrage are the main causes for the growth of government. Later, in their article (1983), they found empirical support for their hypothesis.

Compared with other writer's models, Peltzman (1980) has presented the most sophisticated model of the growth of government. While Peltzman also recognises the role of government as a redistributer of income, he analyses the vote-gathering and coalition formation processes more deeply which support the expansion of the public sector. In his model, increased equality of income is a major source of
the growth of government because the more equal the distribution of income among groups, the more bargaining strength they would have and they can articulate support for more public spending. For example, he suggests the growth of the middle class is an important source of government growth. Peltzman argues the spread of education is an important factor in reducing the inequality of income and thus leading to the growth of public spending. Unlike the Meltzer and Richard model which rests on increasing inequality, Peltzman's model emphasises increasing equality of income as a main determinant of the growth of government. Peltzman finds empirical evidence for his hypothesis and his model explains a great deal of the growth of government in several industrialised countries.

Both Meltzer-Richard and Peltzman have examined the role of redistribution policy in the expansion of the public sector. They assume that most government expenditures are aimed at redistribution - even public consumption expenditure on goods and services. In their empirical works, they claim that the data they examine empirically fit their model. Although some other writers do not provide empirical evidence in support of their hypotheses, they also emphasise the role of government as a redistributor of income and wealth (see Brunner (1978), Aranson and Ordeshook (1981) and Lindbeck (1985)).

Although those wealth redistribution models have offered a different explanation for the growth of the public sector, some authors have argued that the pure wealth redistribution model is incomplete because the model ignores some important features of the political institutions. The pure model neglects the role of pressure groups, bureaucrats, and other political and constitutional institutions which affect the size of government. The pure wealth redistribution model needs to incorporate these supply-side factors. Public choice theorists argue that the size of government has increased far greater than is necessary to achieve redistribution. For example, Buchanan and Tullock (1977, p.150) writes "The public sector
may be indeed be "out of control" in the sense that its development is no longer related to the desires of the ultimate purchasers of governmental services."

Due to the multidimensional character of government activities, it is difficult to rationalise all government expenditures as purely aimed at redistribution. For example, the pure wealth redistribution model cannot explain the rapid growth of public employment in the government sector in many developed countries. Therefore, as Mueller notes (1989, p.333), "The hypotheses put forward so far, which attempt to explain the growth of government in simple redistributio nal terms, are inadequate. Some additional elements are needed to complete the story. Two villains often mentioned as instrumental in the growth of government are interest groups and bureaucrats."

1.2.3 Fiscal Illusion

Many authors have introduced the concept of fiscal illusion to explain the growth of government. They argue that if government can design certain methods of public financing that make citizens think they pay less taxes than they actually pay, then fiscal illusion occurs and this illusion leads to an increase in public budgets because citizens do not perceive the true cost of government program. Those writers emphasise the institutional structure of public financing as an important determinant of government expenditure.7

7 For a comprehensive review article of the fiscal illusion hypothesis, see Oates (1988).
Drawing on earlier work by an Italian scholar, A. Puviani, Buchanan (1967) has developed the fiscal illusion hypothesis into a positive theory of government. In his book, Buchanan examined various sources of revenue which are less visible to citizens and can create fiscal illusion. In particular, Buchanan stresses the complexity of the revenue system as a main source of fiscal illusion. According to his analysis, complex revenue structures containing many small taxes rather than a few larger ones will reduce the perceived tax burden and can create illusory effects (Buchanan, 1967, p.135). If, for example, public revenues are raised from a single-base revenue structure, the taxpayer would surely be more conscious of the tax burden associated with public services. However, if public expenditures are raised from a more complex revenue structure, then it is more difficult for the taxpayer to perceive the true tax prices of public services and it is likely that they underestimate their tax burdens. The hypothesis implies that a more complex revenue structure will lead to an expansion in public budget.

Although he does not test the hypothesis with econometric techniques, Goetz (1977) reviews the various forms of fiscal illusion and notes that the revenue structure in which governments raise revenues can affect the level and composition of public budgets. According to Goetz's study, the major form of fiscal illusion comes in the form of indirect taxes and of debt finance which can create illusory effects.

Richard Wagner (1976) attempted the first empirical studies for the fiscal illusion hypothesis, using the 50 largest US local government data. He proxies the complexity of the tax structure by a measure of simplicity: the Herfindahl index.
that is widely used in industrial organisation theory. Wagner's measure of the tax simplicity \((S)\) is written:

\[
S = \sum_{i=1}^{4} R_i^2
\]

where \(R_i\) is the proportion of total city revenues generated from tax source \(i\). The simpler the tax structure, the larger the value of \(S\). In the extreme, if only one tax is used to raise revenue, \(S\) is equal to 1. The fiscal illusion hypothesis posits a negative coefficient for \(S\). Using the Herfindahl index as the measure of the illusion variable, Wagner (1976) finds that the simplicity of tax structure is associated with lower levels of public expenditure, thus supporting the fiscal illusion hypothesis.

While R. Wagner finds empirical evidence for the illusion hypothesis, subsequent econometric studies have produced mixed results. Munley and Greene (1978) re-examines Wagner's model, using a sample of US cities much like that of Wagner. They find that the empirical result is sensitive to the specification of the equation (especially the omission of population), thus the estimated coefficient is not supportive of Wagner's hypothesis.

In another study of public spending for higher education in the US, Clotfelter (1976) finds no correlation between the complexity of the tax structure and the level of public expenditure. The estimated coefficient of the Herfindahl index is not significantly different from zero, suggesting that the fiscal illusion hypothesis does not apply to public higher education. In his empirical study, Clotfelter suggests that a heavier reliance on visible revenue (direct taxation) has a depressing effect on public spending relative to reliance on invisible source (indirect taxation) because in the case of visible revenue, taxpayers have a more
certain perception of the cost of publicly provided goods. Pommerehne and Schneider (1978), using data from the 110 largest Swiss municipalities, have examined the fiscal illusion hypothesis and found that the coefficient of the Herfindahl index had the expected negative sign and statistically significant. In addition to this empirical evidence, they also find that the fiscal illusion effect is much stronger in democracies with referendum compared with no public referenda. Breeden and Hunter (1985) offer evidence for the fiscal illusion model. Using data from 37 large US cities, they have examined the relationship between the tax structure and the size of the public budget. By estimating the commonly cited fiscal illusion model, they found that the coefficient of the Herfindahl index was negative and statistically significant, thus supporting the fiscal illusion theory.

In addition to the revenue complexity hypothesis, Buchanan (1967) also proposes the income elasticity hypothesis and notes that "In a period of rapidly increasing national product, that tax institution characterised by the highest elasticity will tend, other things equal, to generate the largest volume of public spending " (p.65). According to the income elasticity hypothesis, more income-elastic tax structures lead to higher levels of public expenditure because of a fiscal illusion effect. Oates (1975) has done the first empirical studies for the income elasticity hypothesis. Using data from state and local governments in the US from 1960 to 1970, he examined the relationship between tax elasticity and local government expenditure growth. He found a positive and statistically significant relation of tax elasticity with expenditure growth and the effect of tax elasticity on the growth of public spending was most significant at the local level of government. Craig and Heins (1980) also found a positive relationship between the income elasticity of the tax system and the level of expenditure, supporting for the elasticity theory in their test of state government revenue. However, DiLorenzo (1982), using a sample of 66 local governments in the US,
found that expenditure growth was negatively related to an income-elastic tax system. He attributes this to Tiebout-like migration effects caused by a higher tax burden. Based on his empirical evidence, DiLorenzo casts doubt on the validity of the elasticity hypothesis.

From the above discussion, we can see that the empirical results of the various studies of the fiscal illusion hypothesis are somewhat mixed. Many scholars have attempted to develop a model based on public choice theory to explain the hypothesis that the illusion-inducing revenue structures lead to higher levels and rates of growth of public expenditure. They claim that fiscal illusion is another important source of budget expansion. Researchers have offered empirical evidence for the hypothesis. However, in many other cases, the evidence is not consistent with the illusion hypothesis. These mixed empirical results lead Oates (1988) to conclude that "although all five cases entail plausible illusion hypotheses, none of them have very compelling empirical support" (p. 78).

Since there is no strong empirical evidence for the hypothesis, it has been widely suggested that the fiscal illusion hypothesis is not sufficient to explain much of the growth of government in many countries. Especially when we look at the tax revolt in European countries and the United States in the 1970s, it seems doubtful that taxpayers consistently misperceive their prices.

In these respects, the fiscal illusion hypothesis does not by itself explain the whole picture of the growth of government. To explain the complex phenomenon such as the growth of government, the fiscal illusion model needs to be combined with some other alternative hypotheses.
1.2.4 Bureaucracy

The growth of bureaucracy has been claimed by many scholars to be another important source of budget growth. In contrast with demand side explanations such as the median voter model, the bureaucracy model focuses on the influence of bureaucratic power in determining the level and relative size of public expenditure. For example, the median voter model of the demand for public expenditure assumes that politicians and bureaucrats are neutral, and they do not exercise their independent power over how much public output to be produced. However, the demand side analysis of the determinants of public expenditure has been criticised as somewhat unrealistic because that approach ignores the discretionary power of governmental and bureaucratic agencies.

For the last several decades, many writers have argued that bureaucrats are motivated by their own self-interest and they also have their own preferences. These writers have also asserted that bureaucrats are budget-maximisers and bureaucrats' preferences influence the size and the growth of public expenditure. Therefore, many analysts have attempted to extend the simple demand side model to include the bureaucratic influence on public spending levels.

The most widely cited economic model of bureaucracy is that of Niskanen (1968, 1971, 1975). In contrast to the traditional approach to public administration which emphasises the public interest as the distinguishing characteristics of bureaucrats, Niskanen presents a formal model of bureaucracy based on a public choice perspective. Niskanen's approach is that the bureaucracy can be modelled in much similar ways to those employed by economists studying the behaviour of individuals in the private business. Since Niskanen was the first
who studied the influence of bureaucrats on budget growth within the public choice framework and his model was widely used as an analytic approach to the bureaucracy, we will examine his model of bureaucracy in this section.

The Niskanen model rests on the following two central assumptions: (1) bureaucrats maximise the size of their budgets subject to the constraint that the budget must cover the costs of production. (2) bureaucrats possess both discretionary and monopoly powers over the supply of their outputs. Under these assumptions, Niskanen proposes the budget-maximising bureau model which implies that bureaucrats would maximise budgets as a way of maximising utility. In his model, power, pay and prestige are all assumed to be positive functions of the bureaucrat's budget. According to his own words, "salary, perquisites of the office, public reputation, power, patronage, output of the bureau, ease of making change, and ease of managing the bureau. All of these variables ... are a positive monotonic function of the total budget of the bureau during the bureaucrat's tenure in office" (Niskanen, 1971, p.38). In short, the main implication of Niskanen's model is that bureaucrats use their monopoly powers in order to increase budget and output levels that are above the socially optimal level. Budgets will be excessive in the Niskanen model.

Like other economic models, Niskanen's model is built around the notion of supply and demand. The Niskanen model can be stated more formally in the following terms.

Demand for the bureau's output is assumed to come from the legislature. The legislature places a value on different levels of output and offers a schedule of budgets, B, equal to this total evaluation. The legislature's budget evaluation function represents the maximum budget that the legislature is willing to grant to
the bureau for a specific output. This produces the legislature's budget evaluation
curve (TB) such as:

\[ TB = aQ - bQ^2 \quad (a \text{ and } b > 0) \quad (1) \]

where \( Q \) is the level of bureau output
\( a \) and \( b \) are constants

On the supply side, output is produced by a monopolistic bureau whose head is a
budget-maximising bureaucrat. The cost of producing each level of output
(TC) is given by:

\[ TC = cQ + dQ^2 \quad (c \text{ and } d > 0) \quad (2) \]

It is assumed that the cost of producing output is known only by the bureaucrats
and not by the legislature, i.e. the distribution of knowledge is asymmetric. The
legislature knows the public benefit schedule but they cannot see the true cost of
providing public services. Thus the bureaucrat acts to secure the largest budget
that he can for his bureau, subject to the constraint that he must be able to deliver
the \( Q \) which he promises. How do legislatures and bureaucrats interact to arrive at
a decision? As clearly indicated in his model, Niskanen regards the bureau to be a
monopoly supplier of \( Q \) while the legislature is a monopoly buyer (a monopsonist).
The relationship between the bureau and the legislature is seen as one of bilateral
monopoly. But, in his book, Niskanen (1971) goes further and argues that
"although the nominal relation of a bureau and its sponsor is that of a bilateral
monopoly, the relative incentives and available information, under most
conditions, give the bureau the overwhelmingly dominant monopoly power"
(p.30).
The conclusions of the Niskanen model can be derived from the bureaucrat's constrained optimisation problem. That is the budget to be maximised subject to the constraint that the budget must cover the cost of production:

\[
\begin{align*}
\text{Maximise} & \quad TB = aQ - bQ^2 \\
\text{Subject to} & \quad aQ - bQ^2 = CQ + dQ^2
\end{align*}
\]

Optimality from the first order condition requires that the marginal benefit equals marginal cost

\[ MB = MC \]

Differentiating (1) and (2), the socially optimal level of bureau output (or the legislature's optimum) is given by:

\[
\begin{align*}
MB &= a - 2bQ \quad (3) \\
MC &= c + 2dQ \quad (4)
\end{align*}
\]

Solving for \( Q \) from the equality of (3) and (4) produces

\[ Q = \frac{1}{2} \frac{a - c}{b + d} \]

In contrast with the legislature's optimum, the bureau optimum in the budget-constrained condition is given by the following condition:

\[ TB = TC \]
Solving for $Q$ from the equality of (1) and (2) gives

$$Q^* = \frac{a-c}{b+d}$$

Therefore the bureau tends to produce twice as much output as the social optimum ($Q^* = \frac{1}{2} Q$).

From the above discussion, we can see that there are two solutions to the budget output decision, depending on the prevailing cost and demand conditions. These are illustrated in Figure 1.1.

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**Figure 1.1 Total Evaluation Function and Alternative Total Cost Functions**

[Graph showing the Total Evaluation Function and Alternative Total Cost Functions with annotations for efficient solution, cost constrained solution, and demand constrained solution.]
To derive the social optimal condition, we need two additional assumptions: that the legislature's total evaluation of Q is an accurate reflection of the underlying society's evaluation, and that the cost used represents the minimum social costs of supplying Q. (1) Under these assumptions, the social optimum occurs where the marginal social benefit to the legislature equals to the marginal social cost of supply. In Figure 1, this is where the slope of total evaluation function (B) equals the slope of total cost function (C). The social optimum occurs at $Q = \frac{(a-c)}{2(b+d)}$. (2) Under the cost-constrained conditions, the bureaucrat can secure the level of output for which the budget is large enough to cover costs. It corresponds to $Q=\frac{(a-c)}{(b+d)}$ and it is twice the social optimal output. (3) Under the demand-constrained conditions, the bureau will make the unconstrained choice and secure the maximum budget $Q=a/2b$. This is the maximum budget that the bureaucrat can secure and it produces an even greater amount of social waste.

The Niskanen model has provided a large set of hypotheses concerning the level of government budgets, the production efficiency of bureau and the consequences of the bureaucratic structure. The main implication of his model is that when government services are supplied by monopolistic bureau, then the level of public output and the budget size will be higher than that which is socially optimal. In the pure Niskanen model, government will be too large. Niskanen's results provide some important policy implications to those who wish to find alternative institutional arrangements that have a capacity for improving social efficiency. Niskanen's model also suggests that there will be efficiency gains on moving away from monopoly bureau and towards competitive market supply.

While Niskanen was the first who proposed the budget maximisation model within public choice framework, and his work was widely cited in the bureaucracy literature, many scholars have criticised the central behavioural assumptions of Niskanen's simple model. In particular, many commentators
have raised questions about the two assumptions and suggested that those assumptions are unrealistic and cannot be acceptable. They have altered the original simple Niskanen model and attempted to incorporate a more complex bureaucratic motivation into a revised model.

The basic criticism of Niskanen's model has centred around the assumption of budget maximisation. As clearly pointed out by Niskanen, it is assumed that there exists a positive monotonic relationship between the size of budget and the salary of bureaucrats. But many authors have argued that this assumption is too narrow and bureaucrat's salaries are not solely a function of the size of the budget. For example, in the USA, Breton and Wintrobe (1975) assert that the salary of bureaucrats and other benefits may be greater in the small bureaux than in larger ones. In the Canadian government, they also find that the salaries of bureaucrats in the Department of Finance are greater than in much larger bureaux such as Health and Welfare. Furthermore, they argue that some bureaucrats may prefer budget cuts as a means to their promotion.

After examining the UK civil service, Jackson (1982) notes that "Moreover, if, as in the UK, the bureaucrat's salary, perquisites etc. are not related to budget size" (Jackson, 1982, p.133). He asserts that the salaries of UK bureaucrats is fixed irrespective of the size of the bureau's budget. Later, Jackson (1985) has also criticised Niskanen's specification of the bureaucrat's utility function. According to Jackson's view, the bureaucrat's utility function is much more complex than those proposed by Niskanen and bureaucrats may pursue other goals such as a relative expansion of slack instead of large budget. In his own words, "some bureaucrats might prefer to maximise their leisure time - in particular their 'on the job leisure'. This organisational slack or economic rent will be taken out in the form of long lunch breaks, unnecessary and lengthy committee meetings and an avoidance of change" (Jackson, 1985, p.184).
Migue and Belanger (1974) have also attacked the simple Niskanen model and pointed out that if the increase in the budget size comes at the expense of other utility enhancing items such as a quiet life, bureaucrats are not necessarily budget maximisers. Using the notion of organisational slack, they have revised the simple Niskanen model to include some other motives (such as economic rents, excess revenues or discretionary profit) that limit the bureaucrat's desire to maximise the size of budget. Since the Migue-Belanger model of bureaucracy, the pursuit of slack, X-inefficiency and risk aversion have been put forward as the most plausible goals of bureaucratic behaviour. For this reason, many analysts have argued that the complex nature of the bureaucrat's preference function makes it impossible to deduce any behavioural characteristics of public bureaux.

Aside from the problem of the budget maximisation hypothesis, many criticisms have focused on the assumption of bureau bargaining power. In Niskanen's model, bureaucrats posses the monopoly power over the supply of their output. Niskanen assumes that the bureau is a monopolist supplier of public services, and only the bureau knows the true cost of producing output. Due to informational advantage, bureaucrats posses overwhelming bargaining power in relation to the sponsor and they are in a position to make an all-or-nothing offer to the sponsor that maximises the bureau's budget. The bureaucrat is all powerful in the pure Niskanen model, whilst the sponsor has very little power.

However, a large group of writers has argued that this is empirically unacceptable assumption. Breton and Wintrobe (1975) have pointed out that sponsors posses monitoring devices which enable them to control the bureau's budget maximisation. They argue that sponsors will invest in devices to reduce

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8 For a more detail discussion of X-inefficiency and slack resources, see Mueller (1989, p.257) and Wyckoff (1990).
the bureau's budget. These monitoring devices include the close examination of proposed budgets, the creation of budgetary watchdog agencies and the use of various monitoring agencies.

In the similar way, McGuire (1981) suggests that sponsors have more information and power than bureaucrats because sponsors in the US local government are heavily involved in the budgetary process and they are more educated about the production function of local public services than bureaucrats. McGuire also finds that price elasticities of demand for public services are almost less than unity and these empirical results are not consistent with Niskanen's model that bureaucrats seek to maximise budgets.

Moreover, Miller and Moe (1983) have emphasised the role of the sponsor in determining the size of budget. They argue that if the sponsor can conceal his demand from the bureau, then the sponsor is able to control the bureau's budget. To curb over-provision caused by bureaucrats, Miller and Moe stress a legislative constraint on budget maximisation.

In contrast to the US bureaucrat of Niskanen's model, several British scholars, led by Jackson (1981, 1985) and Cullis and Jones (1993) argue that there are more checks and accountability for the bureau in the UK. Jackson emphasises the role of the legislature and the complex organisational structure in the UK budget system such as the Westminster model and the Cabinet decision-making process.

Although Niskanen's model has come under attack, some empirical studies have been done to test the budget maximisation hypothesis. One difficulty with testing Niskanen's model is that it requires the optimum size of public budget. In a review article, Niskanen (1975, p.638) himself notes that "no available study, to my knowledge, directly addresses the oversupply hypothesis". However, some indirect tests have been done by several analysts.
For example, Deacon (1979) have examined the cost difference between the private and public sector and found that non-competitive local government in Los Angeles can increase budgets by as much as 25 percent.

Borcherding (1977) also offers evidence that the public sector producers charge higher prices than the competitive suppliers. He also finds that the cost differentials between private and publicly owned firms will be narrowed if the public producers face more competition. These findings lead him to conclude that "it appears that waste is directly related to a bureau's monopoly power. The removal of an activity from the private to the public sector will double its unit costs of production" (Borcherding, 1977, p.62). Borcherding's conclusion implies that competition may force the bureaucrat to reveal his true cost function to legislature which allows them to control the bureau's budget.

Romer and Rosenthal (1978, 1979 a, 1982) have found empirical evidence for the Niskanen model. Using the notion of a 'reversion budget', they have analysed the formation of school budgets in Oregon. In Oregon school districts, school boards can increase the budget size by proposing larger budgets at an annual referendum. If the proposed budget fails, the budget reverts back to the level set by law, so that if the reversion level is below the level favoured by the median voter, the larger budget is accepted. According to their empirical studies, referenda pass budgets from 16.5 to 43.6 percent higher than most preferred by the median voter. Romer and Rosenthal's studies have provided the most strong empirical evidence for the budget maximisation hypothesis.

Most empirical studies for Niskanen's model have dealt with the case in the USA. Recently, however, Cullis and Jones (1993) have tested the Niskanen model in the UK. Using annual data for the period 1948-89 in the UK, they have examined the relationship between the number of bureaucrats and the relative size of government and found that the growth of bureaucrats in the UK has a negative effect on the share of government in national income. Based on
these empirical findings, they conclude that "while bureaucrats cannot be cast as paragons of all economic virtues, they are surely not repositories of all economic vices either" (Cullis and Jones, 1993, p.101).

Similarly, after examining the empirical evidence in support for the budget-maximising model of bureaucracy, Conybeare (1984, p.486) notes that "In general, the empirical studies offer little support for the budget maximisation hypothesis."

Public choice model of bureaucracy has provided an important proposition that the activity of bureaucrats is a significant variable in explaining the growth of the public sector. Many scholars have attempted to develop the economic model of bureaucracy and to analyse the influence of bureaucratic behaviour on public sector budgets. However, as yet, we do not have a well-developed dynamic theory of bureaucratic behaviour. Moreover, the hypothesis that bureaucratic power leads to larger budgets is yet to be tested. Most empirical studies have adopted an indirect method to test the bureaucratic power hypothesis. The study of bureaucracy has just begun to raise some basic questions and to develop models to explain the role of the bureaucracy in the public sector. We need a more adequate model of bureaucracy and further research in this field.
1.2.5 Baumol's Model

In 1967, Baumol proposed a model of unbalanced growth which is now a classic model of public sector growth. In his model, Baumol argued that because government is inherently a labour-intensive sector, productivity increases in government are presumed to be smaller than those for other areas of the economy (which are typically more capital intensive). Because of technological differences between the two sectors and due to low rates of productivity growth in the public sector, there would exist productivity disparities. If so, the relative cost of government services would rise over time, and this could lead to a steadily growing share of the public sector.

Baumol attempted to explain the growth of government by analysing unbalanced growth (or lagging productivity) between the public and private sector. Since the Baumol hypothesis of low productivity has provided a useful insight to explain the relative expansion of the public sector, his model has attracted considerable attention for a wide array of applications. In this section, we will examine the Baumol hypothesis of unbalanced productivity growth.

Baumol (1967) divided the economy into two sectors: one progressive and the other non-progressive (stagnant) sector. The progressive sector is characterised by a cumulative increase in productivity per man-hour, and in this sector, technological progress and innovations cause an exponential rise in output over time. In the non-progressive sector, however, labour productivity increases at a slower rate than that in the progressive sector. An important aspect of the non-progressive sector is that technological change can be introduced only as an exceptional case. Thus, Baumol's model implies that there exists a productivity
differential between the two sectors and the low rate of productivity increases in the public sector is the main cause of public sector expansion.

Since labour is the only factor input in the Baumol model, the productivity differential between the two sectors can be explained by the key role that is played by labour in the production activity. In the progressive sector (for example, the manufacturing sector) "labour is primarily an instrument". Along with innovation and capital accumulation, capital can be substituted for labour without reducing the level of output. However, in the non-progressive sector (for example, the personal service industry and the local public sector in particular), "labour is itself the end product" (Baumol, 1967). In the non-progressive sector, labour services are themselves part of the product and the quality of products is judged in terms of the amount of labour input. If we reduced labour input in the non-progressive sector, the quality of product would be changed.

An example of the problem of introducing technological changes into non-progressive sector was suggested by Alan Peacock (1969, p.325) in the following remarks:

"Removing Judge Brack from the cast of Hedda Gabler would certainly reduce labour input to Ibsen's masterpiece but it would also destroy the product. Nor could one increase the productivity of the cast by performing the play at twice the speed."

Another example is the class size for teachers. As pointed out by Baumol (1967, p.416) himself, teachers cannot be easily replaced by machines because teachers should pay personal attention to the students in the class. Despite some innovations in teaching methods, there is some limit for the class size.

Therefore, the production function of the non-progressive sector is characterised by high labour intensity as compared to the progressive sector. Technological progress for improving labour productivity in the non-progressive sector is limited. These non-progressive activities include the service industries
(such as restaurants, leisure time activity and the performing arts) and a lot of local public services (such as education, health care, police and fire protection). Productivity increases in the non-progressive sector are inherently difficult to achieve and they take place at a slow rate. Due to the innate lack of productivity growth and the limitation of technological change, the unit costs of these services would rise over time relative to those in the progressive sector.

The Baumol hypothesis of unbalanced growth can be stated more formally in the following way. The output of the non-progressive public sector \( X_1 \) is produced only by labour inputs \( L_1 \) which has a constant level of productivity. In the progressive private sector, on the other hand, labour productivity grows at an exponential rate \( r \), which produces an exponential growth in the output of this sector \( X_2 \). Thus, the production functions can be written

\[
X_{1t} = a_1 L_{1t} \quad (1)
\]

\[
X_{2t} = (a_2 e^{rt}) L_{2t} \quad (2)
\]

where \( X_2 \) is the output of the private sector \( L_2 \) is labour used in the private sector, \( r \) is the rate of technological progress, \( t \) is a time subscript, and \( a_1 \) and \( a_2 \) are constant terms.

From equations (1) and (2), we can derive the ratio of non-progressive sector (government) output to total output

\[
\frac{X_{1t}}{X_{1t} + X_{2t}} = \frac{a_1 L_{1t}}{a_1 L_{1t} + (a_2 e^{rt}) L_{2t}} \quad (3)
\]
The wage rates between the two sectors are assumed to be equal, and they increase in line with labour productivity in the private sector. Then

\[ w_t = w_0 e^{\alpha t} \]  \hspace{1cm} (4)

where \( w_t \) is the wage rate in period \( t \) and \( w_0 \) is a constant.

The unit costs in the public sector \((C_{1t})\) follow from equation (4):

\[ C_{1t} = \frac{(w_0e^{\alpha t})L_{1t}}{\alpha_1 L_{1t}} = \frac{w_0e^{\alpha t}}{\alpha_1} \] \hspace{1cm} (5)

The unit costs in the private sector \((C_{2t})\) are

\[ C_{2t} = \frac{(w_0e^{\alpha t})L_{2t}}{(\alpha_2 e^{\alpha t})L_{2t}} = \frac{w_0}{\alpha_2} \] \hspace{1cm} (6)

We can now derive the relative costs between two sectors:

\[ \frac{C_{1t}}{C_{2t}} = \frac{w_0e^{\alpha t}}{\alpha_1} / \frac{w_0}{\alpha_2} = \frac{\alpha_2}{\alpha_1} e^{\alpha t} \] \hspace{1cm} (7)

Hence the unit costs of output in the public sector \((C_{1t})\) will steadily increase with the rise of productivity, while the unit costs in the private sector\((C_{2t})\) will remain constant.
From these equations, we can see some important properties of the Baumol model. First, if the ratio of public sector output to total output (equation 3) is to remain constant, then labour must be transferred from the private to the public sector. Second, if labour resources are transferred from the private to the public sector, public sector exhaustive expenditure of which a large proportion is spent on wages and salaries will rise faster than private sector expenditure because the same money wage rate is paid in both sectors but productivity of the public sector is lagging behind that of the private sector.

In the Baumol model of unbalanced growth, the price of public sector output relative to private sector output will increase over time. Due to differential productivity between the public and private sector, the relative prices of public sector outputs will rise with the passage of time (the cost disease arguments). It has been known in public expenditure analysis as "the relative price effects". In national income accounts, the relative price effect means that the relative price of public sector inputs rises faster than the price of private sector output; i.e. the price deflator for government expenditure rises faster than the GNP deflator. Therefore, in the published national accounts figures, the nominal ratios of government expenditure to GNP tend to rise, while real ratios decline over time.\(^9\)

Since the seminal contribution by Baumol (1967) to the study of public sector growth, many researchers have tested the Baumol productivity disparity hypothesis.

Bradford, Malt, and Oates (1969) were the first who examined the rate of growth of productivity of the public sector. Using data for US cities, they have examined the trend of the unit costs of four local public services (education, police, fire and hospitals). Bradford-Malt-Oates found that due to a low rate of

\(^9\) These statistical ratios of the public sector's share in GNP are discussed further in Chapter 2.
productivity growth, the unit costs of providing these local public services rose at 5 to 7 percent annual rate over the 1947-1967 period and rising costs were much more intense in local governments than those in the rest of the economy. Estimating the changes of the unit costs of public sector output, they have provided indirect evidence for the Baumol model.

Similarly, Spann (1977) tested the Baumol hypothesis and found that "the degree of accuracy is reasonably good" because the model predicts the increased rate of growth in government expenditure for the period 1950-60. Spann also found that the annual price increase of public sector output was 1.5 percent during this period. His empirical results support for the Baumol cost disease hypothesis.

Contrary to the empirical support for the Baumol model, Gramlich (1982) argues that in the US federal government, public sector productivity has risen during the 1970s. By citing some empirical studies (The Civil Service Commission and The Office of Personal Management), Gramlich suggests that there are some positive productivity increases in the US public sector (about 1.2 percent to 1.7 percent over the 1967-1979 period). These positive rates of productivity increases in the public sector lead him to conclude that "there is nothing to activate the Baumol model, and little reason to fear that it will lead to progressively larger shares of output devoted to the public sector" (Gramlich, 1982, p.298).

Pommerehne and Schneider (1982) have tested the Baumol hypothesis of lagging productivity for Switzerland. Using local government expenditures data from 48 Swiss municipalities for the period 1965-1975, they have estimated actual (7.85 percent) and predicted (7.69 percent) growth rate of government expenditure for the 1965-1975 period. They find that the model's overall
performance is good and the results are statistically significant. Their empirical findings are favourable for the Baumol model in Switzerland.

In his original work, Baumol (1967) did not give empirical evidence for the basic model of unbalanced growth. Recently, however, Baumol et al. (1985) offer evidence that the relative price of government sector outputs has risen for at least four decades. Using national account data, Baumol-Blackman-Wolff (1985) calculate sectoral rates of productivity growth in the US economy for the period of 1947-1976. They find that productivity growth in the public sector (especially government industry and government enterprise) has lagged behind that of the private sector by 2.5 percent per year over the study period. This empirical evidence supports the original Baumol model.

The Baumol model has provided a useful insight into why the public sector grows rapidly relative to the private sector. In his model, the cause of unbalanced growth comes from the greater labour intensity in the public sector compared with the private sector. On the supply side, the Baumol model can explain the growth of government exhaustive expenditures with the lagging productivity hypothesis. The relative price effect is also an important determinant of the growth of public expenditure. Many researchers have offered evidence for the Baumol model of unbalanced growth.

However, the Baumol model has suffered from many criticisms. In particular, the Baumol model ignores the institutional influences on the growth of public expenditure. As Peacock and Wiseman (1979, p.12) point out; "We know of no evidence to suggest that technical barriers opposing innovation in the public sector are higher than in the private sector. We suspect that the institutional barriers are greater. --- The theory tells us that bureaucrats are in charge of
productivity operations in which they have a monopoly of supply and a monopoly of information about the way in which supply is produced."

We need to extend the simple Baumol model to include some additional supply side pressures (for example, the role of bureaucrats and interest groups).
1.2.6 The Political Business Cycle

Since the mid-1970s, economists have become increasingly concerned with the political business cycle theory. By studying the behaviour of politicians and the electorate, public choice theorists have attempted to explain the interdependence between the economy and polity. Since its development in modern forms, the politico-economic model has provided some insights into macroeconomic cycles in price, output and employment.

The basic idea which underlies the political theory of the business cycle is that voters have preferences about economic conditions which are reflected in their political behaviour, and that governments aim to win elections which make them vote maximisers, and therefore, governments manipulate the economy in order to increase their chances for re-election. Thus, governments seek to produce the most desirable economic conditions just prior to an election and postpone unfavourable conditions afterward. Instead of being exogenous factors in economic affairs, government behaviour becomes an endogenous variable in the macroeconomic system because governments actively create the election cycle in order to improve their re-election chance.

According to the political business cycle hypothesis, the state of the economy (in particular GNP growth, unemployment and inflation) influences voters attitudes and election outcomes: the worse the economic conditions are, the less the voters support for the government. The political business cycle model predicts
falling unemployment (rising GNP) prior to an election and rising unemployment (falling inflation) afterward.

Since the best known of politico-economic models is the work of Nordhaus, it is worth to discuss the Nordhaus model in some detail. In his provocative paper, Nordhaus (1975) develops the basic model of the political business cycle in its modern form and presents some evidence for his hypothesis. Nordhaus' political business cycle is based upon the following three assumptions. First, the economy is characterized by a Phillips curve. There exists a trade-off between inflation and unemployment. Second, voters are myopic and backward-looking in evaluating economic conditions. They are concerned only with economic conditions (especially the level of unemployment and the rate of inflation) at the time of elections and heavily discount past observations. Finally, governments can manipulate the economy so as to improve their chances of re-election and they do not have partisan objectives.¹⁰

Under these assumptions, Nordhaus shows that the incumbent government stimulates the economy at the election time in order to provide favourable economic conditions, and that the rate of unemployment tends to fall just before the election while the rate of inflation tends to rise as a result of the pre-electoral economic expansion. After the election, the government follows deflationary policies to reduce inflation.

Thus, in the Nordhaus version, governments deliberately cause political business cycles with decreasing unemployment (rising inflation) before the election, rising unemployment (falling inflation) afterward. Cycles in unemployment and

¹⁰ For the contrast between Nordhaus' view and the views of rational partisan theory, see Alesina (1989), Alesina and Roubini (1992).
inflation will be set up and the election cycles will persist as a regular phenomenon. The optimal political business cycle is shown in Figure 1.2. Although the tests are simple in design, Nordhaus (1975) provides reasonable evidence for his political business cycle hypothesis. He finds that, over the period of 1947-72, unemployment rates rise during the first half of incumbencies and fall during the second half of each regular electoral period in three of the nine countries, Germany, New Zealand and the USA.

Figure 1.2 The Political Business Cycle

Note: The figure is purely illustrative. For a more complicated shape, see Nordhaus (1975, p. 185) and Paldam (1981, p.291)
Since the influential work of Nordhaus (1975), a number of attempts have been made to test the political business cycle hypothesis. Most of the empirical work on political cycles has been performed on US data. While many authors have supported the view that macroeconomic economic conditions affect voter behaviour and elections outcomes, the empirical studies which have examined the validity of the political business cycle theory have found mixed results at best.

For example, Tufte (1978) provides favourable empirical evidence that government pursues expansionary policies in election years. He examines the growth of real income in election and non-election years from 1961 to 1972 for the British and American governments and finds that real income has been accelerated more rapidly in the election years than in other years. These evidence are generally consistent with the prediction of the political business cycle hypothesis. Although Tufte does not provide statistical tests, he presents the most favourable results for the Nordhaus' political business cycle model.

A sophisticated econometric test is provided by McCallum (1977). Using seasonally adjusted quarterly US data for the period 1948-1974, he tests for the existence of the electoral cycle. It is assumed that patterns of the electoral variables would be consistent with the general idea of the political business cycle hypothesis. Then, he examines whether the inclusion of a dummy variable provides additional explanatory power and finds that the electoral variable has no incremental explanatory power. With these negative empirical results, McCallum casts doubt on the relevance of the Nordhaus model.
MacRae (1977) also tests the political business cycle theory by a survey data for the four American governments from 1957 to 1972. By examining patterns of unemployment and inflation in the US over the study period, he finds that the political business cycle hypothesis is only confined to the Kennedy and Johnson years and that there is no evidence for the electoral cycle during the Eisenhower and Nixon administrations. These results question the validity of the empirical relevance of the political business cycle model.

More rigorous econometric tests is provided by Beck (1982). Using seasonally adjusted monthly US data, he examines whether the government attempts to manipulate the economy in order to aid in an election; i.e. whether unemployment decreases around election dates. According to his estimates, there was no evidence of falling unemployment before an election. Based on this negative empirical result, Beck concludes that "Macroeconomic series such as unemployment and inflation do not appear to shift as elections approach. ... Business cycles may have a political basis, but that basis must be more complicated than the simple picture Nordhaus and Tufte paint." (p. 208)

The empirical evidence in support of the political business cycle theory is not particularly strong. Although few researchers find weak evidence of the electoral cycle, it is difficult to identify a stable and regular political business cycle. There are various reasons that might prevent governments from behaving as predicted by the political business cycle hypothesis. The derivation of the optimal political business cycle strategy is complicated and governments react differently in different circumstances. Furthermore, if governments do not possess the required information for the economy and if governments cannot manipulate macroeconomic policies to create favourable economic condition before elections, there cannot be a stable electoral cycle. With regard to the behaviour
of governments, partisan theory suggests that different political parties have different preferences over the trade-off between inflation and unemployment. According to this partisan view, different political parties follow different policies which are favourable to their supporting groups and they do not behave in a similar way even before the election.

Reacting to these criticisms, Frey and Schneider (1978 a, b) reformulate the strict political business cycle model and propose a "popularity maintenance model". The basic assumption of the popularity maintenance model is that government maximises its own utility in pursuing ideological objectives. However, in order to put ideological programs into action, a government has to remain in power and seeks to increase its popularity when its re-election chances are low. Consequently, in the absence of a political crisis a government would pursue its ideological goals, and in the presence of a political crisis a government would concentrate on securing re-election purposes rather than pursing its ideological goals. When there is a popularity deficit, a government will undertake an expansionary policy which lowers unemployment and raises the growth of real income. Frey and Schneider's model is more appealing than the strict political business cycle because it recognises that a government would adjust its policy instrument according to its political and economic conditions.

In their papers, Frey and Schneider (1978 a, b) provide empirical estimate of a popularity function which measures the support given the government by the electorate; and a reaction function which shows how government influences the state of the economy in order to stay in power. They measure popularity through Gallop-type opinion polls. The three main macroeconomic variables which influence vote outcome and government popularity are the rate of unemployment, the rate of inflation and the growth rate of real disposable income. Frey and Schneider estimate the popularity (lead) and reaction (policy)
functions and present positive empirical results on the political-economic interactions for the US, the UK and Germany. According to their empirical studies, the state of the economy (represented by unemployment, inflation and the growth of consumption) affects the popularity of the governing party and the government manipulates economic policies (like government expenditure, transfer payments and tax rates) to increase its re-election prospects.

Since the publication of Frey and Schneider's paper, there has been a wealth of empirical research to examine the evidence for the political business cycle in Western democracies. Although many authors have estimated the popularity and reaction functions for various countries, they have found mixed results for the model.\textsuperscript{11}

Table 1.1 lists studies which have examined the relationship between the government popularity and the macroeconomic variables in several industrialized countries. The table shows that economic variables do influence government popularity. Although each variable is not significant in every study, the rate of inflation and of unemployment and the growth of real income have a significant effect on government popularity. For this table, it is seen that the rate of unemployment has a larger effect on government popularity than the rate of inflation. However, the estimated coefficients on unemployment and inflation jump around a bit. For example, in various studies, an increase in unemployment of 1 per cent will decrease government popularity from 0.006 to 6 per cent. An increase in the inflation rate has a smaller impact, varying from 0.004 to 1.95 per cent.

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\textsuperscript{11} The empirical literature on the politico-economic model is too many to be reviewed here. Fortunately, Schneider and Frey (1988) have completed a comprehensive review of it.
<table>
<thead>
<tr>
<th>Country</th>
<th>Author (s)</th>
<th>Inflation Rate</th>
<th>Unemployment Rate</th>
<th>Real Income Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>Fair (1978)</td>
<td>-0.68</td>
<td>----</td>
<td>0.98**</td>
</tr>
<tr>
<td></td>
<td>Frey (1978)</td>
<td>-1.00*</td>
<td>-4.03**</td>
<td>0.52*</td>
</tr>
<tr>
<td></td>
<td>Hibbs (1982)</td>
<td>-0.017**</td>
<td>-0.017**</td>
<td>0.015**</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Frey (1978)</td>
<td>-0.61**</td>
<td>-6.01**</td>
<td>0.81**</td>
</tr>
<tr>
<td></td>
<td>Pissarides (1980)</td>
<td>-0.57**</td>
<td>-4.55**</td>
<td>0.26**</td>
</tr>
<tr>
<td></td>
<td>Hibbs (1982)</td>
<td>0.0038**</td>
<td>-0.21**</td>
<td>0.0081</td>
</tr>
<tr>
<td></td>
<td>Minford-Peel (1982)</td>
<td>1.95</td>
<td>----</td>
<td>0.53</td>
</tr>
<tr>
<td>France</td>
<td>Lewis-Beck (1980)</td>
<td>-1.89**</td>
<td>-0.56*</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td>Hibbs (1981)</td>
<td>0.004**</td>
<td>-0.01**</td>
<td>0.017**</td>
</tr>
<tr>
<td></td>
<td>Lafay (1984)</td>
<td>-0.028**</td>
<td>-0.103**</td>
<td>0.029**</td>
</tr>
<tr>
<td>Germany</td>
<td>Frey (1978)</td>
<td>-0.71**</td>
<td>-0.91**</td>
<td>0.43*</td>
</tr>
<tr>
<td></td>
<td>Kirchgassner (1977)</td>
<td>-0.09*</td>
<td>-0.31**</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>Hibbs (1982)</td>
<td>-0.0044**</td>
<td>-0.006**</td>
<td>0.0051**</td>
</tr>
</tbody>
</table>

Note: * Significant at 0.05 level, ** at 0.01 level, two-tailed tests.
On the complex evidence, there has been a great deal of technical debate about the appropriate statistical techniques and the stability of the popularity and reaction functions. The main criticism is about the problems of model specification and estimation of the equations. For example, Chrystal and Alt (1981) have criticized the Frey-Schneider model for the UK. In their paper, Chrystal and Alt argue that the Frey-Schneider equation is mis-specified and omits some important variables (like the effect of national income) which potentially affect government popularity. In contrast to the Frey-Schneider model, they have suggested a 'permanent income model'.

The other criticism has to do with the stability of the equations. Frey and Schneider assume that the relationship between economic factors and government popularity is stable, and they estimate the popularity function in various countries. However, many studies (Lybeck (1986), Pissarides (1980), Chrystal and Alt (1981)) have found that the relationship between macroeconomic variable and government popularity is not stable and the estimates of the parameters vary between various time periods and various socio-economic groups in a country. Based on these disappointing results, these authors cast doubt on the empirical validity of the politico-economic model.

The theory of the political business cycle is an interesting development in public choice theory and offers some useful insights to understand the difference in the size of government and its growth rate. Although many authors have found mixed evidence or the existence of such cycle, the literature on political business cycle has been widely invoked. We need further research to understand the full politico-economic system.
Chapter 2 Public Expenditure; Definition and Measurement

2.1 Introduction

In recent years, economists have shown interest in measuring the size of government and explaining the main factors which account for its growth. Considerable attention has frequently focused on the relative size of the public sector, the amount of tax raised, the share of government employees in the total labour force, the size of the public sector deficit and the means of its control. All these indicators have been commonly used as measures of government's activity in the economy. However, due to the lack of a commonly agreed measure for capturing overall government size, different researchers so far have used particular (or ad hoc) definitions of these important variables.

Depending on the definitions for the size of government and the public expenditure measure chosen, government size may be seen as increasing, constant or even decreasing. The use of different definitions of public expenditure can lead to different results about the growth of government. For example, if we compare total public expenditure at all levels of government within the Korean national accounts framework, we can observe that absolute size of public expenditure rose from 552.7 billion won in 1971 to 41,873.6 billion won in 1991 - about a seventy fold increase over the period (see Table 2.1). In contrast, if we examine public expenditure as a share of GNP (at
factor cost), we can find a figure of 17.8 percent for 1971 and 22.9 percent for 1991, suggesting a pattern of slow growth (see Table 2.2). In addition, if we use a different measure of the size of government, the different pattern of the growth of the public sector would emerge.

Therefore, before proceeding to examine the theoretical and empirical explanations of the growth of the public sector, we need to properly define and measure the size of government because without an accurate measure it is difficult to evaluate its role in the economy. But many additional problems exist in measuring government activity. As many economists have pointed out, the size of government is multidimensional in nature (see Abizadeh and Basilevsky (1990), Break (1982) and Stibbard (1985)). Due to the multidimensional nature of government size, no single measure can explain all aspects of government activity. Several different measures have been used to explain the importance of the public sector in the economy. In many cases, however, measures of the size of government has been arbitrary. Many statistical measures give an incomplete picture of the size of the public sector and we need to use great care when interpreting those statistical data.

In this chapter, the problems of measuring and defining the relative and absolute size of government will be discussed. By introducing various available statistical data on the size of government in Korea for the 1970s and 1980s, we seek to explain the changes in the level and structure of government activities over the study period.
2.2 What is public expenditure?

The National Accounts - compiled by the Bank of Korea - define the public sector as consisting of general government plus public enterprises. There are relatively few problems about the definition of what comprises the government sector (general government). General government appears in almost all systems of the national accounts and the government sector is usually defined to include central and local government activity. The definitions of public enterprises, however, are more controversial. Different criteria are used in defining public enterprises and there is no general agreement on how to define and measure the scope of public enterprise activity. The activities of public enterprises are not included in the general government sector (A more precise definition of Korean public enterprises is given in section 2.4.1).

According to the Korean national income accounting definition, general government expenditure is defined to include current and capital account activities of both central and local government. Prior to 1970, however, the activities of public enterprises had been included in a limited way by including their gross capital formation as part of public investment. Total government expenditure is the total consolidated spending of general government after netting-off transactions within the public sector. To avoid double counting, transfers between the different levels of government such as central government grants to local authorities are excluded in defining total public expenditure. The resulting
aggregate is referred to as general government outlays, and these general government (central government and local authorities) expenditures have been used for international comparison.

Since the national accounts framework has been used to develop comparative indicators of the size of government in the economy, the most commonly used definitions of general government expenditure have been based upon the national accounting systems. Even though general government expenditures are imperfect indicators of the overall measure of government intervention, the national accounts data on government expenditure can be used in the context of other important macroeconomic variables such as GDP, households' consumption expenditure and implicit price deflators. Furthermore, they measure the scope of the same types of government activity in exactly the same way in different countries. Therefore, the national accounts framework is widely used by international institutions like the OECD, European Communities, the IMF and other international organisations.

Within the Korean national accounts framework, total public expenditure can be divided into the following components.

i) government final consumption expenditure; this item includes the wage and salary payments to general government employees, expenditure on materials used in public production and spending on purchases of the outputs from private producers. Among these expenditures, wage and salaries payments are the most important component.

ii) gross fixed capital formation; this item includes expenditure on government plant and equipment (land, roads, plant and machinery etc.) by general government.
iii) subsidies; this item includes direct payment on current accounts by general government to enterprises both in the private and public corporations.

iv) current transfers; this item includes transfers to the private sector, especially social security benefits such as unemployment insurance payments, pensions and other social funds. And it also includes transfers to abroad (e.g. contributions to international organisations).

v) capital transfers; this item includes unrequited transfers on capital account by general government to the private sector and abroad.

The above items represent the basic elements of total public expenditures on which the Korean national accounts are constructed. The effect of changes in composition of public expenditure is quite different. Public sector consumption and investment expenditure represents the government's claim on the real resources of the economy, and those expenditures are termed as exhaustive or resource-using expenditure. They represent the government sector's real consumption and investment. On the other hand, government transfer outlays such as subsidies, current transfers and capital transfers, represent the transfer of purchasing power from one group to another and those expenditures are referred to as non-exhaustive or non-resource using expenditure. As far as transfer payments are concerned, the government does not involve the direct use of resources. In effecting transfer payments, the government acts so as to achieve redistribution objectives.

The most recently available data on the composition of general government expenditure in Korea are shown in Table 2.1 for selected years 1971, 1981 and 1991. The data include all general government outlays in the form of

68
government final consumption expenditure, gross fixed capital formation and transfer payments.

Table 2.1 Composition of Korean Public Expenditure, 1971-1991

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>In billion won</td>
<td>%</td>
<td>In billion won</td>
</tr>
<tr>
<td>government consumption expenditure</td>
<td>332.2</td>
<td>60.3</td>
<td>5,515.0</td>
</tr>
<tr>
<td>gross capital formation</td>
<td>153.8</td>
<td>27.8</td>
<td>1,993.9</td>
</tr>
<tr>
<td>subsidies</td>
<td>10.2</td>
<td>1.9</td>
<td>343.8</td>
</tr>
<tr>
<td>current transfers</td>
<td>37.1</td>
<td>6.7</td>
<td>813.5</td>
</tr>
<tr>
<td>capital transfers</td>
<td>18.4</td>
<td>3.3</td>
<td>368.5</td>
</tr>
<tr>
<td>total</td>
<td>552.7</td>
<td>100.0</td>
<td>9,034.7</td>
</tr>
</tbody>
</table>

Note: The amount figures in the table are based on current prices.
Source: Bank of Korea, National Accounts, 1990, 1993

As can be seen from Table 2.1, exhaustive expenditures such as government consumption and investment spending represent about 80 per cent of the total

1 In the National Accounts, the Bank of Korea has not provided consistent data on interest payment and net lending and those components are excluded from the figures in table 1. Apart from the National Accounts, the Bank of Korea has compiled another data set for general government expenditure. In Economic Statistics Yearbook, the Bank of Korea has produced data on general government expenditure which includes interest payment and net lending. However these data date back only to 1971. See Appendix.
government expenditure in 1991 while transfer payments account for about 20 percent. We can also find that transfer payments (i.e. subsidies, current transfers and capital transfers) have increased in relative importance over the period; 12.0 percent in 1971 to 20.6 percent in 1991.

2.3 Measuring the size of government

Given a definition of public expenditure based on the national accounting conventions, several measurement issues arise. Because of the multidimensional nature of the concept of the public sector, there is no single accepted measure of the size of government. For different purposes, researchers have used different sets of indicators. For example, the following issues have been discussed in the way of explaining government size and growth. Should we include transfer payments in defining total government expenditure? Should we be concerned with absolute or relative size of government expenditure and if relative size matters, relative to what? Does it make any difference if government expenditures are measured in nominal or real values? This section will focus on the problem of measurement because it is a necessary step in explaining the growth of government in the economy.
2.3.1 Forms of government expenditure

As noted in the previous section, total government expenditure can be broadly divided into two components; exhaustive and non-exhaustive expenditure. Although such a distinction is mainly a national accounting problem, many debates have arisen in connection with the problems of the inclusion of transfer payments in measuring total government expenditure.

Exhaustive expenditures such as government consumption and investment expenditure are resource-using components and those expenditures are exhausted in the sense that those will be consumed over a number of succeeding periods. These activities of government require real resource inputs and represent the government sector's real consumption and investment. Because these expenditures are major components of national income, government consumption and investment spending have been included in both the definition of the national output (GNP or GDP) and total government expenditure.

In contrast, transfer payments and subsidies merely redistribute real resources and these expenditures are not major components of national income. Therefore, many scholars have argued that whilst transfers are included in the measurement of total government expenditure they should not be included in the definition of an expenditure/income ratio. This is to avoid double counting; i.e. if transfers are included in the denominator, the ratio of government expenditure to GNP (or GDP) can exceed 100 per cent.
For example, Bird (1970, p.18) proposes that the inclusion of transfers in total government expenditures will tend to exaggerate its size. Similarly, Chrystal and Alt (1979, p.130), examining the government expenditure function for the U.K. economy, advocate that the inclusion of transfers in government spending has no useful economic meaning because such a government expenditure to GNP (or GDP) ratio can exceed one.

Conversely, there are many authors who insist that transfer payments are important components of government expenditures and they should be included when measuring the government expenditure ratio. Peacock and Wiseman (1961, p.5), for example, state that "a similar ratio omitting transfers and subsidies would be without any general significance as a rough indicator of changes in the government's overall influence in the community over time, since transfers and subsidies also have to be financed and are clearly of importance in many economic contexts". Buchanan and Flowers (1987, p.63) also write that "transfer is as much a real cost as direct outlay for tanks, planes and paper clips. When estimating the real cost of government, the distinction between productive and transfer expenditures is not useful". Recently in examining the growth of government in OECD countries, Saunders (1993) adopts the relative size of general government expenditure to GDP which includes transfer payments.

In this chapter, to analyse the overall government's control on the economy and measure the real cost of government, the more inclusive definition will be
used. The broader definition of government expenditure which includes transfer payments seems to be a better indicator of the public sector size. It demonstrates the volume of resources that flow through the public sector budget and as such is a more accurate indicator of the total activity of government relative to the rest of the economy.
2.3.2 Absolute Versus Relative Measures

The absolute level of nominal public expenditure is likely to be of little interest because it does not reflect the changes of other important magnitudes in the economy. As total government expenditure increases, other aggregate variables such as population, prices, real income and GNP (or GDP) can increase also. Thus if we measure changes in the size of government sector by changes in absolute levels of expenditure, then it will not reflect the changes in prices and real income in the economy. Therefore, to explain the pattern of long-term growth of the government sector, we need to use a relative measure rather than an absolute level of government spending.

Even though the relative size is a more appropriate measure of the size of government in the economy, several scholars have used the absolute values of different variables for representing the size of government. For example, examining the empirical verification of Wagner's Law, Pryor (1968), Chrystal and Alt (1979), and Mann (1980), have chosen absolute values. They have argued that the growth of government can be measured by the absolute level of government expenditure. At the same time, Henrekson (1988), explaining the growth of the public sector in Sweden, has concentrated on the absolute growth. He claims that the relative size is an inconsistent measure for the growth of government.

In contrast with this view, many analysts have been concerned with the relative size of public expenditure. They have argued that the size of government can be measured relative to some national income aggregates.
There are, however, several variations of the measurement of the national output that government expenditure could be related to. Depending on the definitions of national incomes, the ratio can result in different values. Table 2.2 shows the different figures of measuring the relative size of the public sector in Korea. The differences between the ratios depend upon whether it is GNP, GDP or NI that is used in the denominator and whether the denominator is measured at market prices or factor cost. Since the difference between GNP and GDP is equal to net factor income from abroad, the relative sizes between two ratios show only a slight difference. In the National Income Accounts, if we deduct capital consumption allowances and indirect taxes and add subsidies to GNP, we can get National Income (NI). Since NI is smaller than GNP, the ratio of public expenditure to NI is larger than the ratio of public spending to GNP.

Table 2.2 Public Expenditure Ratio in Korea, 1971-1991 (per cent) 2

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Public expenditure as a proportion of GNP (market prices)</td>
<td>16.2</td>
<td>19.8</td>
<td>20.3</td>
</tr>
<tr>
<td>Public expenditure as a proportion of GNP (factor cost)</td>
<td>17.8</td>
<td>22.7</td>
<td>22.9</td>
</tr>
<tr>
<td>Public expenditure as a proportion of GDP (market prices)</td>
<td>16.2</td>
<td>19.0</td>
<td>20.1</td>
</tr>
<tr>
<td>Public expenditure as a proportion of GDP (factor cost)</td>
<td>17.8</td>
<td>21.6</td>
<td>22.7</td>
</tr>
<tr>
<td>Public expenditure as a proportion of NI (factor cost)</td>
<td>19.1</td>
<td>25.1</td>
<td>25.7</td>
</tr>
</tbody>
</table>

Note: Figures on current prices.
Source: Same as Table 2.1.

2 The figures in Table 2.2 do not include interest payments and net lending. To examine the relative size of government which includes interest payment and net lending, see Appendix Table 2.9.
Factor costs are less than market prices by the amount of difference between indirect taxes and subsidies. Since indirect taxes exceed subsidies, the relative size of the public sector measured by factor costs is larger than that of market prices. Thus if the denominator is made as small as possible, the relative size of government becomes larger. In the Table 2.2, therefore, the ratio of government expenditure to NI (at factor costs) is the largest.

The above comparison of the ratios of government expenditures to national income aggregates has led to some questions. Which is the best measure of national product to be used as the base of comparison? Conservative economists and radical politicians who oppose the growth of government will choose the largest ratio and argue that the public sector is too large. More liberal economists and some civil servants, on the other hand, will favour small government and focus on the small measure. What is the true relative size of the public sector? It seems that the choice of national output used to measure the relative size of government has been arbitrary. The relative size can increase either because the growth of government expenditures has accelerated or because there has been a decline in the rate of growth of GNP (or GDP). In the latter case, the relative size can increase without increasing the absolute level of government expenditure. There are another arguments for using one ratio rather than another. Depending on the national income measure and upon the choice between market prices and factor cost measures, we can arrive at different values.

All measures are tricky and partial in nature and are, therefore, imperfect indicators. Due to the multidimensional nature of government activity, no single
measure can be the true one. But one measure can be more useful than another in its degree of usefulness.

Different authors so far have employed various alternative measures for their own purposes in explaining the growth of government. Among those various indicators, the commonly used measures of national output are GNP and GDP. For example, when examining the validity of Wagner's Law for Mexico, Mann (1980) has chosen GDP as a measure of national product and concluded that Wagner's Law holds in aggregate terms in Mexico. Similarly, explaining international differences in public expenditure in OECD countries, Saunders (1988) has used general government expenditure to GDP as the index for the relative size of government. At the same time, Borooah (1988), investigating the growth of the public sector in the UK for the period 1960-86, has also employed public expenditure as a portion of GDP as a measure of the size of government.

On the other hand, many writers have argued that GNP is a more proper measure of national output. Peacock and Wiseman (1961), for example, have used GNP at factor cost as a more proper measurement of national output. Similarly, Lewis-Beck and Rice (1985, p.5) claim that "GNP stresses the production of a nation’s citizens and their property, while GDP emphasises production within the geographical boundaries of a nation... Because of our concern with a nation's government activity as a share of the total economic activity of its citizenry, we choose to employ GNP". A similar view is shown by Abizadeh and Basilevsky (1990), who have adopted the ratio of government expenditures to GNP as their index for the relative size of government.
2.3.3 Real Versus Nominal Measures

The other important measurement issue for the size of government is related to the use of real or nominal values. As government provides more public goods and services, total government expenditures in current terms will increase. But it does not necessarily mean that the government will provide more public goods because the unit cost of public goods could have risen. Further, if the ratio of inflation in the government sector is higher than the general price level, then the real size of the public sector could decline over time. In this case, nominal values may overstate the true relative size of government. To examine the real public sector size, we need to deflate the current figures by an appropriate price index.

However, there are many problems in developing the appropriate deflator for the activities of the public sector. In the case of private goods, it is usually possible to define the units by which the quantities of such goods are measured. Since the market could be applied to private goods, we can easily observe changes in prices and changes in quantities consumed. However, public goods and services are non-marketed so that we cannot observe market prices for publicly supplied goods. In addition, defining quantity units is very difficult because the outputs of the public sector are intangible. Since markets do not operate for the consumption of public goods, decomposing the increase in prices into price changes (implicit price deflator) and quantity changes is also extremely difficult.
Because of these conceptual and measurement difficulties, many researchers have used the real value of input cost rather than quantity output for calculating the government price deflator. Most efforts have been focused on developing the appropriate price (cost) deflator to measure the increase in the cost over time of providing a given basket of public goods and services. The task of analysing the real size of the public sector has been greatly eased by the development of the System of National Accounts. National Accounts usually include deflators for public consumption and public investment expenditure. Especially, in the National Accounts System, statistical efforts have been focused on the estimation of a deflator for public consumption. In calculating the deflator, national accounts statisticians assume low (or zero) productivity growth in the public sector. As was shown in the Baumol (1967) lagging productivity model, the productivity increase in the public sector is less than that of the private sector, and thus unit costs in the public sector will rise over time. Due to the relative price effect, the prices (cost) of government services will rise faster than the prices of private sector outputs. The ratio of real government expenditure to GNP could, therefore, rise less than the nominal share.

There has been a lot of debate about the use of real or nominal values in measuring the size of the public sector. For instance, in his extensive review of the Leviathan literature, Musgrave (1981, p.86) has made a statement in favour of an unadjusted nominal ratio and concluded that "given the assumption that public services are worth their cost, it is the change in the nominal share that should be considered in measuring public sector expansion". Following

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Later, Musgrave changed his view and wrote in his textbook "the same deflator is applied to both GNP and government expenditures. Since the cost of public services has
Musgrave's suggestion, Lewis-Beck and Rice (1985, p.6) claim that "the unadjusted measure is preferable because it gives a better indication of government scope and power vis-à-vis the national economy". At the same time, Abizadeh and Basilevsky (1990, p.357) point out that "particularly if time series data are used, these indices still follow the same trend and as such will not make the results that are much different from nominal series. Accordingly, we include only nominal values in our subsequent analysis". Those researchers have favoured nominal values rather than a real ratio as a proper measurement of the size and growth of government.

But unlike these views, many scholars are not satisfied with the use of the nominal ratio. They have argued that due to the relative price changes of government expenditure with respect to GNP, the numerator (government expenditure) and denominator (GNP) need to be deflated with separate price indexes. For example, Peacock and Wiseman (1961), in their study of British public expenditure over the period 1890-1955, claim separate deflation of public expenditure and national product, and state that "Money expenditures are an unsatisfactory measure of this over periods of changing prices; we need to deflate the money figures by an appropriate price index" (P-W, 1961, p.8). Similarly, examining nine models of government growth in the United States, Lowery and Berry (1983) have employed the deflated measure of size to correct for inflation. However, it was Beck (1979, 1982, 1985) who has made the strongest statement in favour of real values. Examining the long term patterns of real public sector size in major developed countries with the UN risen faster than the general price level, this multiple overstates the rise of the public share in real terms" (Musgrave and Musgrave, 1989, p.114)
data, Beck has found that nominal and real ratios have risen in all industrialised countries but real size has increased less than the nominal share. Especially because of the relative price effect (i.e. the growth of the government price deflator exceeds that of the GNP deflator), Beck has argued that real public sector size has even declined over time in some countries. At the same time, Pluta (1981) has also employed the similarly weighted price indexes and found declining real public sector size in some developing countries.

Nominal and real measures have their respective merits in analysing the size and growth of government. When attempting to explain the flow of real resources between the private and public sector, we need to use a real measure. However, if we are concerned with changes in consumer's expenditure allocation, nominal share may be more relevant.

Table 2.3 shows some evidence of relative price effects in Korea. It shows nominal and real ratios of government consumption expenditure to (real) GNP for the period 1970-1991. The implicit price deflator for government consumption expenditure and GNP (at market prices) are also presented. As shown in the table 2.3, the nominal share of government consumption expenditure to GNP rose slightly between 1970 and 1991; 9.4 percent in 1970 to 10.8 percent in 1991.

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4 For the period 1970-1991, there were no changes in the definition or classification of public expenditure. The definition of public expenditure that has been used for the period 1970-1991 makes all the elements of the series compatible with one another. We can examine the ratio of government consumption expenditure to GNP over the period.
On the contrary, real size declined from 14.6 per cent in 1970 to 9.7 per cent in 1991. According to the Korean National Accounts data, the price index of government services rose faster than the price index for GNP. For GNP, the implicit price deflator rose thirteen fold; on the other hand, for government consumption expenditure, the deflator rose twenty-twofold over the study period. Due to the relative price effect, the share of resources used for public consumption has actually declined in Korea.

Table 2.3 Government consumption expenditure (GeCon) and GNP (at market prices) in Korea

(In current and constant prices, as % of GNP)

<table>
<thead>
<tr>
<th></th>
<th>GeCon/GNP (at current prices) (%)</th>
<th>GeCon/GNP (at 1985 prices) (%)</th>
<th>Relative Price of Government * (1985 =100)</th>
<th>Price Deflator for GeCon (1985=100)</th>
<th>Price Deflator for GNP (1985=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>9.4</td>
<td>14.6</td>
<td>64.5</td>
<td>7.19</td>
<td>11.15</td>
</tr>
<tr>
<td>1975</td>
<td>11.2</td>
<td>13.8</td>
<td>80.8</td>
<td>22.04</td>
<td>27.29</td>
</tr>
<tr>
<td>1980</td>
<td>11.9</td>
<td>13.2</td>
<td>90.7</td>
<td>63.80</td>
<td>70.32</td>
</tr>
<tr>
<td>1985</td>
<td>10.4</td>
<td>10.4</td>
<td>100.0</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>1991</td>
<td>10.8</td>
<td>9.7</td>
<td>110.5</td>
<td>161.20</td>
<td>145.94</td>
</tr>
</tbody>
</table>

Note; * Price deflator for general government consumption expenditure divided by GNP (market prices) deflator.

Source: Same as Table 2.1.
2.4 Off-Budget Activities

Most types of the government activities mentioned in previous section are usually recorded in the national accounts. However, it should be noted that the statistical measures of general government spending derived within the national income framework are subject to many pitfalls and limitations. Although the national accounts data have a lot of merits in analysing the size of government, they do not give a full picture of total activities of government. As all government activities are not always included in the national accounts, the use of the share of general government expenditure in GNP will understate the extent of government participation in the economy. The scope of Korean public sector activity extends far beyond the general government outlays as estimated in the SNA. The SNA data do not encompass all of the important public sector activities and, in particular, they exclude "off-budget activities". 5

In Korea, some types of off-budget activities have grown rapidly since the early 1960s. During the rapid development process, when the government faced the choice between direct expenditures and off-budget means to achieve a given policy objective, executive government preferred the less visible method. These extra-budgetary areas of government operation have recently received considerable attention. Although off-budget activities are difficult to quantify, we need to include these activities in any comprehensive measure of the size of government.

5 Off-budget activities are defined in OECD as "Activities which do not appear in the budgetary accounts but nevertheless have an impact on the economy" (OECD Observer, March 1983, p.6).

83
2.4.1 Public enterprises

The most difficult aspect of defining the public sector is concerned with the definition of public enterprises. While public enterprises play an important role as employer, producer and investor, there is no general agreement on how to define and measure the scope of public enterprise activities. Each country has used different definitions of public enterprise for their own purposes. The problem of defining and measuring the size of public enterprises is clearly pointed out by Pathirane and Blades (1982, p.263) as "Few countries identify public enterprises separately in their national accounts publications, and those that do so provide little information about the criteria used in deciding whether or not an enterprise is public".

In Korea, the government has established or acquired public corporations as a development instrument during the rapid development period. Since the early 1960s, the Korean government has established various public enterprises to achieve the strategic targets of the development plan. Because of the shortage of indigenous entrepreneurial skills and of the poor private capital endowment, the Korean government has sought to fill the gap by establishing various
public enterprises, notably in fertiliser, mining, electricity, iron & steel industry and transport activities. Since the early period of rapid economic growth, the Korean public enterprise sector has played a more important role in the economy.

While some countries have used a strict definition of public enterprises, Korea has employed a rather broad definition - even including all enterprises in which the government ownership share is less than 50 percent (for OECD countries, see Saunder and Klau, 1985). Public enterprises in Korea can be broadly divided into four categories as shown in Table 2.4; government enterprises, government invested enterprises, subsidiaries of government invested enterprises and other government enterprises. 6

The data shown in Table 2.4 indicate the importance of public enterprise activities in the Korean economy. In 1991, there were about 88 public enterprises in operation, employing 374 thousands workers, approximately 2.6 percent of the total employment in the non-agricultural sector. Its size is comparable to the other developing countries which have experienced larger share of public enterprises such as India and Pakistan.

6 In this subsection, we focus only on public enterprises owned and controlled by the central government. There have been various types of public enterprises at the local level of government in Korea. However, no accurate statistics are collected or reported for local public enterprises.
Table 2.4 Korean Public Enterprises by type (1991)

<table>
<thead>
<tr>
<th>Type of public enterprise</th>
<th>Number</th>
<th>Employment (thousands)</th>
<th>Budget (billion US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government enterprises ¹)</td>
<td>4</td>
<td>72</td>
<td>3.7</td>
</tr>
<tr>
<td>Government invested enterprises ²)</td>
<td>23</td>
<td>171</td>
<td>45.3</td>
</tr>
<tr>
<td>Subsidiaries of government invested enterprises ³)</td>
<td>54</td>
<td>93</td>
<td>22.0</td>
</tr>
<tr>
<td>Other government enterprises ⁴)</td>
<td>7</td>
<td>39</td>
<td>10.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>88</strong></td>
<td><strong>374</strong></td>
<td><strong>81.9</strong></td>
</tr>
</tbody>
</table>

Source: Song (1992, p.411, Table 16-1)

Note; 1) These enterprises are actually government departments and include the railway, the post office, the office of supply and the office of grain management.

2) These enterprises include 4 financial companies, 8 promotional and 11 productive companies. Among four categories of public enterprises, this type is by far the largest category in terms of employment, investment and valued added.

3) These enterprises include shipbuilding and heavy industry company as well as financial, tourism, consulting and service companies.

4) These enterprises, in which the public ownership share is less than 50 per cent, include 2 banks, the Po-Hang Iron and Steel company and other three firms.

There are no consistent data on output values of public enterprises in Korea. However, we can use the share shown in the Table 2.5 as estimates of public enterprises contributions to GDP. Table 2.5 shows the public enterprise value added share in GDP between 1975 and 1990. Since 1975, the public enterprises represented about 9 per cent of valued added in total GDP.
Although the share has slightly declined in the mid-1980s, it still accounted for 9.4 percent of GDP in 1990.

<table>
<thead>
<tr>
<th>Year</th>
<th>Public enterprise/GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>8.3</td>
</tr>
<tr>
<td>1980</td>
<td>9.1</td>
</tr>
<tr>
<td>1984</td>
<td>9.7</td>
</tr>
<tr>
<td>1986</td>
<td>9.0</td>
</tr>
<tr>
<td>1990</td>
<td>9.4</td>
</tr>
</tbody>
</table>

Source: Song (1992, p.418, Table 16-2)

Although public enterprise activity is an important component of the public sector, this measure has rarely been included in studies of the size and growth of government. The size of the public sector based on national accounts data would under-estimate the growth of government. The inclusion of public enterprise activities will give a different pattern of the growth of the public sector.

2.4.2 Extra-Budget Accounts and Government Funds

These categories of government activities have not shown up in the national accounts and have represented another hidden kind of public sector activities in the economy. Since these extra-budget items have grown rapidly in recent years
and exerted an important influence to the economy, the analysis of government behaviour in these off-budget activities is important.

Traditionally, the Korean budgeting system has emphasised the function of accountability and administrative control of government expenditure. Each year, the budget is presented by the Office of Budget which is part of the Economic Planning Board and submitted to the National Assembly. The annual budget contains a package of public expenditure plans and tax legislation for the given period and is subject to statutory or constitutional restrictions. Thus, the general account (i.e., the annual budget) has been treated as an on-budget item.

As the government increases its role in the economy, the traditional Korean budget system cannot meet the needs of policy-makers. Off-budget activities such as government funds and extra budget accounts have grown rapidly since the early 1970s. These off-budget accounts are important components of unified budget expenditures and those activities encompass various fiscal operations which have important economic effects. However, these extra-budgetary activities have not been reported in the national accounts and are often treated as off-budget transactions. In contrast with the annual budget, extra-budget activities are not reviewed by members of the National Assembly but are only subject to the approval of their supervising ministers.

Since the early 1970s, the Korean budget system has been criticised as grossly inadequate because the traditional budgeting practice was not comprehensive enough to analyse the overall government influence on the economy. It had been widely argued that the budget system should be able to facilitate the assessment of the economic effects of extra-budgetary area and that the definition of
government expenditure should be comprehensive enough to capture the government's overall influence on the economy. This dissatisfaction with the budget system brought about a committee inquiry into the whole system of the budget structure and presentation.

In 1976, a committee was established to derive the Korean government finance data in an internationally practised framework. Based on "A Manual on Government Finance Statistics" published by the International Monetary Fund (IMF), a coherent budget system was set up. Within the new budget system, the coverage of government activities is comprehensive, incorporating all government activities, including extra-budgetary accounts, government funds and nonfinancial public enterprises.

The unified system was formally adopted in 1979 for the first time in Korea. Figure 2.1 shows the structure of the unified budget system and Table 2.6 reports unified budget expenditure data for the years 1971, 1981 and 1991.7

7 Since data on local government activities are not always available, the unified budget expenditure data which are compiled within the IMF framework provide a more detailed set of data on central government operations.
Figure 2.1 The Unified Budget System in Korea, 1991
(Based on IMF, A Manual on Government Finance Statistics)

<table>
<thead>
<tr>
<th>Central Government</th>
<th>Budget</th>
<th>General Account</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Special Account (17) 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Government Fund (32) 2)</td>
</tr>
</tbody>
</table>

Consolidated

Public Sector

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Extra-Budget Account (4) 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non financial Special Account (4) 4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Government Fund (2) 5)</td>
</tr>
</tbody>
</table>

1) There were 17 special accounts such as Fiscal Investment and Loan, National Forestry Management, Military Personal Pension, Industrial Worker's Accident Insurance, National Medical Centre Management, Judicial Building Construction, and Road & Urban Railway Construction, etc.

2) There were 32 government funds including National Investment Fund, Foreign Exchange Stabilisation Fund, Defence Industry Development Fund, Industrial Development Fund, Small Business Establishment Fund, Coal Industry Fund, National Housing Fund, Tourism Promotion Fund, National Pension Fund, Rural Area Development Fund, and South & North Co-operation Fund, etc.

3) There were 4 extra-budget accounts such as Foreign Loan in Kind & Service, Repayment of Sub-Loan, Equity Subscription and Contingency Transfer Use.

4) There were 4 special accounts such as Grain Management, National Railroad, Government Supply, and Communication Service Special Account.

5) There were 2 government funds such as Grain Management and Government Supply Fund.

As can be seen from Table 2.6, the central government fund has been the fastest growing element of consolidated public expenditure over the last two decades. In 1971, central government fund amounted to 4.9 billion won which was only 0.6 percent of total public expenditures. However, since the early 1980s, the number and size of government funds have grown at an astonishing rate and amounted to 5,228.7 billion won for the fiscal year 1991. Thus, in
1991, there were 32 public funds in operation, which constituted 11.0 percent of total public expenditure. As shown in Figure 2.1, there were a variety of public funds in Korea: defence industry development, small business establishment, national housing, rural development and tourism promotion, etc.

These government funds have been referred to as "the second budget" and have been a key instrument of government policy in Korea (For the Japanese case, see Bennett and Lorenzo, 1983, p.163). In connection with government fiscal operations, the funds have been allocated to achieve important policy objectives during the rapid development process. Under this fund system, government makes more flexible and discretionary fiscal actions and provides more effective financing for government-related projects.

Since government funds are not reviewed by members of the National Assembly, the government has large discretion and flexibility in the actual budget execution. During the 1970s and 1980s, the number and size of public funds have grown rapidly. The most important funds are National Investment Fund, Industrial Development Fund, Petroleum Development Fund and National Housing Fund. National Investment Fund was introduced in 1973 for providing a financial support to the heavy and chemical industries. Industrial Development Fund was established in 1986 to provide a financial support to the balanced growth of industry and improvement of industrial technology. Petroleum Development Fund was also introduced in 1986 to execute petroleum development project as well as management of demand and supply for oil price stabilisation. Finally, National Housing Fund was created in 1981 to supply fund for housing construction project. This project is concerned with promotion of home building and is operated by providing financial support to local
government. These government funds contribute to the domestic capital formation and serves as a useful financial resources for the public investment (see Park (1992)).

In addition to government funds, there has been also "a third budget" in Korea, known as the special accounts. There were 17 special accounts in 1991 and they accounted for 17.6% in total public expenditures. Like government funds, special accounts are also designed for supporting special projects and providing a stable supply of financial resources.

While the general account is designed for the overall fiscal activities of government, special accounts are designed to implement special projects and financial operation. The most important special accounts are Fiscal Investment and Financing Special Account, Grain Management Special Account, Government Supply Special Account and Communication Service Special Account. The recent budgetary performance of the special accounts is characterised by a continuous deficit. This deficit has been caused by the grain price support system which the government has used to support the farmer's income. Budget deficits in the special accounts have been financed by borrowing from the Bank of Korea, resulting a money expansion (see Kim (1992)).

Since the early 1960s, the Korean government has preferred extra-budgetary activities, because of their incentives and other merits. Through the creation of these alternative budgets, the government can take a greater control over the economy's resources. Since the government can establish various extra-budget areas without the consent of the legislative body, they can conceal the expansion of the public sector. While there has been strict control over the
operation of on-budget activity, extra-budget areas of government activities have been criticised for their lack of simplicity and their controllability. Recently, the government has attempted to integrate extra-budget activities into the on-budget process to achieve greater effectiveness and ensure more control over the expansion of hidden public sector activities.

2.4.3 Tax expenditures

Although tax expenditures had been widely used as an important instrument of public policy, the concept of tax expenditures was first developed in the 1960s. The term "tax expenditures" has been applied to the special provisions of the tax laws that defer the tax liability for those who make payments or receive incomes in certain forms (Break, 1982). These tax expenditure systems have been used as tax incentives or hardship relief provisions and have taken various forms, such as special tax rates, tax exemption, tax deduction, tax credits and special tax deferral reserve. 8

The tax incentives are designed to encourage certain forms of economic activities or favour certain sources of incomes. The common character of these tax expenditures systems is that they reduce tax liability and hence government

8 Feldstein (1980) has used the terms "tax expenditures", "tax subsidies", and "tax incentives" interchangeably.
revenue. Due to special tax provisions, tax expenditures can also influence government's financial positions by the amounts of revenue losses.

Like other off-budget activities, many of these tax expenditures are an equivalent of direct public expenditure, although it is difficult to assess the relative merits of using tax incentives and direct expenditures. Even though there has been a lot of debate about the desirability of tax expenditures as an appropriate instrument of public policy, tax expenditures have been introduced in order to achieve various economic policy objectives.

Since the mid-1960s, many countries have constructed "tax expenditure budgets". Especially, in Korea, the government has employed a tax expenditure system as an essential instrument of economic development strategy. During the rapid development process, the Korean government has applied various tax incentives to encourage certain kinds of economic behaviour that seem desirable for industrial development and other policy objectives.

The major forms of tax expenditures in Korea have been: (1) the deductions of certain expenses or exemptions in the calculation of taxable income (for example, under the individual income tax, personal deductions, education expenses, insurance premiums and medical expenses deductions); (2) exclusions from taxable income (exclusions of interest income from public bonds, capital gains on financial assets, and exclusion of acquisition tax) and (3) tax credits and accelerated depreciation for investment (A brief summary of the major tax incentives in Korea is given by Yun (1992)).
There exist several difficulties in measuring tax expenditures. Since tax expenditures are usually defined as deviations from the normal tax structure, we need to define properly the concept and nature of that normal structure. However, the tax law does not define the normal tax structure and there is no general agreement on the concept of taxable economic income. Due to the conceptual and measurement difficulties, it is difficult to quantify tax expenditures. Official estimates of tax expenditure should be treated with caution.

In Korea, there are no official definitions or estimates of tax expenditures. Only total tax exemptions for internal tax revenue and customs duties (a proxy measure of the size of tax expenditures) have been estimated by the Ministry of Finance.

Table 2.7 shows that the revenue losses (or the amount of tax exemptions) have been very large. Especially, during the early 1970s, when the Korean government announced its Heavy and Chemical Industry Policy, various tax incentives were provided to support strategic industries. In 1970, total tax exemptions accounted for 39.9 percent of total tax revenue and 5.3 percent of GNP. From the Table 2.7, we can also see that the ratio of tax exemption to GNP has declined since 1970. The ratio fell to 4.6 per cent in 1975 and further to 2.1 percent in 1980. Especially, the Tax Reform ("Tax Reduction Control Law") in 1981 contributed to remove numerous tax exemptions, so that the ratio fell to 1.4 percent in 1985, much lower than earlier years.9

9 Saunders and Klau (1985) have studied the size of tax expenditures in OECD countries. According to their study, in 1980, the share of tax expenditures for GDP was
Table 2. Total tax exemptions in Korea (A proxy of the size of tax expenditures)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total government tax exemption (billion won)</th>
<th>Tax exemption as a percentage of total tax revenue (%)</th>
<th>Tax exemption as a percentage of GNP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>145.7</td>
<td>39.9</td>
<td>5.3</td>
</tr>
<tr>
<td>1975</td>
<td>463.6</td>
<td>33.3</td>
<td>4.6</td>
</tr>
<tr>
<td>1980</td>
<td>765.7</td>
<td>13.2 **</td>
<td>2.1</td>
</tr>
<tr>
<td>1985</td>
<td>1066.8</td>
<td>9.0</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Note: ** The government revised "Tax Reduction Control Law" extensively in 1981. Consequently, many tax reductions and exemptions were removed and the ratio fell from 33.3 per cent in 1975 to 13.2 per cent in 1980.


For the last several decades, tax expenditures have been an important policy instrument for Korea's development strategy. The government has provided various tax incentives to induce the private sector to engage in certain kinds of economic activities. Nevertheless, there have been many criticisms about the effectiveness and desirability of using tax expenditures as an essential element of public policy. Many researchers (for example, Yun (1992)) have argued that tax expenditures are less efficient than direct public expenditures because tax incentives are not so effective in achieving a desired policy purpose. In many

1.4 per cent in Austria and 0.9 per cent in Germany. In 1975, the ratio was 0.5 per cent in Japan and 9.8 per cent in the U.K.
cases, tax incentives do not appear to have affected the behaviour of the private sector even though they were actually introduced in order to encourage that activity. For example, Yun (1992) claims that "tax incentives do not appear to have affected the corporate financial structures in any significant way. Similarly, regarding the relocation of industries, tax incentives often fail to provide the proper signals intended by the legislation; Even worse, some incentives seem to provide taxpayers with loopholes for realiseing capital gains tax free" (p. 176).

Another criticism is that there have been too many tax incentives in Korea during the development process. Since the early 1960s, the government has introduced numerous tax incentives, and tax laws have been revised very often. One consequence of these tax incentives was that the tax laws became too complicated. Although the desirability of using tax expenditures still remains as an important policy issue, tax expenditures have grown in importance partly because of the constraints imposed upon the growth of direct public expenditures.

2.5 Conclusion

The emphasis in this chapter has been on describing how different measures of government size have been constructed and used to investigate the changes in the level and structure of government activity in Korea over the last two decades. Due to the multidimensional nature of public sector activities, it is impossible to express all the various forms of government activities in a single
aggregate measure. For different purposes, different authors have employed alternative measures and the *ad hoc* use of different measures would lead to different conclusions about the size and growth of the public sector.

Statistical measures which have been presented within the national accounts framework do not give the whole picture of the total activities of the public sector. Although the national accounts data have macroeconomic relevance, the data give an incomplete picture of the growth of government activities. In particular, they do not cover off-budget activities such as public enterprises, extra-budget accounts and tax expenditures. Therefore, the use of the ratio of public expenditure to GNP (GDP) in the national accounts understates the government involvement in the economy. Because off-budget activities are important components of the total activities of the public sector and have an important impact on the economy, they need to be integrated with other components.

There are a lot of problems in designing a meaningful measure of public sector growth. More research and discussion are clearly needed.
Appendix Comparison of Public Expenditure Data

As noted in section 2.2, there are a variety of ways of measuring public expenditure. The Bank of Korea (BOK) has compiled two different kinds of public expenditure data. Following *A System of National Accounts* (SNA), the BOK has produced data for general government expenditure. According to the Korean national income accounting definition, general government expenditure is defined to include current and capital account activities of both central and local government. However, in the *National Accounts*, the BOK has not provided consistent data on interest payment and net lending.

As mentioned in previous section, those components (interest payment and net lending) have rarely been included in the Korean national accounts data. The most common measure of public expenditure in the SNA has been current disbursements, current and capital expenditures, and subsidies (see Table 2.1). These measures of the size of government are commonly presented as a share of GNP (see Table 2.2).

Apart from the national accounts data, the BOK has produced another data set for general public expenditure. To measure the size of the total public sector, the BOK has provided data on general government expenditure which includes interest payment and net lending. For purpose of comparison with Table 2.1, Table 2.8 presents major components of general public expenditures. Since public expenditure data in *Economic Statistics Yearbook* include interest payment and net lending, the relative size of the public sector shown in Table 2.9 is larger than that of Table 2.2.
Table 2.8 Composition of Korean Public Expenditure (II), 1971-1991

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In billion won</td>
<td>%</td>
<td>In billion won</td>
<td>%</td>
<td>In billion won</td>
<td>%</td>
</tr>
<tr>
<td>Public sector consumption</td>
<td>363.2</td>
<td>54.8</td>
<td>5,686.6</td>
<td>46.7</td>
<td>21,052.9</td>
<td>40.5</td>
</tr>
<tr>
<td>Public sector investment</td>
<td>178.5</td>
<td>26.9</td>
<td>2,127.9</td>
<td>17.3</td>
<td>14,710.5</td>
<td>28.3</td>
</tr>
<tr>
<td>Subsidies &amp; Current transfers</td>
<td>42.4</td>
<td>6.3</td>
<td>1,187.2</td>
<td>9.8</td>
<td>8,444.6</td>
<td>16.2</td>
</tr>
<tr>
<td>Capital transfers</td>
<td>20.9</td>
<td>3.2</td>
<td>350.5</td>
<td>2.9</td>
<td>1,117.8</td>
<td>2.2</td>
</tr>
<tr>
<td>Debt interest</td>
<td>15.6</td>
<td>2.4</td>
<td>593.0</td>
<td>4.9</td>
<td>1,481.0</td>
<td>2.9</td>
</tr>
<tr>
<td>Net lending</td>
<td>42.5</td>
<td>6.4</td>
<td>2,241.7</td>
<td>18.4</td>
<td>5,192.3</td>
<td>10.0</td>
</tr>
<tr>
<td>Total</td>
<td>663.1</td>
<td>100.0</td>
<td>12,186.9</td>
<td>100.0</td>
<td>51,999.1</td>
<td>100.0</td>
</tr>
</tbody>
</table>


Table 2.9 Korean Public Expenditure Ratio (II), 1971-1991 (per cent)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Public expenditure as a proportion of GNP (market prices)</td>
<td>19.4</td>
<td>26.8</td>
<td>25.2</td>
</tr>
<tr>
<td>Public expenditure as a proportion of GNP (factor cost)</td>
<td>21.3</td>
<td>30.6</td>
<td>28.4</td>
</tr>
<tr>
<td>Public expenditure as a proportion of GDP (market prices)</td>
<td>19.4</td>
<td>25.7</td>
<td>25.0</td>
</tr>
<tr>
<td>Public expenditure as a proportion of GDP (factor cost)</td>
<td>21.3</td>
<td>29.2</td>
<td>28.2</td>
</tr>
<tr>
<td>Public expenditure as a proportion of NI (factor cost)</td>
<td>23.0</td>
<td>33.9</td>
<td>31.9</td>
</tr>
</tbody>
</table>

Note: Figures on current prices.

Chapter 3 The Growth and Pattern of Public Expenditure in Korea

3.1 Introduction

Despite its obvious importance, the study of the long-term growth of public spending in developing countries appears to have received a little interest among public finance economists. Partly due to the lack of reliable historical data on public expenditure and national output in developing countries, most such studies have been based on a cross-sectional approach (for example, see Martin and Lewis (1956), Musgrave (1969), Enweze (1973) and Heller and Diamond (1990)). A cross-sectional approach, however, provides little insight into the causes of the long-term growth and time pattern of public expenditure in a single country. Since the growth of the public sector is a process of a postulated change over time in a particular country, it seems more useful to study the development of one government over time.

This chapter presents an effort to extend time-series analysis of the growth and pattern of public expenditures in Korea during the thirty-nine year period 1953-1991. Using recently available data, this chapter is concerned with long-term changes in the relative size of the public sector and the growth of public expenditure at both the aggregate and individual programmes (functional and economic composition) in Korea since 1953. By examining long-term trends of
public expenditure and by analysing the causes of these developments, we will explore the changing role of the public sector during the Korean modernisation process.

Korean experience is of particular interest because the public sector has exerted an enormous influence on the level and allocation of resources during the development process. Over the past four decades, taxation and public spending have been used as an important policy instrument for mobilising and allocating scarce resources. Especially, since the early 1960s, government involvement in the economy has increased rapidly to promote export and economic growth.

Since time-series studies of the growth of public expenditures in developing countries are relatively rare in the literature, a study of Korean public expenditure growth will contribute to stimulate further research in other case studies.

3.2 The Aggregate Level of Public Expenditure

As already pointed out in the previous chapter, there are several difficulties in measuring and analysing long-term changes of the relative size of the public sector. One of the most serious problems is that definitions of public expenditure
change over time. In this section, we will employ the Korean national income accounting definition of public expenditure. In order to examine long-term trend of the ratio of public expenditure to GNP for the period 1953-1991, we define public expenditure to be the sum of total government expenditures excluding any expenditures of public enterprises and netting-off transactions between the different level of government.

Several measures of public sector size based on this definition of public expenditure to GNP over the period 1953-1991 are shown in Table 3.1. As can be seen in the Table, public expenditure growth in Korea over the past four decades has been significant at the aggregate level. Especially when the data are considered in current prices, we can observe the rapid growth in public expenditure. Viewed in current prices, public expenditure rose from 4.29 billion won in 1953 to 41873.60 billion won in 1991; a growth about 9760%.

After deflating the data to adjust for price inflation, public spending in real terms rose from 728.02 billion won in 1953 to 28367.55 billion won in 1991: overall growth has been 39%. This growth in real public spending has been at a faster rate than GNP.

Adjusting the data still further to account for the increase in population, we can find that real per capita government expenditure rose eighteen fold over the past thirty nine years (359.71 million won in 1953 to 6556.24 million won in 1991).

When we consider total public expenditures in relation to the Gross National Product (GNP), it appears that the relative size of the public sector (in current prices) has more a doubled during the period from 8.96 per cent in 1953 to 20.26 per cent in 1991 (As mentioned in previous chapter, these ratios are arbitrary).
Viewed in constant prices, the ratio of public spending to GNP has increased from 8.72 to 20.23 per cent. This latter fiscal behaviour is important because it seems to give some support to Wagner's hypothesis that the share of public sector tends to grow as the economy develops.

Table 3.1 Measures of Public Sector Size

<table>
<thead>
<tr>
<th>Year</th>
<th>GNP (In Billion Won)</th>
<th>Public Spending (G) (In Billion Won)</th>
<th>Per Capita Spending (In Million Won)</th>
<th>G/GNP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1953</td>
<td>47.88</td>
<td>8346.92</td>
<td>2.12</td>
<td>8.96</td>
</tr>
<tr>
<td>1961</td>
<td>294.18</td>
<td>11367.43</td>
<td>21.63</td>
<td>18.94</td>
</tr>
<tr>
<td>1971</td>
<td>3416.70</td>
<td>27128.00</td>
<td>168.08</td>
<td>16.18</td>
</tr>
<tr>
<td>1981</td>
<td>45528.10</td>
<td>55354.30</td>
<td>2333.16</td>
<td>19.84</td>
</tr>
<tr>
<td>1991</td>
<td>206681.20</td>
<td>141623.20</td>
<td>9677.73</td>
<td>20.26</td>
</tr>
</tbody>
</table>

Note; * Series spliced to current SNA where appropriate

Source: Bank of Korea, National Accounts, Various Years
Economic Planning Board, Major Statistics of Korean Economy, Various Years

Table 3.1 has already introduced us to one aspect of the growth of government expenditure but what is the long-term pattern of Korean expenditure growth?
Long-term growth of Korean public expenditures can be drawn and the result is plotted in Figure 3.1.

Figure 3.1, which depicts real relative size behaviour between 1953 and 1991, shows the pattern of long-term growth of the government sector. As can be seen in the Figure, the relative size of the public sector has grown in an irregular fashion; a series of peaks in 1961, 1979 (coinciding with political upheavals) and 1969 (with development policy) and troughs in 1964, 1973 (restrictive budgetary policies). Major changes in the ratio of public expenditure to GNP over the study period will be explained in more detail in next section.
Figure 3.1 Public Expenditure as a Share of GNP, 1953-1991 (In 1985 Constant Prices)

Figure 3.2 Different Measures of Government Spending as a Share of GNP (In 1985 Constant Prices)
Figure 3.3 The Growth of GeCon85, GeTra85, GeCap85

Figure 3.4 The Growth of Indexes of Government Expenditures and GNP (1953=100)
In most studies, the growth of government means the growth of public expenditure in relation to GNP. This development has been depicted in Figure 3.1. However, even though the long-term pattern of total government expenditure remains constant, the growth pattern of the major expenditure items can be widely dissimilar. We need to disaggregate total public expenditures into three main components: government consumption expenditure (GeCon), capital investment expenditure (GeCap) and transfer payments (GeTra).

In Figure 3.2 and Figure 3.3, the growth patterns of the three different components of public expenditures are displayed for the period 1953-1991. In this case the three categories of public expenditures represent their formal national income accounting definitions. All components are deflated by the appropriate implicit price deflators. Government consumption is deflated by the implicit GNP deflator and government capital investment is deflated by its own deflator, while transfer payments are deflated by the implicit deflator for private consumption expenditure.

In Figure 3.4, the growth of the main components of public expenditures (calculated by the growth of index, 1953=100) is depicted and compared to the growth of GNP since 1953. As shown in the Figure, the public sector has grown faster than GNP over the entire period. Concerning the growth of the different components of public spending, we can find that government capital investment has increased the fastest. The growth of subsidies and transfer payments had begun to accelerate in the mid 1970s. In contrast, government consumption has increased only marginally faster than GNP over the period.
As mentioned in the previous section, the growth pattern of each of the different component of total public expenditures has often shown quite different. In Table 3.2, the growth rates of the different components of public expenditure and GNP for successive ten-year periods are presented. From the Table, it can be seen that total public expenditure (GeGov) has grown faster than GNP; i.e. GeGov has grown 10.69% for the whole period compared with 7.81% in GNP. Among three components of public expenditures, government capital investment has grown fastest and government consumption expenditure has increased only slightly faster than GNP (see also Figure 3.4). Since the growth pattern of the different components of the public sector is quite different, we cannot explain all of the growth of the public sector in a single model.

Table 3.2 Average Growth Rates of Public Expenditures and GNP in Korea 1953-1991

<table>
<thead>
<tr>
<th></th>
<th>GNP</th>
<th>GeCon</th>
<th>GeTra</th>
<th>GeCap</th>
<th>GeGov</th>
</tr>
</thead>
<tbody>
<tr>
<td>1953-60</td>
<td>3.73</td>
<td>14.13</td>
<td>26.36</td>
<td>36.65</td>
<td>15.42</td>
</tr>
<tr>
<td>1961-70</td>
<td>8.84</td>
<td>4.82</td>
<td>15.07</td>
<td>29.77</td>
<td>8.56</td>
</tr>
<tr>
<td>1971-80</td>
<td>7.76</td>
<td>10.57</td>
<td>14.65</td>
<td>10.22</td>
<td>10.47</td>
</tr>
<tr>
<td>1981-91</td>
<td>9.52</td>
<td>8.50</td>
<td>12.90</td>
<td>10.84</td>
<td>9.81</td>
</tr>
<tr>
<td>1953-91</td>
<td>7.81</td>
<td>9.11</td>
<td>16.41</td>
<td>20.41</td>
<td>10.69</td>
</tr>
</tbody>
</table>

GeCon; Government Consumption Expenditure, GeTra: Government Transfer Payments, GeCap; Government Capital Investment Expenditure, GeGov; GeCon+GeTra+GeCap

Source: Bank of Korea, National Accounts, Various Years
3.3 Changes in the Composition of Public Expenditures

The aggregate data presented in the previous subsection are useful to analyse the nature of the overall growth of Korean public expenditure. However, as many authors have argued, a more useful analysis can be obtained through disaggregation (see Bird (1970), Musgrave (1969) and Saunders and Klau (1985)). Since changes in government expenditure shares between different expenditure components reflect changes in budgetary priorities, a comparison of expenditure shares over time can give us some information about the relative importance of particular programmes. By examining the changes in the structure of government expenditure, we can get further insight into the changing role of the public sector in the economy.

Korea has experienced some important changes in the structure of government expenditure over the last four decades. In this section, long-term changes in government expenditure shares between different programmes for the period 1953-1991 are examined. By analysing changes in relative priorities of public spending over time, we will explore the changing role of the Korean public sector during the modernisation process. While there has been a lot of debate about the relative merits of functional versus economic groupings of public expenditures, two types of disaggregation have their own advantages. In this section, the two basic methods of disaggregation are chosen to explain changes in composition of public expenditure over the study period.

The post-war modernisation process in Korea can be divided into four stages as follows: i) 1953-60 Reconstruction Period ii) 1961-1970 Rapid Growth and

3.3.1 1953 - 1960

At the end of World War II in 1945, Korea obtained independence from Japanese rule. However the attainment of independence was not a sufficient condition for Korea's social and economic development. The peninsula was divided along the 38th parallel; the south and north Korea. Much of natural resources and physical plant were left in the north, and in the south, agriculture was a major industry. The division of Korean peninsula has influenced the social and economic condition since 1945.

During the transition period from 1945 to 1948, the U.S. military administration ruled South Korea. The important aims of socio-economic policy under the American military administration were self-defence and social stability. Budgetary priorities were given to defence and general administration. More than sixty percent of government expenditures was spent to defence and political stability (justice & policy). The fiscal structure during the period of American
military administration has influenced the future growth and composition of Korean public expenditures—especially heavy burden of defence expenditure.

In 1948, the first Korean government was established, and the first Korean President Sung-Man Ree inaugurated. Two years later, the Korean War broke out. The Korean War, which lasted for three years between 1950 and 1953, destroyed nearly all of the economy's productive potential. The economic and social damage done by the war was undoubtedly substantial.

In Korea, the period 1953-1960 was characterised as post-war reconstruction. After the end of the Korean war in 1953, the government initiated an effort to rebuild the economy and to raise the living standards of population who had suffered during the war. Meeting defence needs and maintaining a minimum substance level of living conditions, the Ree government tried to prepare a socio-economic development plan to recover the poor economic conditions.

Reconstruction policy was carried out during a period of political instability and economic underdevelopment. Per Capita Income was only $63 (at U.S. dollars) in 1953— one of typical cases of a poor country. Between 1953 and 1956, the average annual inflation rate (measured by GNP deflator) was 42.63 percent. The domestic market was too small to induce internal investment, and unemployment was too high due to poor economic conditions and a rapidly growing population. The average annual growth rate of real GNP for the 1953-1960 was only 3.73 percent.
Under these circumstances of instabilities and uncertainties after the war, government reconstruction policies were faced a lot of difficulties. The instability of socio-economic conditions made the formulations of long-run development plans difficult, and many short-term stabilisation policies were implemented on a trial-and-error basis.

Since personal income was too low at subsistence level and tax administration was not well developed, tax revenues were too low to afford public spending during the early 1950s (for example, see Figure 3.7). Due to the low tax yields and minus government savings, public funds for reconstruction projects were supported by foreign aid. For the period 1954-1959, more than 50 percent of reconstruction projects were funded by foreign aid particularly from the US counterpart funds. Those funds were obtained from sales of Economic Aid and Relief Goods and they played an important role in supporting the post war reconstruction policy during the 1950s.

Public functions which were performed over this period were mainly confined to defence, economic services (the construction of infrastructure) and general administration. As can be seen in Table 3.3, the relative share of defence expenditure in total public spending for the period 1953-1955 was the highest 48.63 percent. The shares of economic services and general public services were also high; 23.0 percent and 11.95 percent respectively. Compared with the high burden of defence and economic services, the social welfare function of government during the 1950s was low; the share of social welfare programme (health, social security, housing and other social services) in total public spending was only 4.23 percent.

114
The structure of government expenditure during the 1950s revealed something about the circumstances after the war and about the priorities held by policymakers for the period\(^1\).

The 1950s is usually thought of as a period of economic stagnation and political upheaval. Due to the significant decline of foreign assistance at the end of the 1950s, the government budget showed a substantial deficit and the economy faced a severe recession.

The Ree government collapsed following the Student Revolution in 1960, and the revolution increased inflation and it also influenced the growth pattern of public expenditure in the early 1960s.

After years of social and political instability at the end of the 1950s, the military government, headed by President Chung-Hee Park, came to power by a military coup in 1961. The military government adopted an expansionary policy and played an active role in promoting growth. After the political crisis of 1961, many new government expenditures (especially economic development services) became highly desirable and the responsibility for handling social and economic policies came under the power of the Park Government. The political

\(^1\) Due to the lack of reliable data on GNP and general government expenditures before the Korean War, I cannot examine the displacement effect associated with the war. Unfortunately, GNP data has been compiled after the end of the Korean War of 1953. For the empirical test of the displacement effect hypothesis in the context of social disturbances caused by the two political crises in Korea, see Chapter 5.
crisis of 1961 generated pressures for increased spending on social and economic development services (see Bahl, Park, and Kim, 1986, chapter 4).

For example, the central government expenditure on economic development services increased (in absolute terms) from 8.28 million won in 1960 to 19.45 million won in 1961, an increase of 135 per cent. In contrast, social welfare expenditures increased from 1.95 million won in 1960 to 3.14 million won in 1961, an increase of 61 per cent (see Table 3.3). It is quite likely that the political crisis of 1961 changed the character of government expenditure and produced an upward shift in the level of government expenditures on economic development and social welfare services.
Table 3.3 Functional Composition of Central Government Expenditures

(selected periods 1953-1991)

<table>
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</thead>
<tbody>
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<td>General Public Services</td>
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<td>11.93</td>
<td>18.49</td>
<td>9.43</td>
<td>8.66</td>
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<td>16.45</td>
<td>15.44</td>
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<td>1.32</td>
<td>1.23</td>
<td>1.74</td>
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<td>Social Security &amp; Welfare</td>
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<td>5.25</td>
<td>4.33</td>
<td>6.02</td>
<td>8.31</td>
</tr>
<tr>
<td>Housing &amp; Community Develop</td>
<td>0.68</td>
<td>0.94</td>
<td>1.41</td>
<td>5.21</td>
<td>9.67</td>
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<tr>
<td>Others Social Services</td>
<td>0.24</td>
<td>1.32</td>
<td>1.16</td>
<td>0.69</td>
<td>0.51</td>
</tr>
<tr>
<td>Economic Services</td>
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<td>35.66</td>
<td>24.62</td>
<td>22.08</td>
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<td>6.11</td>
<td>11.17</td>
<td>15.32</td>
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<tr>
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<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

3.3.2 1961 - 1970

The 1960s was an important period for the Korean modernisation process. It was since the early 1960s that Korea had experienced rapid industrialisation accompanying by rising real per capita income, technological advances and institutional changes. The "take-off" period may be dated from this period.

After years of stagnation and political instability at the end of the 1950s, President Chung-Hee Park came to power by a military coup. In 1961, the new government of the Third Republic, headed by President Park, was established. The main aims of economic policy under the military government were economic growth, stable prices and the promotion of export industries. Compared with the weak government policy in the 1950s, the military government played an active role in promoting growth in the 1960s. Korea has transferred from one of the poorest countries in the 1950s to the fastest growing economies in the 1960s.

In 1953, per capita income was only $63. In 1971, per capita income reached $288. Average annual growth of real GNP for the period 1963-1971 was 9.5 per cent. On a per capita basis, real growth for the period 1963-1971 was 6.9 per cent, compared with 0.7 per cent over the period 1954-1962.

Because the internal domestic market was so small and the development stage was too low, the Park government adopted an "export-led strategy" which favoured the growth of export industries. Since the early 1960s, exports were emphasised and the government mobilised both internal and external resources to support export industries. To increase exports, the government provided a lot of direct subsidies and other incentives systems, including a variety of tax incentives.
The government's increasing role in the economy was clearly revealed in the execution of the "First Five-Year Economic Development Plan" which was launched in 1962. With the launching of the First Five-Year Plan, the government began to exert considerable influence on the economy. This plan involved development and co-ordination of capital expenditure programs, and the plan aimed at promoting export industries. At an early stage of economic development, the government invested public funds for promoting infrastructure development. As can be seen in Table 3.4, public investment has expanded since the early 1960s.

The First Five-Year Plan was over-ambitious because the target of real economic growth of 7 percent per annum was too high compared to the actual growth performance. To achieve the growth target, the government adopted an expansionary fiscal policy, and it resulted in a rapid expansion of government expenditures. But due to bad harvests and monetary reform in 1962, the economic condition in the early 1960s was very weak. Especially due to the expansionary policy, inflation measured by WPI (Wholesale Price Indexes) rose sharply to 20.37 percent in 1963 and to 34.36 percent in 1964.

The plan was revised in 1964. To reduce inflation, the government adopted a deflationary policy. The major purpose of the deflationary fiscal policy was the elimination of the fiscal deficit, which was considered as a major source of inflation. The government cut expenditure in 1963 and in 1964. The expenditure/GNP ratio declined in 1963 and in 1964 (see Figure 3.1).

After two years of budgetary austerity, however, government expenditure entered the second expansion stage. Since 1965, the absolute and relative size of
the public sector has grown steadily. The share of public expenditure in GNP rose again since 1965.

In 1965, foreign aid was cut sharply and counterpart funds were decreased rapidly. Since many development projects, postponed during the two years deflationary years, had to be carried out, there existed serious pressure for financing public expenditure. Especially as the commencement of the Second Five-Year Plan in 1967, fiscal pressure for financing government expenditure increased.

To meet fiscal needs during the 1960s, the government established the Office of National Tax Administration (ONTA) in 1966. The ONTA was responsible for collecting tax and formulating tax policy and introduced an effective tax administration and undertook various reforms of the tax structure. Government's direct cost of collecting tax was also reduced. As can be seen in Figure 3.7, the structure of financing has changed significantly since the mid 1960s. The share of direct taxes has increased steadily throughout the whole period. Partly due to these reforms and partly to rapid economic growth in the mid 1960s, national tax revenues increased steadily. In contrast, the share of government receipts financed by foreign aid has declined sharply since the mid 1960s.

The other important institutional change taken in this period was the establishment of the Economic Planning Board (EPB). The EPB was set up in 1961, and took over responsibility for budgeting, economic planning and resource mobilisation. The head of the board was ranked as a Deputy Prime Minister. As deputy prime minister, the head of the EPB played an important role in co-
ordinating and controlling conflicts among the various economic ministries through the EPB's budgetary function.

Compared with the early 1950s, there has been a significant change in composition of public expenditures. As shown in Table 3.3, during the early 1960s, the share of public spending allocated to economic services and education has been increased. This has been balanced against a decline in defence expenditure (see also Figure 3.5). Especially, the share of economic services was the highest; 35.66 percent for 1961-1963. It reflected the changing role of fiscal policy between different stages of development. At the early stage of development, an increased level of capital formation was needed, and budgetary priorities were set to raise productivity in the economy.

During the period, education expenditure was 12.88 percent of total public spending. From Table 3.3, we can see that the share of public spending on education has increased continuously since the early 1960s. During the Korean modernisation process, education was considered as an important source of economic development. Influenced by Confucian values, many Koreans thought education as an important source of upward class mobility and to future success in their lives. Those factors contributed to the growth of education expenditure.

While the share of education expenditure has increased, the share of social welfare expenditure (health, social security, housing and other social services) has not increased greatly. Like other developing countries, social welfare received a low priority for policy makers at the early stage of development.
<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Expenditure on Goods &amp; Services</td>
<td>62.92</td>
<td>40.47</td>
<td>38.68</td>
<td>36.72</td>
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</tr>
<tr>
<td>Interest Payment</td>
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<td>0.84</td>
<td>2.22</td>
<td>5.60</td>
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<td>Subsidies and Current Transfers</td>
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<td>28.84</td>
<td>34.58</td>
<td>29.10</td>
<td>40.86</td>
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<tr>
<td>Capital Transfer</td>
<td>4.58</td>
<td>6.86</td>
<td>5.92</td>
<td>5.22</td>
<td>5.39</td>
</tr>
<tr>
<td>Capital Spending</td>
<td>6.00</td>
<td>12.41</td>
<td>12.52</td>
<td>7.83</td>
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</tr>
<tr>
<td>Net Lending</td>
<td>9.52</td>
<td>10.58</td>
<td>6.07</td>
<td>15.53</td>
<td>12.27</td>
</tr>
<tr>
<td>Total Expenditure</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The share of general public services in total central government expenditure increased from 10.21 per cent in 1971 to 22.49 per cent in 1972. In contrast, the share of public spending on unallocated expenditure decreased from 12.81 per cent in 1971 to 2.48 per cent in 1972. The share of other government expenditures (defence, education, social services and economic services) remained constant. It is unlikely that there were interfunctional displacements in the early 1970s. For the empirical test of the displacement hypothesis, see Chapter 5.
3.3.3 1971 - 1980

The major aims of economic policy in the early 1970s were similar to those of the 1960s. Many of the promotional policies were pursued, export-led growth policy continued, and the same group of policy makers managed the economy. The development strategy in the 1970s was again characterised by continued government intervention. However, due to the two oil shocks in 1973 and 1979 and the subsequent world-wide economic recessions, Korea also experienced some important structural changes. The government tried to adopt macroeconomic policy in response to the changes of the internal and external economic conditions.
With the launching of the Third Five-Year Economic Development Plan (1972-1976), the government emphasised the growth of exports and especially the development of heavy and chemical industries. To achieve the planning targets and to promote economic growth, the government played a much more active role in the economy.

1973 was an important turning point for the Korean economy. The first oil shock hit the economy, and inflation rose 41.97 percent in 1974. The government undertook a deflationary policy to reduce inflation. Efforts were made to deflate the economy in 1973 by reducing public expenditure and public investment. Due to the deflationary fiscal policy, the public expenditure/GNP ratio declined in 1973.

It was also in 1973 that the government announced the Heavy and Chemical Industry Development Plan. The government considered that these industries were important for further economic development and export growth. The government undertook large scale investment projects in these industries. The government also supported those industries through preferential credit allocation, tax exemptions and government loans and subsidies programmes. In addition to those programmes, the government established the National Investment Fund (one of the largest government funds in Korea) in 1974. Throughout the operation of the fund, the government provided financial resources at lower interest rates and supported heavy industry projects. To secure public sector financing requirements, the government also resorted to foreign borrowing.
Many of these development strategies attributed to the growth of "off-budget" activities\(^2\) in the 1970s. Especially, the Central Government Fund increased rapidly since 1973. It increased from 69.8 Billion Won in 1974 to 209.3 Billion Won in 1976 and to 713.4 Billion Won in 1980. It was also during the 1970s that public enterprise activities increased. Over the period, public enterprise investment accounted for more than 20 percent of total gross investment. To support strategic industries, the government used various tax expenditures measures such as tax exemptions, tax allowances and tax credits. Although those off-budget activities are not included in the general government expenditures in the national accounts, such activities have increased greatly since the early 1970s.

Active government intervention and aggressive policy measures led to rapid economic growth. Between 1971 and 1979, Korea experienced rapidly increasing exports and GNP growth. The industrial structure changed from labor intensive industries in the 1960s to heavy and chemical industries in the 1970s.

Exports increased from 55 millions of dollars in 1962 to 1,068 millions of dollars in 1971, with an average annual growth rate of 39.0 per cent. The share of the mining and manufacturing sector in GNP increased 16.0 per cent in 1960 to 22.5 per cent in 1971, while the agricultural sector decreased from 37.0 per cent to 26.6 per cent over the period. Heavy industries increased their share of nominal manufacturing output from 38.0 per cent in 1971 to 57.0 per cent in 1983. In contrast, light industries decreased their share from 62.0 per cent to 43.0 per cent over the period (see Corbo and Suh, 1992).

\(^2\) For a more detail discussion of off-budget activities, see Chapter 2.
By the end of the 1970s, major problems appeared. As the second oil shock hit the economy in 1979 and due to the following world-wide recession, the Korean economy faced very difficult circumstances. Excess capacity appeared in the heavy and chemical industries and the operation ratio of these industries decreased sharply. Due to the recession in the late 1970s and excess capacity, the equipment in the heavy and chemical industries did not fully utilised.

To make matters worse, the assassination of President Park in 1979 produced profound political upheavals. In an already difficult time, the second political coup occurred in 1979. President Doo-Hwan Chun came to power by a military coup.

Due to the poor harvest in 1980, real agricultural GNP dropped in 1980. Inflation measured by the WPI accelerated to 38.86 percent and 20.41 percent in 1980 and 1981. In 1980, for the first time in nearly two decades, the Korean economy experienced a negative growth rate of -3.7 percent. All of these factors had aggravated the structural difficulties by the early 1980s.

As indicated above, composition of government expenditures in the 1970s was similar with that of the 1960s. In 1971-1973, the share of public spending on general public services and education had increased; compared with the early 1960s. The ratio of defence expenditure remained constant. Since the number of U.S. troops reduced by nearly one-third in the early 1970s, the need for self-defence resulted in the high burden of defence expenditure once again.

While the economy experienced rapid economic growth during the 1970s, the share of social expenditures in total public spending was still too low.
3.3.4 1981 - 1991

In September 1980, President Doo-Hwan Chun was inaugurated and the Fifth Republic was established. The overriding aims of economic policy under the Chun government were (i) price stabilisation, (ii) market liberalisation and (iii) balanced socio-economic growth.

Although all of these aims were emphasised during the Fifth Five-Year Socio-Economic Development Plan (1982-1986), the principal concern of the new government was given to price stabilisation. Since the macroeconomic circumstances in 1979 had so deteriorated and the overall role of the government in the economy was being questioned, new macroeconomic strategies were in order. The active government involvement in the economy during the 1970s had created inefficiencies and high inflation. Inflation rates (measured by WPI) recorded at an annual rate of 15 per cent in the 1970s. In 1980, wholesale prices increased 39.0 per cent, while consumer prices rose 29 per cent. Inflation became a prominent objective under the Chun government. To reduce inflation, the government adopted a package of reflationary measures (restrictive monetary and fiscal policies) that replaced the aggressive government spending of the late 1970s.

In 1980 when President Chun came to power, the ratio of public expenditure to GNP was 19.48 percent. The growth of the public expenditure / GNP ratio in
1980 was mainly due to the negative GNP growth in that year. Real GNP fell by 3.7 percent in 1980. Due to high inflation in the early 1980s, the government undertook a restrictive fiscal policy in 1983. The growth of public expenditures was restrained and in 1984 the government froze nominal public spending at 1983 levels. On the other hand a restrictive monetary policy was also adopted to control the overall money supply. As a result of reflationary fiscal and monetary policy, the budget deficit as a ratio of GNP dropped from 5.6 percent in 1981 to 1.5 percent in 1985, and inflation stabilised to one digit (The average annual rate of inflation in the 1980s was less than 10 per cent.); The average annual inflation rate (WPI) for 1982-1988 was 1.18 percent. During the 1980s, the relative public sector size remained around 20 percent to GNP.

Another new direction of economic policy under the Chun government was market liberalisation. In connection with the policy objective of reducing government involvement in the economy and with its emphasis on market forces, the government pursued de-regulation and privatisation policy. Since Korea's earlier growth strategy had resulted in inefficiency and unbalanced industrial development, the government changed its policy toward more reliance on indirect guidance and market forces. During the 1980s, a number of government loan programs were eliminated, and the government tried to reduced off-budget activities. The size of extra-budget accounts had shown a continuous reduction and tax exemptions also reduced substantially. Public enterprises, especially financial sector and heavy & chemical industries, have been privatised.

It was also during the early 1980s that the need to build a welfare state emerged in Korea. As presented in the Fifth Plan, the government emphasised the policy objective; "growth with equity". Although the government resources which
could be spent on welfare expenditures were limited, the Fifth plan was concerned with the promotion of balanced growth and social development. Compared with the previous plans in the 1960s and 1970s, the new plan gave more priority to the welfare policies.

Compared with the previous three decades, there have been some changes in the structure of government expenditure. Since the early 1980s, the share of general public services in total expenditures has declined; the share fell to 8.65 percent in 1990-1991. Education expenditure has maintained a steady proportion of total public expenditure since the early 1970s; around 16 percent for the period (see Table 3.3). During the rapid economic growth process, human capital has been regarded as an important source of economic growth. Within the total limit of public expenditures, budget priorities were given to human resource development especially through education spending.

One of the important changes in the composition of public expenditure in the late 1980s can be found in social welfare expenditures. Since the early 1980s, the major Korean social welfare system has been emerged; legal minimum wage, state medical insurance program, housing development program and state aid program to the poor. Due to these social welfare programs, welfare expenditures (health, social security, housing and other social services) have increased; 13.15 percent in 1981-1983 and 20.23 percent in 1990-1991.

Among these welfare expenditures (education, health, social security, housing and other social services), the largest component went to education. Although the share of education spending in total government expenditures decreased slightly during 1971-1991, this item received 13.91 per cent of total
government expenditures in 1991 (see Table 3.5). Housing and community
development expenditures grew fastest for the period 1971-1991. The rapid
urbanisation of the 1970s generated a great demand for housing in cities. The
government introduced housing development program in the early 1980s and
housing and community development spendings rose from 1.22 per cent in 1971
to 9.20 per cent in 1991. Due to the introduction of legal minimum wage, state
aid program and state medical insurance program in the early 1980s, social
security and welfare expenditures also increased 5.30 per cent to 8.53 per cent
during the 1971-1991. However, the share of health and other social spendings
in total government expenditures remained constant over the period.
empirical study shows that the Gini coefficient for all households dropped from
0.3981 in 1980 to 0.3567 in 1984 (see Corbo and Suh, 1992).

In contrast with the increase of welfare expenditures, the share of economic
services slightly declined. Although the relative share has declined, economic
services expenditure shows the largest portion in total public expenditure; 20.53
percent in 1990-1991. As in other developing countries, public capital formation
in Korea is regarded as an important role of the public sector.

However, even in the 1990s, the protective role of the state is still important in
Korea. Although the share of defence expenditure has been declining since the mid
1980s, the burden of defence spending is still high in Korea. Given the
uncertainties surrounding the Korean peninsula and taking into account the U.S.
defence policy, it is most unlikely that Korea's defence budget will decline
appreciably in the near future.
Table 3.5  Functional Composition of Central Government Expenditures

(selected periods 1971-1991)

<table>
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<tr>
<td></td>
<td>million won</td>
<td>%</td>
<td>million won</td>
<td>%</td>
<td>million won</td>
<td>%</td>
</tr>
<tr>
<td>General Public Services</td>
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<td>8.91</td>
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<td>8.84</td>
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<td>Housing &amp; Community Develop</td>
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<td>763.800</td>
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<td>Others Social Services</td>
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<td>0.89</td>
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<tr>
<td>Economic Services</td>
<td>192.412</td>
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<td>Unallocable &amp; Others</td>
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<td>12.82</td>
<td>1027.600</td>
<td>10.08</td>
<td>6834.000</td>
<td>16.95</td>
</tr>
<tr>
<td>Total Expenditure</td>
<td>622.351</td>
<td>100.00</td>
<td>10189.800</td>
<td>100.00</td>
<td>40311.500</td>
<td>100.00</td>
</tr>
</tbody>
</table>

3.4 Summary

This chapter examined the growth and change of the structure of public expenditure in Korea during the period 1953-1991. Since time-series analyses of public expenditures in developing countries are relatively rare in the literature, this study represents an effort to employ time-series analysis of the growth and change of public expenditure in Korea over the last thirty-nine year period.

Over the last four decades, the relative size of the Korean public sector was smaller than that of the developed countries. However public expenditure in absolute terms grew significantly. The growth of public spending was mainly due to the development in economic services and defence expenditure. In Korea, the government played an important role in promoting capital formation.

Under the particular social circumstance in the Korean peninsula, the protective role (national-defence) has been important. However the relatively small share in transfer and social expenditure during the 1960s and 1970s indicates the weak redistributive function of government.
The time pattern of Korean public expenditures was irregular and major changes were caused by political and social upheavals.

To explain the long-term pattern of public expenditure in Korea more clearly, we need further research on the determinant analysis. This is the subject matter of the next chapters.
Chapter 4 Wagner’s Law
(An Application of Cointegration Analysis for Korea)

4.1 Introduction

Toward the end of the nineteenth century, Adolph Wagner (1883) formulated his famous law of increasing state activity for western industrializing countries by linking the growth of government activity to economic development. Although there has been some disagreement among scholars regarding the correct interpretation of the hypothesis, Wagner's Law has been generally interpreted as follows; as per capita income increases in industrializing nations, a rising share of an economy's resources will be devoted to public sector activities. Wagner's hypothesis, i.e., the proposition that there exists a long-run tendency for the public sector to grow, has become a stylized fact in public sector economics (Brown and Jackson, 1990, p.122).

As explained in Chapter 1, many researchers have discussed about the correct interpretation of Wagner's Law. Although Wagner's original ideas were broad, subsequent researchers have interpreted the law in narrow terms (especially, Bird (1971)).

In modern economic terms, Wagner's hypothesis has been explained in terms of the income elasticity of demand for public goods. For Wagner, publicly produced goods and services are superior or income elastic wants. Therefore, as
real income increases in the economy, public expenditure rises more than proportionately (the income elasticity of public expenditure in excess of unity).

Since the early 1960s, many studies have examined the empirical verification of Wagner's hypothesis. As new data sets on the relevant variables have become available, and more advanced econometric techniques have been developed, further tests of the law have been done. The debate about the correct interpretation and validity of Wagner's hypothesis continues today. Most empirical studies have been based on either time-series analysis of a single country or cross-sectional analysis of different countries. The empirical results of Wagner's hypothesis are inconclusive. Many time-series studies find support for the hypothesis, compared with the lacking of support in most cross-section studies. For example, empirical studies by Bird (1971), Abizadeh and Yousefi (1988) confirm Wagner's law whereas studies by Wagner and Weber (1977), Ram (1987), and Gemmell (1990) do not find conclusive support for the law.

Several authors have argued that Wagner's Law should be tested with time-series data rather than cross-section basis. Since Wagner's hypothesis is concerned with the long term growth of public expenditure in a country, they argue that cross-section studies cannot prove Wagner's Law. For example, Bird (1971, p.10) suggests that such tests (international cross-section comparison) are "completely irrelevant as tests of a hypothesis the essence of which is a postulated change over time in a particular country".

A number of studies using time series data have been undertaken in order to examine a positive correlation between the growth of public expenditure and national income. In general, these empirical studies have found support for the
law with few exceptions. However these studies have also suffered from numerous methodological problems which render their results of dubious value. Recently Henrekson (1992) and Murthy (1993) have criticised the problems of previous time-series econometric tests for Wagner's Law and suggested a cointegration analysis to test the validity of the law.

The purpose of this chapter is to examine the validity of Wagner's Law in the Korean economy by employing a recently advanced econometric method. In Korea, public spending and national income have had a tendency to grow over the last four decades. However, unless the two variables (government expenditures and GNP) are cointegrated, we cannot determine a long-run relationship between them; i.e. the regression equation, using non-stationary variables, leads to the problem of spurious regression. In this chapter, I attempt to test the stationarity of the time series data on public spending and GNP (in real terms) for Korea during the period 1953-1991. By employing a recently advanced econometric technique (unit root test and cointegration analysis), I attempt to examine a long-run relationship between real government expenditures and real GNP in the framework of Wagner's Law.

This chapter is organised as follows. Before econometric techniques are discussed, a brief reference of six different versions of Wagner's Law is made and the six formulations are presented. Subsequently, the econometric technique for stationarity and of cointegration analysis are explained and these techniques are applied to Korean data. Finally, after the presentation of the statistical results, some concluding remarks are offered.
4.2 The Empirical Model of Wagner's Law

As in all other empirical studies, we need to choose an appropriate model for an empirical verification of Wagner's Law.

Due to the complexity of the problems and the vagueness of Wagner's hypothesis, it is difficult to precisely define the empirical form of the relationship between public expenditures and the level of economic development. Different empirical researchers have interpreted the law differently and many different versions of Wagner's Law have appeared.

Following Gandhi (1971) and Mann (1980), the following six different versions of Wagner's Law have been most commonly investigated.

(i) Peacock and Wiseman (1967) have tested the relation

\[ GE = f(GNP) \]

where GE stands for government expenditure and GNP is gross national product. They briefly write Wagner's Law as "government expenditure must increase at an even faster rate than output" (P-W, 1967, p.17). This functional form is called the traditional Peacock-Wiseman version. According to this version, the elasticity of GE with respect to GNP is expected to exceed unity.
(ii) Pryor (1968) has examined the relation

\[ GEC = f (GNP) \]

where GEC stands for government consumption expenditure. To exemplify Wagner's spirit, Pryor (1968, p.451) asserts that "in growing economies the share of public consumption expenditures in national income increases". According to the Pryor version, the elasticity of GEC with respect to GNP would be expected to exceed unity.

(iii) Goffman (1968, p.359) interprets Wagner's Law "as a nation experiences economic development and growth, an increase must occur in the activities of the public sector and that the ratio of increase, when converted into expenditure terms, would exceed the rate of increase in output per capita". The Goffman version assumes a functional relationship of the form as follows

\[ GE = f \left( \frac{GNP}{N} \right) \]

where N denotes population and GNP/N stands for gross national product per capita. According to this version, the elasticity of public expenditures with respect to gross national product per capita is greater than unity.

(iv) Musgrave (1969, p.74) claims "Ever since Adolph Wagner expounded his law of the expanding scale of state activity, economists have speculated on its validity and the underlying causes. The proposition of expanding scale, obviously, must be interpreted as postulating a rising share of public sector or ratio of public expenditure to GNP ... development of a country from low to high per capita income". The Musgrave version, the most widely accepted specification of Wagner's Law, can be written as follows
GE/GNP = f(GNP/N)

where GE/GNP denotes public expenditure as a share of GNP. According to Musgrave's version, Wagner's Law is validated if the ratio elasticity exceeds zero.

(v) Gupta (1967) and Michas (1975) have examined the following version of Wagner's hypothesis

GE/N = f(GNP/N)

where GE/N represents government expenditure per capita. They tried to verify that the elasticity of public spending per capita with respect to GNP per capita is greater than unity.

(vi) The last formulation to testing Wagner's Law is the "modified" Peacock-Wiseman share version. It is referred to as the modified P-W version because Mann (1980) converts the traditional Peacock-Wiseman formulation into a share version. According to the modified P-W version, the law can be written as follows

GE/GNP = f(GNP)

In the relation, if the elasticity is greater than zero, then Wagner's Law is validated.

These six formulations of Wagner's hypothesis can be expressed in log-linear regression forms as follows:
\begin{align*}
\ln GE &= \alpha + \beta \ln (\text{GNP}) + u \\
\ln GEC &= \alpha + \delta \ln (\text{GNP}) + u \\
\ln GE &= \alpha + \gamma \ln (\text{GNP}/\text{N}) + u \\
\ln GE/\text{GNP} &= \alpha + \omega \ln (\text{GNP}/\text{N}) + u \\
\ln GE/\text{N} &= \alpha + \psi \ln (\text{GNP}/\text{N}) + u \\
\ln GE/\text{GNP} &= \alpha + \nu \ln (\text{GNP}) + u
\end{align*}

In the above equations, \( \ln \) stands for the natural logarithm of the variables, and the parameters \( \alpha \) and \( u \) are the intercept and the stochastic error term respectively. In the equations, the estimated coefficients of the independent variable stand for the income elasticity of demand for public expenditures which will produce different values depending on the version used. To validate Wagner's hypothesis the straight income elasticity requires to be \( > 1 \) and the ratio income elasticity needs to be \( > 0 \).

Most previous empirical tests of Wagner's Law in a single country over a long period have used time-series data and employed the ordinary least squares (OLS) regression technique to estimate the above elasticities. Most of these empirical studies have found support for the law.
However, they have suffered from various methodological flaws and errors. The conventional models have ignored the question of stationarity. In the next section I will address about these issues.

4.3 Econometric Problem

Over the last two decades, many researchers have undertaken case studies for their countries with the six different versions of Wagner's Law. The case studies for Mexico, the United States and Canada respectively was undertaken by Mann (1980) (later, Nagarajan and Spears (1990)), Abizadeh and Yousefi (1988), and Afxentiou and Serletis (1991). In order to examine the validity of Wagner's Law, all of these studies have used time-series data obtained from their countries. Using time-series data and employing the ordinary least squares (OLS) techniques, they estimated the regression coefficients. These empirical tests of six different versions of the law have found a statistically significant positive relationship between government expenditures and economic growth. They vindicate Wagner's Law.

These previous studies have contained numerous econometric shortcomings or misspecified equations. In estimating six different equations for Wagner's hypothesis, they have assumed that the time-series data used on government expenditure and national income are stationary and that the error terms in the equation are serially un-correlated. Under these assumptions, the method of OLS
gives estimators that are unbiased and have minimum variance; i.e. the estimated coefficients are consistent and have the usual asymptotic normal distribution.

However, recent advances in time series analysis and available empirical evidence have suggested that many macroeconomic times series are nonstationary in the sense that the mean and variance depend on time (Nelson and Plosser (1982), Schwert (1987), Maddala (1992)).

If a variable tends to return to its mean level through time, the variable is said to be stationary. A stationary series has a well-defined mean which will not vary greatly with the sampling period. But if a series tends to depart even further from any given value as time goes on and has a time varying mean, the time series is said to be nonstationary. For nonstationary time-series, we cannot use the term mean without referring to some particular time period.

Nonstationarity in time-series data gives rise to many econometric problems. Regressions involving such nonstationary variables are likely to produce spurious results. When nonstationary data are being used in a regression, the results obtained by using these variables are likely to be spurious because the variables are actually unrelated. The possibilities of spurious regression also exist if the variables under consideration are not cointegrated.

To overcome the problems of the previous studies dealing with Wagner's Law, we need to examine the stationarity of each variables and to investigate the long-run relationship between government expenditure and GNP in terms of cointegration analysis.
As specified in the six different formulations of Wagner's Law, the data under examination consists of gross national product (GNP), government expenditure (GE) and government consumption expenditure (GEC) in real terms.

In addition, the data are also examined in per capita terms - per capita GNP (GNP/N), per capita government expenditure (GE/N) - and the share of government expenditure in GNP (GE/GNP) in real terms. All six series are measured in real terms and transformed to natural logs\(^1\).

In the next subsection, I will test the stationarity of the data and examine a long-run link between the variables in terms of cointegration analysis, using data for Korea over the period, 1953-1991.

\(^1\) For a definition of the variables and data sources, see APPENDIX 1 Data Sources and Definitions at the end of this chapter.
4.3.1 Two types of Trends

As mentioned above, many economic time series are nonstationary rather than stationary. Nonstationary data must be appropriately transformed so that the statistical condition of white noise for $u_t$ is satisfied. By de-trending the series, the disturbance term $u_t$ becomes a stationary series with mean zero and constant variance (e.g. $u_t \sim \text{IN}(0, \sigma^2)$). If these statistical conditions for the disturbance term are satisfied, then the series $u_t$ is called white noise (A white noise is a serially uncorrelated process).

As pointed out by Nelson and Plosser (1982), most economic time series can be "trend stationary processes (TSP)"- positive or negative growth over time- or "difference stationary processes (DSP)"-stationary in first or higher order differences. Both the models exhibit a linear trend. But the appropriate method for de-trending is different.

If a time series belongs to the TSP class, it can be detrended by regressing the series against an intercept and a time trend. If a time series is the DSP class, we can use successive differencing as a way of removing nonstationarity. Since transformations of the data depend upon the properties of the variables, we need to know about the time-series properties of the variables before de-trending the data. To test the hypothesis of whether the time-series used in the regression belongs to the DSP class or to the TSP class of models, Nelson and Plosser (1982) have used Dickey-Fuller tests.
Theses tests consist of estimating the following regression equation

$$\Delta Y_t = \alpha_0 + \alpha_1 T + \alpha_2 Y_{t-1} + \sum_{i=1}^{m} \beta_i \Delta Y_{t+i} + u_t$$  \hspace{1cm} (7)

where $Y_t$ denotes the relevant variable, $\Delta$ is the first difference operator, $\alpha_0$ is a constant, $T$ is the time trend and $u_t$ is a stationary series with zero mean and constant variance.

By estimating the equation (7), we can test the joint null hypothesis $(\alpha_1 = \alpha_2 = 0)$ for each data series. In this joint test, the null hypothesis to be tested is that the time series belong to the DSP class $(\alpha_1 = \alpha_2 = 0)$ against the alternative that they belong to the TSP class. The failure to reject the null hypothesis means that the data is subject to the DSP class and it follows a random walk with a drift.

Under this null hypothesis, Dickey and Fuller (1981) provide tabulations of the distribution of the t-ratio and the values of the F-statistic for testing the null hypothesis. The critical F-values in Dickey and Fuller are much higher than those in the usual standard F-tables.
Table 4.1 Dickey-Fuller Joint Hypothesis Test
(Joint Test of zero restrictions on the coefficient of deleted variables)

<table>
<thead>
<tr>
<th></th>
<th>Calculated F-values</th>
<th>Critical * F-values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n=50</td>
</tr>
<tr>
<td>LGNP</td>
<td>34</td>
<td>4.92</td>
</tr>
<tr>
<td>LGE</td>
<td>34</td>
<td>4.15</td>
</tr>
<tr>
<td>LGEC</td>
<td>34</td>
<td>2.57</td>
</tr>
<tr>
<td>LGNP/N</td>
<td>34</td>
<td>5.05</td>
</tr>
<tr>
<td>LGE/N</td>
<td>34</td>
<td>3.63</td>
</tr>
<tr>
<td>LGE/GNP</td>
<td>34</td>
<td>6.37</td>
</tr>
</tbody>
</table>

Notes: * The Critical F-values (the $\Phi_3$ statistic) are taken from Table VI in Dickey and Fuller (1981, p.1063). The 95 per cent point of the distribution of the $\Phi_3$ statistic for the sample size 34 falls between 6.73 and 7.24. The lag length 4 is assumed in the equation.²

To test the hypothesis that the time-series of the six variables belong to the TSP (trend stationary processes) class against the alternative that they belong to the DSP (difference stationary processes), I use a test developed by Dickey and Fuller (1981). After testing the six variables used in the six different versions of Wagner's Law, we report the results in Table 4.1.

² Although most of the reported results are based on the lag length 4, a comparison is provided in APPENDIX II of the summary results based on the different lag lengths.
Table 4.1 shows the number of observations (n), the calculated F-values for the six variables and the critical F-values from the tables presented in Dickey and Fuller. As we can see, the number of observations was 34 and the calculated F-values for the six variables are ranged from 2.57 (LGEC; the log of government consumption) to 6.37 (LGE/GNP; the log of government expenditure in GNP). The relevant critical values for the Φ3-statistic are given in Table VI in Dickey and Fuller (1981, p.1063). At the 5% significance level for the sample size 50, the corresponding critical F-value is 6.73, and for the sample size 25, the critical F-value is 7.24. If the calculated F-values are less than the critical F-values, we cannot reject the null hypothesis and the data is subject to the DSP class.

From the above table, we can see that the null hypothesis (α1 = α2 = 0) cannot be rejected at 5% significance level for all six variables. At the 5 per cent level, we failed to reject the hypothesis that the data have unit roots. Therefore, the DSP hypothesis seems to be accepted for all six variables because all of the calculated F-values are less than the critical F-values\. However, if we examine the calculated variables more carefully, the calculated F-value for LGE/GNP (i.e. 6.37) is too high to claim that it is a pure DSP class of model. The better explanation would be that the series for LGE/GNP is a DSP dominant mixed process.

---

3 In examining historical time series for the U.S. economy, Nelson and Plosser (1982) also find that the DSP model is more appropriate for most economic time series.
4.3.2 Tests for Unit Roots

In the previous subsection, I examined the stationary properties of the six series and found that all six series used in Wagner's Law are the DSP class of models. The next step is to apply unit root tests in order to examine the order of integration of each data series.

Testing for unit roots in time series data has received considerable attention in recent econometric literature. Since there exists the problem of spurious regression involving the levels of the variables, we need to examine whether each series is stationary or whether the series has a stochastic trend. If a series contains unit roots, the time series data is not stationary and it will behave as a stochastic rather than a deterministic process.

Until recently, several methods of testing for unit roots have been proposed. The Dickey-Fuller (DF) test and the Augmented Dickey-Fuller (ADF) test have been most commonly used. Pesaran and Pesaran (1991, p.160) suggests that the DF and ADF test are preferable to the other tests and propose the Augmented Dickey-Fuller Regression for testing for unit roots. If we adopt The Dickey-Fuller (DF) test to examine the unit root hypothesis, we can simply use the standard tables from Dickey and Fuller (1981).

4 For example, the Dickey-Fuller (DF) test, the Augmented Dickey-Fuller (ADF) test, the Instrumental Test, and the Phillips-Perron test. For a useful survey of the unit root literature, see Banerjee, et al. (1993).
In this subsection, I will apply the DF and ADF test (the most commonly used test) to examine the null hypothesis of a unit root. I will be concerned with six series; LGNP (the log of GNP), LGE (the log of government expenditure), LGEC (the log of government consumption expenditure), LGNP/N (the log of per capita GNP), LGE/N (the log of per capita government expenditure) and LGE/GNP (the log of the share of government expenditure in GNP).

A series is called "integrated of order $d$" and denoted by $I(d)$, if it needs to be differenced $d$ times to achieve stationary properties. A series which is $I(0)$ (integrated of order zero) is said to be stationary, and a series which is $I(1)$ (integrated of order one) is a random walk.

In order to examine whether a series is $I(1)$ against the alternative $I(0)$, we employ the unit roots tests developed by Fuller (1976) and Dickey and Fuller (1981). The Dickey-Fuller (DF) test can be written as follows:

\[ \Delta Y_t = \alpha_0 + \beta_1 T + \beta_2 Y_{t-1} + u_t \]  \hspace{1cm} (8)

where $\Delta Y_t$ is the first differences of the series, $T$ is the linear time trend and $u_t$ is the normally distributed term. In equation (8) we can test the null hypothesis $H_0 (\beta_2=0)$ by comparing the calculated t-ratio of $\beta_2$ with the relevant critical t-ratio which is given in the bottom part of Table 8.5.2 in Fuller (1976, p373).

If the calculated t-values are less then the critical t-value, then we reject the null hypothesis of unit root. In that case, the series is called as integrated of
order zero (i.e. $I(0)$). However, if $u_t$ is not white noise and serially correlated, Dickey and Fuller (1981) have proposed expanding the regression equation (8) by including a lag polynomial term in $\Delta Y_t$. This is called the Augmented Dickey-Fuller Test (ADF) and can be written as follows:

$$\Delta Y_t = \alpha_0 + \beta_1 T + \beta_2 Y_{t-1} + \sum_{j=1}^{p} \lambda_j \Delta Y_{t-j} + u_t \quad (9)$$

where $\Delta Y_t$ is the first differences of the series, $T$ is the linear time trend, $u_t$ is a white noise residual and $p$ is the number of lags.

In both DF and ADF tests, the null hypothesis is that there is a unit root. A negative and statistically significant $t$-value rejects the null hypothesis in favour of an alternative hypothesis that the series is stationary.

Table 4.2 reports the calculated $t$-values from the DF and ADF tests on each variable for levels both with (panel A) and without (panel B) a time trend in the model. The null hypothesis is that the series is a non-stationary process, against the alternative hypothesis of a stationary process. In the case of the levels of the six variables, the null hypothesis of non-stationarity cannot be rejected. All six variables in levels appear to be non-stationary.\(^5\)

\(^{5}\) It is not clear whether the variable, LGE/GNP, is stationary or non-stationary. According to the DF test with no time trend, the calculated $t$ value of LGE/GNP is -2.96 and it implies the variable is stationary. The ADF test with no time trend shows that the variable appears to be non-stationary. However, the DF and ADF test for the first difference of LGE/GNP confirms that the variable is integrated of order one ($I(1)$).
Applying the same tests, Table 4.3 reports the DF and ADF statistics for their differences. For the first differences of the variables, the calculated t-values are less than their critical values at the 5% level (both no time trend and time trend include) and thus they are stationary.

Therefore, we can conclude that since differencing once produces stationary, all the six series used in the law are integrated of order one (I(1)). Once the order of integration has been established, then we can test whether there is a long-run relationship between all of the variables; i.e. a cointegration analysis.
Table 4.2 Unit Root Tests in Levels

A. No Time Trend in Model

<table>
<thead>
<tr>
<th></th>
<th>DF (p=1)</th>
<th>ADF (p=2)</th>
<th>ADF (p=3)</th>
<th>ADF (p=4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGNP</td>
<td>2.21</td>
<td>1.45</td>
<td>1.12</td>
<td>0.68</td>
</tr>
<tr>
<td>LGE</td>
<td>-0.36</td>
<td>0.31</td>
<td>-0.29</td>
<td>-0.07</td>
</tr>
<tr>
<td>LGEC</td>
<td>-0.23</td>
<td>0.41</td>
<td>-0.31</td>
<td>-0.01</td>
</tr>
<tr>
<td>LGNP/N</td>
<td>2.09</td>
<td>1.77</td>
<td>1.33</td>
<td>0.98</td>
</tr>
<tr>
<td>LGE/N</td>
<td>0.003</td>
<td>0.51</td>
<td>0.01</td>
<td>0.08</td>
</tr>
<tr>
<td>LGE/GNP</td>
<td>-2.96</td>
<td>-2.08</td>
<td>-2.95</td>
<td>-2.73</td>
</tr>
</tbody>
</table>

Note: The critical t-values are given in Table 8.5.2 in Fuller (1976, p.373). For 50 number of observations, the critical t-value is -2.93 at 5 per cent level of significance (No time trend included).

B. Time Trend in Model

<table>
<thead>
<tr>
<th></th>
<th>DF (p=1)</th>
<th>ADF (p=2)</th>
<th>ADF (p=3)</th>
<th>ADF (p=4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGNP</td>
<td>-2.54</td>
<td>-2.81</td>
<td>-3.08</td>
<td>-2.36</td>
</tr>
<tr>
<td>LGE</td>
<td>-2.25</td>
<td>-2.99</td>
<td>-2.53</td>
<td>-3.78</td>
</tr>
<tr>
<td>LGNP/N</td>
<td>-2.35</td>
<td>-2.58</td>
<td>-2.82</td>
<td>-2.09</td>
</tr>
<tr>
<td>LGE/N</td>
<td>-1.82</td>
<td>-2.71</td>
<td>-2.09</td>
<td>-3.15</td>
</tr>
<tr>
<td>LGE/GNP</td>
<td>-3.23</td>
<td>-3.04</td>
<td>-3.75</td>
<td>-4.90</td>
</tr>
</tbody>
</table>

Note: The critical t-values are given in the bottom part of Table 8.5.2 in Fuller (1976, p.373). For 50 number of observations, the critical t-value is -3.50 at 5 per cent level of significance (Time trend included).
## Table 4.3 Unit Root Tests in First Differences

### A. No Time Trend in Model

<table>
<thead>
<tr>
<th></th>
<th>DF</th>
<th>ADF p=1</th>
<th>ADF p=2</th>
<th>ADF p=3</th>
<th>ADF p=4</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔLGNP</td>
<td>-4.37</td>
<td>-3.06</td>
<td>-2.98</td>
<td>-2.39</td>
<td>-1.80</td>
</tr>
<tr>
<td>ΔLGE</td>
<td>-5.05</td>
<td>-4.49</td>
<td>-2.64</td>
<td>-3.81</td>
<td>-3.56</td>
</tr>
<tr>
<td>ΔLGEC</td>
<td>-5.51</td>
<td>-4.88</td>
<td>-2.95</td>
<td>-3.63</td>
<td>-3.49</td>
</tr>
<tr>
<td>ΔLGNP/N</td>
<td>-3.80</td>
<td>-2.68</td>
<td>-2.68</td>
<td>-2.10</td>
<td>-1.58</td>
</tr>
<tr>
<td>ΔLGE/N</td>
<td>-4.92</td>
<td>-4.37</td>
<td>-2.54</td>
<td>-3.68</td>
<td>-3.33</td>
</tr>
<tr>
<td>ΔLGE/GNP</td>
<td>-5.31</td>
<td>-4.23</td>
<td>-2.83</td>
<td>-3.91</td>
<td>-3.84</td>
</tr>
</tbody>
</table>

Note: The critical t-values are given in Table 8.5.2 in Fuller (1976, p.373). For 50 number of observations, the critical t-value is -2.93 at 5 per cent level of significance (No time trend included).

### B. Time Trend in Model

<table>
<thead>
<tr>
<th></th>
<th>DF</th>
<th>ADF p=1</th>
<th>ADF p=2</th>
<th>ADF p=3</th>
<th>ADF p=4</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔLGE</td>
<td>-4.99</td>
<td>-4.42</td>
<td>-2.60</td>
<td>-3.77</td>
<td>-3.59</td>
</tr>
<tr>
<td>ΔLGEC</td>
<td>-5.49</td>
<td>-4.78</td>
<td>-2.92</td>
<td>-3.62</td>
<td>-3.65</td>
</tr>
<tr>
<td>ΔLGNP/N</td>
<td>-4.67</td>
<td>-3.37</td>
<td>-2.94</td>
<td>-2.56</td>
<td>-1.84</td>
</tr>
<tr>
<td>ΔLGE/N</td>
<td>-4.97</td>
<td>-4.33</td>
<td>-2.56</td>
<td>-3.81</td>
<td>-3.58</td>
</tr>
<tr>
<td>ΔLGE/GNP</td>
<td>-5.16</td>
<td>-4.24</td>
<td>-2.72</td>
<td>-3.76</td>
<td>-3.62</td>
</tr>
</tbody>
</table>

Note: The critical t-values are given in the bottom part of Table 8.5.2 in Fuller (1976, p.373). For 50 number of observations, the critical t-value is -3.50 at 5 per cent level of significance (Time trend included).
4.3.3 Tests for Co-integration

The concept of cointegration was first introduced into econometrics by Granger (1981) and further developed by Engel and Granger (1987). It is relevant to the problem of the determination of long-run equilibrium relationships in economics.

The basic idea of cointegration is that if two or more series move together over time, combinations of these economic variables tend to converge in the long run, even though they may drift apart in the short run. If two or more I(1) variables tend to converge, or at least do not drift apart in the long run, we can regard these variables as defining a long-run equilibrium relationship. Thus the concept of cointegration provides a theoretical foundation for dynamic modelling, and it also gives information about the long-run properties of data.

Cointegration analysis consists of two steps. First, before proceeding to test the sets of variables for cointegration, we need to identify the order of integration of each variable. Since different orders of variables (i.e. one series is I(0) and another I(1)) cannot be possibly cointegrated, we have to make sure that the different variables are integrated to the same degree. If we find that the individual series are integrated of the same order, the second step is to examine whether these series are cointegrated.
In the previous subsection, I used the DF or ADF unit root tests to examine the order of integration of each data series, and found that all of the six variables used in six versions of Wagner's Law are I(1). Since all series are integrated of the same order one I(1), I can proceed on testing for cointegration.

There have been several tests for the cointegrating regression. Granger and Engle (1985, 1987) have proposed seven possible tests which can be used for cointegration testing. Among these seven tests, three main approaches have been most commonly used: the Cointegrating Regression Durbin-Watson (CRDW) test, the Dickey-Fuller (DF) test, and the Augmented Dickey-Fuller (ADF) test.

Engle and Yoo (1987) suggest that in most applications the Augmented Dickey-Fuller (ADF) test is preferable to the other tests, especially in high-order system.

In this section, I will use the residual-based ADF method to test for cointegration. Testing for cointegration by the DF and ADF method entails an estimation of the cointegrating regression. After estimating the equation by ordinary least squares (OLS) method, we can get the residuals $U_t$. To test stationarity for the series, we apply the DF and ADF tests to the residuals $U_t$. The null hypothesis of the cointegration test is that the series which are formed by the residuals of each of the cointegrating regressions are not stationary; i.e. the time series are not cointegrated.

As noted earlier, the spurious correlation can occur by using two trended variables in a regression when the two variables are actually unrelated. Therefore, to examine the long-run properties of data, we need to test for
The concept of cointegration is relevant to the problem of determination of long-run equilibrium relationships between variables.

Engle and Granger (1987) propose the DF and ADF test for testing the null hypothesis that the variables are not cointegrated. Unless the two variables which are used in Wagner's Law (government expenditures and GNP) are cointegrated, there does not exist a long-run equilibrium relationship between these two variables.

To test the null hypothesis of non-stationary (Ho: $U_t \sim I(1)$) against the alternative hypothesis of stationary (H$_1$: $U_t \sim I(0)$) of the series of the residuals, I applied the DF and ADF test for each of the six cointegrating regressions. Table 4.4 reports the results of testing for cointegration from the six cointegrating regressions.

<table>
<thead>
<tr>
<th>Cointegrating Regression</th>
<th>Slope</th>
<th>Standard Errors</th>
<th>Calculated DF</th>
<th>Calculated ADF</th>
<th>Adj R$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) LGE=f(LGNP)</td>
<td>1.16</td>
<td>0.03</td>
<td>-3.40</td>
<td>-3.58</td>
<td>0.98</td>
</tr>
<tr>
<td>(2) LGEC=f(LGNP)</td>
<td>1.00</td>
<td>0.03</td>
<td>-3.20</td>
<td>-3.07</td>
<td>0.98</td>
</tr>
<tr>
<td>(3) LGE=f(LGNP/N)</td>
<td>1.53</td>
<td>0.05</td>
<td>-3.70</td>
<td>-3.14</td>
<td>0.97</td>
</tr>
<tr>
<td>(4) LGE/GNP=f(LGNP)</td>
<td>0.20</td>
<td>0.04</td>
<td>-3.52</td>
<td>-3.68</td>
<td>0.44</td>
</tr>
<tr>
<td>(5) LGE/N=f(LGNP/N)</td>
<td>1.20</td>
<td>0.04</td>
<td>-3.51</td>
<td>-3.67</td>
<td>0.97</td>
</tr>
<tr>
<td>(6) LGE/GNP=f(LGNP)</td>
<td>0.16</td>
<td>0.03</td>
<td>-3.40</td>
<td>-3.58</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Note: The critical values of the DF and ADF test at the 5 per cent (10 per cent) level are -3.67 (-3.28), -3.29 (-2.90) respectively for 50 observations (Engle and Yoo (1987), Table 3, p.158).
The above results look promising because all the signs conform with a priori expectation and the computed DF and ADF values are reasonably large.

At the 10 per cent level of significance, the ADF statistics suggest rejecting the null hypothesis of non-cointegration. In all of the six cointegrating regressions, the computed ADF values are larger than their critical values at the 10 per cent level of significance. Even at the 5 per cent level, the null hypothesis of non-cointegration can be rejected in four cointegrating regressions. (However, it should be noted that our sample size has less than 50 observations and the critical test values are merely suggestive).

Similar results can be obtained when we apply the DF test to the residuals from the six cointegrating regressions. The computed DF values are larger than its critical values at the 10 per cent level of significance in five cointegrating regressions.

Therefore, at the 10 per cent level of significance, the DF and ADF tests suggest that the null hypothesis of non-stationarity can be rejected in six cointegrating regressions. The evidence suggests that government expenditures and GNP are cointegrated and there exists a long-run equilibrium relationship between these two variables.
Table 4.4 also shows that the estimated income elasticities range from 0.16 to 1.53. The elasticity coefficients for equation 4 (Musgrave version), and equation 6 (Peacock-Wiseman "modified" version) exceed zero. In equation 1 (Peacock-Wiseman "traditional" version), equation 2 (Pryor version), equation 3 (Goffman version) and equation 5 (Gupta and Michas version), the elasticity coefficients are greater than unity.

The evidence that the estimated income elasticities are significantly positive at the 5 per cent level confirms the finding that Wagner's Law is valid for Korea during the period under consideration.
4.4 Conclusion

The purpose of this chapter was to analyse the applicability of Wagner's law on data taken from Korea over the period 1953-1991 by employing the most recent econometric technique; the cointegration technique. Korea offered an excellent case study to test the Wagner hypothesis since Korea has had the conditions under which one might expect the law to operate.

Although empirical studies have used a variety of models to examine the relationship between government expenditure and economic growth, I have used six different formulations of the law.

Many previous time-series studies of Wagner's Law have found support for the law. However these studies have suffered from numerous methodological problems in their time-series analysis. Since they did not test the stationarity of the variables, the empirical results might lead to the problem of spurious regression.

To overcome the problems of previous studies, I attempt to test the stationarity of the time-series data on real government expenditures and real GNP. In my own test on Korean data for the period 1953-1991, I find that both the government expenditure variables and the income variables are integrated of the same order one (i.e. I(1)). Since all six variables used in the law are integrated of the same order one, I can proceed to test for cointegration.
In a test on Korean data, I find that the government expenditure variables are cointegrated with the income variables and thus there exists a long-run positive relationship between the two variables. Under these conditions, positive income elasticities confirm the validity of Wagner's Law for Korea.

The empirical results indicate that during the study period public expenditure movements in Korea do explain the long-run trend in GNP in real terms.
APPENDIX 1 Data Sources and Definitions

GE is real total government expenditure, and GE consists of GECON (real government consumption expenditure), GETRA (real government transfer expenditure) and GECAP (real government capital expenditure). GECON is deflated by the implicit GNP deflator, GETRA is deflated by the implicit price deflator for private consumption and GECAP is deflated by its own deflator.

APPENDIX II

Table 4-5 Comparison of Summary Results for the Different Lag Lengths
(m=1, m=2, m=3, and m=4)

Table A. Dickey-Fuller Joint Hypothesis Test (II)
(Joint Test of zero restrictions on the coefficient of deleted variables)

<table>
<thead>
<tr>
<th>Lag</th>
<th>m=1</th>
<th>m=2</th>
<th>m=3</th>
<th>m=4</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGNP</td>
<td>5.80</td>
<td>6.02</td>
<td>3.24</td>
<td>4.92</td>
</tr>
<tr>
<td>LGE</td>
<td>4.77</td>
<td>3.21</td>
<td>7.22</td>
<td>4.15</td>
</tr>
<tr>
<td>LGEC</td>
<td>4.41</td>
<td>2.56</td>
<td>4.35</td>
<td>2.57</td>
</tr>
<tr>
<td>LGNP/N</td>
<td>6.56</td>
<td>6.20</td>
<td>3.25</td>
<td>5.05</td>
</tr>
<tr>
<td>LGE/N</td>
<td>4.32</td>
<td>2.26</td>
<td>5.18</td>
<td>3.63</td>
</tr>
<tr>
<td>LGE/GNP</td>
<td>4.62</td>
<td>7.32</td>
<td>11.99</td>
<td>6.37</td>
</tr>
</tbody>
</table>

Table B. Co-Integration Tests (II)
(The Residual-Based DF and ADF Test)

<table>
<thead>
<tr>
<th>Cointegrating Regression</th>
<th>Calculated DF</th>
<th>Calculated ADF(1)</th>
<th>Calculated ADF(2)</th>
<th>Calculated ADF(3)</th>
<th>Calculated ADF(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGE=f(LGNP)</td>
<td>-3.40</td>
<td>-3.09</td>
<td>-3.81</td>
<td>-4.85</td>
<td>-3.58</td>
</tr>
<tr>
<td>LGEC=f(LGNP)</td>
<td>-3.20</td>
<td>-2.85</td>
<td>-3.40</td>
<td>-3.66</td>
<td>-3.07</td>
</tr>
<tr>
<td>LGE=f(LGNP/N)</td>
<td>-3.70</td>
<td>-2.77</td>
<td>-3.85</td>
<td>-4.01</td>
<td>-3.14</td>
</tr>
<tr>
<td>LGE/GNP=f(LGNP/N)</td>
<td>-3.52</td>
<td>-3.08</td>
<td>-3.93</td>
<td>-4.90</td>
<td>-3.68</td>
</tr>
<tr>
<td>LGE/N=f(LGNP/N)</td>
<td>-3.51</td>
<td>-3.08</td>
<td>-3.93</td>
<td>-4.90</td>
<td>-3.67</td>
</tr>
<tr>
<td>LGE/GNP=f(LGNP)</td>
<td>-3.40</td>
<td>-3.09</td>
<td>-3.81</td>
<td>-4.86</td>
<td>-3.38</td>
</tr>
</tbody>
</table>
Chapter 5 Peacock and Wiseman's Displacement Effect
(The Displacement Effect on Government Expenditure of Two Political Crises in Korea)

5.1 Introduction

Since the seminal work by Peacock and Wiseman (1961), the displacement effect hypothesis has been examined by many researchers. By looking at the relevant time-series data and the historical behaviour of the British government spending for the period 1890-1955, Peacock and Wiseman found that government expenditures grew in discrete steps rather than continuously and formulated the displacement effect hypothesis. This hypothesis may help to explain the time path of growth of government expenditure in democratic countries. Their definition of displacement is closely related to large-scale social disturbances, such as the World Wars. Such disturbances may create a displacement effect, shifting public revenues and expenditures to new levels.

Many studies have examined the existence of displacement effects in a number of countries, as a consequence of major social upheavals such as the World Wars (see Gupta (1967), Pryor (1968), Bonin, Finch and Waters (1969)). These studies presumably confirmed the existence of displacement effect in government expenditure associated with the World Wars. However, very few studies have investigated the "displacement" in government spending
resulting from the minor social upheavals of a lesser magnitude such as internal revolution and political crises.

If the displacement effect is solely linked with the major jumps in government spending caused by the World Wars, then the displacement hypothesis does not seem useful in explaining the persistent growth of public spending in many countries in the 1970s and 1980s. As pointed out by Nagarajan (1979 p.102), "non-global upheavals" (such as a bi-lateral war, an internal revolution and an economic crisis) are likely to have a greater impact on the desirable level of government expenditure in many developing countries. Such disturbances could contribute for the displacements and, during the period of social disturbances, there might be radical changes in accepted ideas about the proper role of government.

In this chapter, on the basis of a time-series analysis, the Peacock-Wiseman "displacement effect" hypothesis is tested more rigorously in Korea for the period 1953 to 1991. I will examine the displacement effect on government expenditure in the context of social disturbances caused by the two political crises (or military coup) in Korea. In section 5.2, the displacement literature is briefly reviewed. In section 5.3, I review and assess previous econometric tests of the displacement hypothesis. In section 5.4, based on reasonable interpretations of displacement, a new test focusing on the time-series behaviour of public expenditure is developed and implemented on Korean data for the period 1953 to 1991. Finally, a brief summary of the main results and conclusion of the study are given in section 5.5.
5.2 Displacement Effect; Interpretation

Peacock and Wiseman (1961), hereafter referred to as P-W, are concerned with the time-pattern of expenditure growth. When P-W observe that the time-profile of British government spending is discontinuous and displays stepwise features, and that the movement from one plateau to another is coincided with the two world wars, they are led to develop the "displacement effect" hypothesis. The important finding of P-W's study is that although public expenditure declines after the wars, it does not fall to the pre-disturbance level. Public expenditure is displaced upwards and for the period of the social upheaval displaces private expenditure. This upward shift in government spending in relation to national income they call the "displacement effect".

The displacement effect hypothesis is based on the concept of "tolerable burden of taxation". It is assumed that people's ideas about desirable burdens of taxation remain fairly stable in normal times. P-W saw that some tolerable of taxation would act as a constraint on government behaviour and prevent major increases in public expenditure. According to the displacement effect hypothesis, the basic constraint on government expenditure is the difficulty of raising taxation levels to finance the increase in public expenditures. In peacetime, therefore, there might be a divergence between the desirable level of public expenditure and the tolerable level of taxation. During periods of social upheavals such as wars or some large scale social disturbances, this divergence is likely to be narrowed because the electorate accepts new methods of raising revenue that formerly thought intolerable.
After the disturbance is over, it is unlikely that taxes and public expenditures return to the old level but remain at a higher level so that the pattern of public expenditures over time looks like a series of steps. Thus, it is possible for a government to undertake those expenditure programs which is previously desired but can not be financed. P-W also claim that a war brings into focus problems that were not identified before. They argued that "Wars often force the attention of governments and peoples to problems of which they were formerly less conscious" (P-W, 1961, p.XXXiV). P-W referred to this as the "inspection effect".

P-W consider the set of other permanent factors which can influence the time profile of government spending. The three important factors which are examined by P-W are population change, changes in prices and changes in the level of employment. According to their study, there is little difference in the time profile of government spending whether government expenditures are measured by per capita or not. When P-W removed the influences of population growth on government expenditure, the time profile of government spending remained essentially unchanged (see Chart 9 in P-W, 1961, p.57).

P-W also found that prices changes had little effect on the time pattern of public expenditure development. Conversion of the money expenditure series to real expenditures left the time profile of public spending virtually unchanged. When they discuss about the influence of changes in prices in their original study, their primary concern is not the effect of relative prices but the effect of general inflation on government expenditures (P-W, 1961, p.24). In more recent study (P-W, 1979), however, P-W claim that the productivity lag in the public sector is one of the main causes of the growth of public expenditure. The relative price effect may be of importance in examining the growth of public expenditure.
Finally, while P-W find a short-run positive relationship between the growth of public spending and the rate of unemployment, they point out that "there was no permanent change in the level of expenditures following upon periods of high unemployment" (P-W, 1961, p. 50). Furthermore, they suggest that "Even in the case of heavy unemployment in the early 1930's, the percentage of government of government expenditure to GNP fell again when the unemployment rate declined. There was no continuing displacement effect" (P-W, 1961, p. 50).

Thus, it is clear that P-W considered that the set of permanent factors (population, prices, and unemployment) could not explain the pattern of public expenditure development in the UK.

Since the "tolerable burden of taxation" is the engine that runs the displacement effect, it is quite important how this concept is to be defined. If the P-W hypothesis is to be testable, it is necessary to clarify more fully what is involved in the concept of the tolerable burden of taxation. In the introduction to their book, P-W (1961) themselves point out that "People's ideas about tolerable burdens of taxation, translated into ideas of reasonable tax rates, tend also to be fairly stable. Fixed, if low, rates of taxation are obviously compatible with growing public expenditure if real output is growing, so that there may be some connection between the rate of growth of real output and the rate of growth of public expenditure. Much more rapid rates of expenditure growth are unlikely; in settled times, notions about taxation are likely to be more influenced than ideas about desirable increases in expenditure in deciding the size and rate of growth of the public sector" (p. xxiv). As emphasised in this quote, P-W understood tolerable burdens of taxation as tolerable (reasonable) tax rates. They argued that these tax rates could be translated into a certain share of public expenditure relative to GNP.
However, P-W were fairly ambiguous about the precise meaning of the concept of the tolerable burden of taxation. We can find this ambiguity in their following statement: "A rising real GNP per head brings increasing tax yields with constant tax rates, so that if people's ideas of tolerable burdens are concerned with tax rates rather than total payments, ... " (p. 27). In this statement, P-W identified the tolerable burden of taxation as the real absolute level of public expenditure per capita.

Since the P-W's seminal work, the displacement effect hypothesis has been significantly reinterpreted by many researchers (especially Gupta (1967), Musgrave (1969), Bird (1972), and Diamond (1977)). These authors have also developed several forms of testable versions of the displacement hypothesis.

Gupta (1967), the first to devise statistical tests for the displacement effect, reinterpreted the P-W hypothesis and developed a testable version of the displacement hypothesis. Although there was no such notion in the P-W book, Gupta interpreted the displacement effect as implying a change of income elasticity of government expenditure for the periods before and after social disturbances. In his revised version of the displacement hypothesis, Gupta found a long-run upward shift of public expenditure over time in several countries. In the new edition of their book, P-W (1967) admit that "Gupta has subjected the displacement effect to rigorous economic statistical scrutiny in a number of countries. Gupta confirms the existence of a displacement effect in other countries" (p.xiv).

As argued by Musgrave (1969), there have been considerable controversy over the influence of war expenditures on total government expenditures in the post-war period. Figure 5.1 shows three possible patterns of the post-war trend in government expenditure.
Figure 5.1. The Displacement Effect - various possible formulations

Figure 5.1 (a) represents the case where there is no long-run displacement effect, civilian public expenditures return to their original growth path after the war. Figure 5.1 (b) shows that the wartime trend of public expenditure increase continues into the post-war period along with an upward shift in the level of civilian spending (P-W's interpretation). In the final example, Figure 5.1 (c), there is an increase in post-war civilian spending. However, it is only a temporary increase in civilian public spending until the old trend line is reached (Musgrave and Bird's interpretation).

Bird (1972) offers an alternative explanation of the displacement effect as a ratchet effect. He adopts the ratchet effect hypothesis (following the Duesenberry's consumption function) to explain long-run upward shifts of the government expenditure function. According to the ratchet effect hypothesis, if there is a crisis and per capita income falls as in a depression, then government expander also declines but less rapidly. He regards the ratchet effect hypothesis as "more plausible in general than the completely supply-oriented tolerable taxes approach" (p. 460). But, Bird offers no empirical test for his own model and he is weak in positive contribution to the displacement hypothesis.

A close associate of P-W, Diamond (1977) reformulates the displacement effect hypothesis and reinterprets it as a theory of structural break. In his review article, Diamond examines previous econometric tests of the P-W displacement hypothesis and criticises those econometric techniques. The essence of his criticism is that the usual ceteris paribus assumption of unchanged tastes, preferences and institutions after social upheaval is inappropriate to test for the displacement hypothesis. From his point of view, the displacement effect hypothesis is interpreted as a special case of the more general phenomenon of structural break or structural change.
Later, this reinterpretation is also asserted by P-W (1979). Since then, P-W and many subsequent researchers have revised their original view of the displacement hypothesis and claimed its upward displacement after social upheavals as the major determinant of the growth of government expenditure.

As pointed by Bird (1972, p.463), "the final verdict on the 'displacement effect' ... cannot yet be handed down because an appropriate hypothesis has not yet been rigorously formulated and tested." At present, it is not clear whether it is the ratio of public expenditure to GNP or government expenditure per capita that is suppose to change. Many researchers (Rosenfeld (1973), O'Hagan (1980), and Henrekson (1993)) have used the ratio of public expenditure to GNP as the dependent variable. But many other studies (Gupta (1967), Pryor (1968), Bonin et al. (1969), Tussing and Henning (1991)) have employed public expenditure per capita in some form as the dependent variable to test for the displacement effect hypothesis.
5.3 Previous Econometric Tests of the Displacement Effect

In their original study, P-W (1961) used graphical evidence to support their hypothesis and did not employ econometric techniques to test for the displacement hypothesis. As they claimed, "our general method was the visual inspection of charts" (P-W, 1979, p.13). In work subsequent to P-W's study, researchers have devised statistical tests for the displacement effect hypothesis.

Gupta (1967) fitted the following equation for several countries (United Kingdom, West Germany, U.S.A., and Sweden) for different sub-periods, before and after social disturbances:

\[ \ln G = \ln a + b \ln Y \]

where \( G \) is per capita public expenditure which excludes war-related but not defence spending; and \( Y \) is per capita income. He then estimated statistically the equation. If the value calculated with the equation based on the latter period exceeded the value calculated with the earlier equation, Gupta claimed that an upward displacement had occurred.

Gupta found significant wartime displacements and confirmed the existence of the displacement effect in all these countries except Sweden. Later, Nagarajan (1983) showed that the shift test used by Gupta is a test of forecasting error for a regression model and found a shift in government spending in Sweden.
Unfortunately, Gupta's study has suffered from many methodological shortcomings.¹

Other tests of the "displacement effect" using the similar methodology to Gupta's are Andre and DeLorme (1978) for France and Nagarajan (1979) for India. While Nagarajan found support for the displacement hypothesis after the Indo-China war in India, Andre and DeLorme got mixed results for France.

In contrast to Gupta, Pryor (1968) interpreted the displacement hypothesis as implying an upward intercept shift, and tested the hypothesis by fitting the following equations to the UK data:

\begin{align*}
(1) \quad \ln G &= v + x T + y A + z B \\
(2) \quad \ln Gc &= v + x T + y A + z B \\
(3) \quad \ln G &= v + w \ln Y + y A + z B \\
(4) \quad \ln Gc &= v + w \ln Y + y A + z B
\end{align*}

where
- \( G \) = total per capita government expenditure
- \( Gc \) = \( G \) minus expenditure of defence and war-related purposes
- \( T \) = time
- \( Y \) = per capita national income
- \( A \) = dummy variable for World War I (1890-1913=0, post-1913=1)
- \( B \) = dummy variable for World War II (1890-1913, 1923-1937=0, 1950-1961=1)

In equation 1 and 2, government expenditures are determined by time and dummy variables; in equation 3 and 4, they are determined by income and some post-war intercept dummy variables. When Pryor reformulates the displacement hypothesis with national income per capita, he finds statistically significant upward displacement. However, when Pryor takes time as one of the explanatory

¹ For a recent criticism of Gupta's study, see Henrekson (1993).
variables, he finds conflicting results. With total government expenditures (equation 1), the displacement is statistically significant; but when civilian expenditure is used (equation 2), the displacement effect is not significant. On the basis of this finding, Pryor (1968) concludes that "the displacement which occurred was entirely due to increases for defence and war related purposes" (p.445).

The test of Bonin et al. (1969) is similar to the Gupta methodology. They test the statistical significance of post-war displacement in the UK by estimating the following two equations:

\[
\begin{align*}
G_n &= a + b Y_n + c D + d D Y_n \\
G_x &= a + b Y_n + c D + d D Y_n
\end{align*}
\]

where

- \(G_n\) = total per capita spending net of debt, war-related, and defence spending
- \(G_x\) = \(G_n\) net of spending for replacement of non-military public goods sacrificed during war-time
- \(Y_n\) = per capita GNP less total per capita public expenditure
- \(D\) = dummy variable for war (0 in pre-war period and 1 in post-war period)
- \(DY_n\) = dummy variable which also measures the degree of change in slope

In contrast to Gupta, Bonin et al. focused on post-disturbance displacement shifts in civilian public expenditure. To test for the pure displacement effect, they attempted to estimate shifts in public expenditure caused by the need to catch up with the backlog of foregone peacetime spending. They tried to explain this effect by adjusting the post-war public expenditures series to allow for "replacement" spending. They found inconclusive evidence for the displacement hypothesis. Their findings were influenced by the choice of periods and the definition of dependent variables. When \(G_n\) is employed, they
found a significant slope change. However, when Gx series are employed, slopes of Gx changed insignificantly.

As noted in previous section, Diamond (1977) reinterpreted the displacement effect as a theory of structural change or structural break, and suggested a total test of the structural stability (a joint test of intercept and slope coefficient). Diamond's criticism of Gupta's econometric technique is that "Gupta's statistical tests are an incomplete test of the structural break hypothesis. Since a structural break posits two distinct regimes before and after the social upheaval, instead of separately testing for the stability of the constant term and the slope coefficient, a total test of structural stability should be applied" (Diamond, 1977, p.397).

He examined the displacement hypothesis by the Chow test comparing four time periods: 1885-1913, 1920-1929, 1930-1938 and 1950-1970. Four time periods reflect three social upheavals - World War I, the Great Depression, and World War II. Three different measures of public spending are regressed on GNP per capita. The three categories of government expenditures which have been used for the test of the displacement effect hypothesis are total public spending, total public spending net of defence spending, and total public spending net of war-related and defence spending. If both slope and intercept values increase between adjacent periods, Diamond concludes that there has been displacement.

A statistically significant Chow test result is interpretable as support for the upward displacement hypothesis. Of nine Chow tests performed by Diamond, only five were significant at the 5% level. More seriously, in no case did both slope and intercept values increase. In one case, they both declined; in all eight other cases, they moved in opposite directions. On the basis of this analysis,
Diamond (1977) concludes that "This means that we must reject the null hypothesis, and accept the alternative hypothesis that the percentage of public spending in GNP is significantly greater after a social upheaval like war than the average before the upheaval, even after allowing for the upward trend in the series over the entire time period" (p. 399).

Diamond's study has not gone without criticism. In his 1977 article, Diamond argues that the assumption of equal error variances before and after the displacement is unrealistic, and suggests the Chow test. Subsequently, in the same journal, Watt (1978) criticises Diamond's tests. Watt argues that "Diamond's tests require the same assumption of equal error variance for which he originally criticised Bonin et al." (p.445). Thus, he concludes that "Diamond's use of the Chow test is inappropriate in these cases and his results are placed in doubt" (p.448). Watt proposes a Jayatissa test which is valid for cases of both equal and unequal error variances in examining the displacement effect.

More extensive criticisms of Diamond's study were suggested by Tussing and Henning (1979, 1991). In their 1979 review article, they argued that the Chow test was inappropriate to explain an upward displacement in public expenditures. Since the Chow test does not distinguish between upward and downward displacements, it is an inadequate tool for testing any hypothesis of direction of structural change such as the displacement effect hypothesis. Hence, Tussing and Henning (1979) articulates that "In short, Diamond's Chow tests are virtually worthless as tests of the P-W displacement hypothesis" (p.481).

Follow-up studies by Tussing and Henning (1991) confirmed their earlier conclusions. Using US data for the period 1929 to 1981, they test for structural change of public expenditures before and after World War II. To test for structural stability between the early (1929-1945) and later (1946-1981) periods, they employ White's method that does not require the same assumption of
equal error variance in the two periods. The presence of the displacement effect was also tested for by using an intercept shift dummy (equal to 1 for the later period) and coefficient shift dummies, one for each independent variable for the later periods. (This dummy variable technique is similar to Pryor's (1968).) Their analysis provides no significant difference between the early and later period. Dummy variables were either insignificant or negatively significant, indicating downward displacement. Tussing and Henning (1991) concludes that "a structural break may not, in fact, have occurred, although stronger evidence exists that one did occur midway through the post-war period. We have also shown that if a structural break did occur at the time of World War II, it took a form inconsistent with the displacement hypothesis of P-W" (p.409).

As we can see from this brief review of the displacement literature, empirical studies have generated conflicting evidence on the nature and significance of the displacement effect on government expenditure. There are a number of reasons why these conflicting results have been derived.

One possible explanation for the conflicting evidence of the displacement effect lies in problems of data. Different researchers have employed various data series to test for the displacement hypothesis. While P-W and Gupta take total expenditure less war-related expenditures as the relevant series, Bonin et al. take the P-W series but add replacement spending. Other authors have employed either total non-defence public expenditures (Tussing and Henning (1974)) or simply total public expenditures (Diamond (1977), Andre and DeLorme (1978)). Furthermore, it is not clear whether the dependent variable should be measured in the absolute level of public spending per capita or the ratio of government expenditure to GNP. Many researchers have used per capita government expenditure as the dependent variable (Pryor (1968), Nagarajan
(1979), Nomura (1991)), whereas other studies have employed the ratio of government expenditure to GNP (Rosenfeld (1973), O'Hagan (1980)).

Another source of conflicting results comes from the fact that different researchers have different views of what a displacement is and how to define a social upheaval. Although, in their original study, P-W considered war as the most pronounced form of social disturbance, they did admit the possibility of other types of social upheaval, especially the Great Depression. While Bonin et al. (1969) and Diamond (1977) allow for possible displacement due to the Great Depression, Pryor (1968) do not admit it. Furthermore, subsequent authors have broadened the scope of the displacement hypothesis to include other types of social upheavals such as; the recession of 1974-1975 (O'Hagan (1980)), internal revolution and hyper-inflation (Bahl, Kim and Park (1986)), and two oil crises (Nomura (1991)). Different interpretations of the hypothesis have influenced the statistical techniques and the choice of time periods. Different interpretations of the displacement effect have led to great confusion when trying to test for the hypothesis and have produced conflicting evidence for the displacement hypothesis.

As discussed in previous section, the original P-W displacement hypothesis was primarily concerned with the development of government expenditure over time. Since P-W themselves took public expenditure as a function of time, an appropriate treatment of time is of crucial importance in an empirical test of the displacement hypothesis. The only test taking time as one of the explanatory variables is that of Pryor (1968). Taking time as an explanatory variable, Pryor found a weak support for the displacement hypothesis. However, other authors who take government expenditure as a function of income ignore the

2 Recently, Henrekson (1993) emphasises time as an important variable to examine the displacement hypothesis. This problem is discussed later.
time dimension completely. These studies seem to be a misspecification of the original P-W displacement effect. They have not tested for the behavioural theory offered by P-W.

Since the original P-W thesis was concerned with the development of government expenditure over time, we need to model the entire time pattern of expenditure growth. In order to test empirically the displacement hypothesis, we need to take account of the effect of time on public expenditure development.
5. 4 The Empirical Test

As explained in the previous section, the P-W hypothesis was concerned with the development of public expenditure over time. In this section, a hypothesised relationship between government expenditure and time is formally tested.

Since the original P-W hypothesis focuses on the time-series behaviour of government spending before and after social upheavals, an appropriate time-series model is needed to explain an upward shift in public expenditure. As is well known, the Auto Regressive-Integrated Moving Average (ARIMA) model is widely used to explain the time pattern of growth (see Pindyck and Rubinfeld, 1991, p.415, and Banerjee et al., 1993, p.13). ARIMA model was introduced by Box and Jenkins (1970) and they have recently found wide applications of time-series models to economic forecasting. Unlike the regression model, the ARIMA model explains the movement of a time series by relating it to its own past values and to a weighted sum of current and lagged random disturbances. The ARIMA model can be used to explain the time-pattern of public expenditure development.

Recently, Henrekson (1992) examines an upward displacement of government expenditure in Sweden and the UK after World War II. Using an ARMA technique, he tests for the displacement hypothesis and finds no evidence for the P-W hypothesis. In his article, Henrekson argues that "an ARIMA analysis seems to be the most consistent with P-W, who assert that permanent
influences are unlikely to give rise to general and testable hypotheses about
government spending. Hence, within the confines of the P-W hypothesis, I find
that a time-series approach is the most appropriate" (Henrekson, 1992, p.52).

Following Henrekson, an ARMA technique is used to test for an upward
displacement after the two political crises in Korea. I examine the displacement
effect on government expenditures as a consequence of the first political crisis
(or military coup) which occurred in 1961, and the second political crisis which
occurred in 1979. 3

As pointed out by Nagarajan (1979, p.103), the social disturbances caused
by a "non-global " (or a less pronounced) crisis is likely to have a greater
impact on the desirable level of government expenditure in developing
countries. The minor social disturbance such as internal revolution and political
crises could contribute for the displacement and bring about a change in
people's ideas of tolerable tax burden. During the period of the political crisis,
there might be radical changes in people's ideas about the proper role of
government. It seems likely that the political crisis could cause an upward shift
in the level of government spending and new government expenditures could
become desirable. After the first political crisis of 1961 in Korea, economic
policies adapted by the Park (military) Government might have been associated
with a shift in people's idea about the desirable level of government
expenditure. The political crisis of 1961 has generated a greater role of the Park
government in the sphere of social and development services by transferring
more resources to the public sector. After the crisis, the responsibility for
handling social and development programs comes under the power of the Park
government.

3 For the historical background of the two political crises in Korea, see Chapter 3.
To examine the displacement effect caused by the two political crises, we need to construct a model. An obvious way to test for shift in government spending is to begin by formulating an appropriate model which can explain the movement of public expenditure over time.

As pointed out by Henrekson (1993), an ARMA model can be used to explain the long-run growth pattern of public expenditure in Korea. The ARMA model represents the behaviour of public expenditure over the entire period.

In the first place, I plot the log of real total government expenditure per capita (Go / N) and the log of real government expenditure as a share of real GNP (Go / Y). These are depicted in Figure 5.2 and Figure 5.3. These figures give us a good representation of the movement of public expenditure in Korea for the period 1953-1991.

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4 For a detail definition of the variables and data sources, see Appendix.
Figure 5.2 The development of GeGov (Go) / Population (N) in Korea, 1953-1991

Figure 5.3 The development of GeGov (Go) / GNP (Y) in Korea, 1953-1991
The model to be tested is the following:

\[ Y_t = \alpha + \beta T + \theta_1 Y_{t-1} + \theta_2 Y_{t-2} + \varepsilon_t \]

where \( Y_t \) is the relevant dependent variable

- (log of real total government expenditure per capita (Go / N) or
- log of real government expenditure as a share of real GNP (Go / Y))

\( T \) = time trend

\( \varepsilon_t \) = well behaved error term

Following Henrekson (1992), I identify an ARMA (p, q) model around a deterministic trend for the log of real total government expenditure per capita (Go / N) and the log of real government expenditure as a share of real GNP (Go / Y) for the period 1961-1991. An ARMA model with two lags p and a time trend adequately represents the behaviour of Go / N and Go / Y. Thus, an ARMA (2, 0) model with trend is identified. The deterministic trend is included to account for the long-run growth of Go / N and Go / Y. I assume that the dependent variable can be written as \( Y_t = \alpha + \beta t + Y_t^s \) where \( Y_t^s \) is stationary and \( \beta \) is the constant annual growth of the deterministic trend.

Using OLS, the parameters of an ARMA model are estimated. The results of estimations for the period 1961-1991 are shown in Table 5.1, where the t-values are given in parentheses. For equation of Go / N, all estimated coefficients are significant at the 5 % level. The coefficient for \( T \) (trend) is positive and significant at the 5 % level (two-tailed test). The adjusted coefficient of determination is high with an \( R^2 \) of 0.97, suggesting a good prediction potential. However, the results for equation of Go / Y is less
satisfactory. The estimated coefficient for T (trend) was positive but not significant at the 5% level.

It is appropriate to check whether the ARMA (2, 0) model is an adequate fit. To test whether the estimated residuals $\varepsilon_t$ are uncorrelated, I examine the Ljung-Box Q statistic. The Ljung-Box Q statistic is significant and it confirms that the fitted model is adequate.

---

5 A diagnostic check for general tests of serial correlation, particularly appropriate for ARMA models, is the Ljung-Box Q statistic. Box and Ljung (1978) suggest the Q statistic to examine whether autocorrelation function is zero. The Q statistic tends to be more reliable in small samples. If Ho is true ($\varepsilon_t$ are uncorrelated), then $\chi^2$ has approximately a chi-square distribution with d.f. = L - p - q
Table 5.1 Identified ARMI model with trend for Korea, 1961-1991

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Parameters</th>
<th>Go / N</th>
<th>Go / Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>$\alpha$</td>
<td>0.97**</td>
<td>0.90**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.49)</td>
<td>(2.66)</td>
</tr>
<tr>
<td>$T$</td>
<td>$\beta$</td>
<td>0.02**</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.56)</td>
<td>(1.65)</td>
</tr>
<tr>
<td>$Y_{t-1}$</td>
<td>$\phi_1$</td>
<td>1.10**</td>
<td>0.96**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(6.50)</td>
<td>(5.26)</td>
</tr>
<tr>
<td>$Y_{t-2}$</td>
<td>$\phi_2$</td>
<td>-0.37**</td>
<td>-0.31*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-2.19)</td>
<td>(-1.87)</td>
</tr>
<tr>
<td>Ljung-Box Q</td>
<td></td>
<td>11.73</td>
<td>10.94</td>
</tr>
<tr>
<td>Degree of Freedom</td>
<td></td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>$R^2$</td>
<td></td>
<td>0.97</td>
<td>0.70</td>
</tr>
<tr>
<td>SEE</td>
<td></td>
<td>0.10</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Note: Figures in parentheses are t-values. * denotes significance at the 10 per cent level and ** denotes significance at the 5 per cent level.
The following model is formulated to test for the displacement effect on government expenditure in Korea associated with the two political crises - the first political crisis of 1961 and the second political crisis of 1979. Using dummy variables, I test for an upward shift of government expenditure after the two political crises for the period of 1953-1991:

\[ Y_t = \alpha + \beta T + \theta_1 Y_{t-1} + \theta_2 Y_{t-2} + \gamma_1 \text{Dum}_1 + \gamma_2 \text{Dum}_2 + \varepsilon_t \]

where \( Y_t \) = the relevant dependent variable

(log of real total government expenditure per capita (Go/N) or log of real government expenditure as a share of real GNP (Go/Y))

\( T \) = time trend

\( \text{Dum}_1 = \) dummy variable for the first political crisis (1953-1960 = 0, 1961-1991 = 1)

\( \text{Dum}_2 = \) dummy variable for the second political crisis (1953-1978 = 0, 1979-1991 = 1)

\( \varepsilon_t = \) well behaved error term

The results of estimations for the whole period 1953-1991 are presented in Table 5.2. The results for equation Go/N are similar to those of the previous equations. The trend value (T) of Go/N is positive and significant at the 5% level. Dummy variable for the first political crisis is also significant at the 5% level but the sign is negative. The results for equation Go/Y are less satisfactory. The trend and dummy values are insignificant even at the 10% level.

The relevant diagnostic tests are on the whole satisfactory. The low Q-statistics confirm that the estimated residuals are uncorrelated.
We did not find support for the P-W hypothesis of an upward shift of government spending after the political crises in Korea. The estimated coefficients of dummy variables are all negative. This suggests that the two political crises in Korea led to a drop in government expenditure. The coefficient of Dum_1 variable for Go / N is significant at the 5% level of significance. In this case, the negative effect for government spending per capita is significant at the 5% level. However, other coefficients of Dummy variables are not found to be significant even at the 10% level of significance.

It implies that the first political crisis of 1961 led to a downward shift in Go / N by 17.0 percentage points and the second political crisis of 1979 also led to a downward shift in Go/N by 5.0 percent points (not significant). This can be used as a weak evidence against the P-W displacement effect hypothesis.

The evidence for Korea over the period 1953-1991 is not compatible with the displacement effect hypothesis.
Table 5.2 Results of the test for the displacement effect hypothesis due to the two political crises in Korea, 1953-1991 (Long-Run Effect)

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Parameters</th>
<th>Go / N</th>
<th>Go / Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>$\alpha$</td>
<td>1.35**</td>
<td>0.87**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.53)</td>
<td>(2.82)</td>
</tr>
<tr>
<td>T</td>
<td>$\beta$</td>
<td>0.03**</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4.06)</td>
<td>(1.60)</td>
</tr>
<tr>
<td>$Y_{t-1}$</td>
<td>$\phi_1$</td>
<td>0.92**</td>
<td>0.92**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5.91)</td>
<td>(5.51)</td>
</tr>
<tr>
<td>$Y_{t-2}$</td>
<td>$\phi_2$</td>
<td>-0.29*</td>
<td>-0.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-2.01)</td>
<td>(-1.56)</td>
</tr>
<tr>
<td>Dum_1</td>
<td>$\gamma_1$</td>
<td>-0.17**</td>
<td>-0.07</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-2.63)</td>
<td>(-1.05)</td>
</tr>
<tr>
<td>Dum_2</td>
<td>$\gamma_2$</td>
<td>-0.05</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.81)</td>
<td>(-0.14)</td>
</tr>
<tr>
<td>Ljung-Box Q</td>
<td></td>
<td>18.41</td>
<td>15.70</td>
</tr>
<tr>
<td>Degree of Freedom</td>
<td></td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>$R^2$</td>
<td></td>
<td>0.97</td>
<td>0.74</td>
</tr>
<tr>
<td>SEE</td>
<td></td>
<td>0.08</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Note: Figures in parentheses are t-values. * denotes significance at the 10 per cent level and ** denotes significance at the 5 per cent level.
To examine the short-run displacement effect on government expenditure in Korea associated with the two political crises, the following model is also formulated. Using dummy variables, I examine the short-run effect of an upward shift of government expenditure after the two political crises for the period of 1953-1991:

\[ Y_t = \alpha + \beta T + \theta_1 Y_{t-1} + \theta_2 Y_{t-2} + \gamma_1 \text{Dummy}_1 + \gamma_2 \text{Dummy}_2 + \varepsilon_t \]

where \( Y_t \) = the relevant dependent variable

- (log of real total government expenditure per capita (\( \text{Go} / \text{N} \)) or
- log of real government expenditure as a share of real GNP (\( \text{Go} / \text{Y} \))

\( T \) = time trend

\( \text{Dummy}_1 \) = dummy variable for the first political crisis (1953 - 1960 = 0, 1961-1963 = 1, 1964-1991 = 0) (Short-Run Effect)

\( \text{Dummy}_2 \) = dummy variable for the second political crisis (1953-1978 = 0, 1979-1981 = 1, 1982-1991 = 0) (Short-Run Effect)

\( \varepsilon_t \) = well behaved error term

The results of estimations are reported in Table 5.3. The results for equation \( \text{Go} / \text{N} \) and \( \text{Go} / \text{Y} \) are less satisfactory than those of the previous equations. The trend value (\( T \)) of \( \text{Go} / \text{N} \) is positive and significant only at the 10% level. The coefficients of dummy variables for the first and second political crises had negative signs, contrary to the displacement effect hypothesis and insignificant. The results for equation \( \text{Go} / \text{Y} \) are less satisfactory. The trend and dummy values are insignificant even at the 10% level.

The relevant diagnostic tests are on the whole satisfactory. The low Q-statistics confirm that the estimated residuals are uncorrelated.
Like the long-run displacement effect, I did not find support for the P-W hypothesis of an short-run upward shift of government spending after the political crises in Korea. The estimated coefficient of dummy variable is negative. This suggests that the first political crisis in Korea led to a drop in government expenditure even in the short-run.

It implies that the first political crisis of 1961 led to a downward shift in Go/N by 7.0 percentage points and the second political crisis of 1979 also led to a downward shift in Go/N by 1.0 percent points (not significant). This can be also used as a weak evidence against the P-W displacement effect hypothesis.

The evidence for Korea over the period 1953-1991 casts doubt on the usefulness of the displacement effect hypothesis.
Table 5.3 Results of the test for the displacement effect hypothesis due to the two political crises in Korea, 1953-1991 (Short-Run Effect)

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Parameters</th>
<th>Go / N</th>
<th>Go / Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>$\alpha$</td>
<td>0.76*</td>
<td>0.90**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.10)</td>
<td>(2.47)</td>
</tr>
<tr>
<td>$T$</td>
<td>$\beta$</td>
<td>0.02*</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.04)</td>
<td>(1.51)</td>
</tr>
<tr>
<td>$Y_{t-1}$</td>
<td>$\phi_1$</td>
<td>1.11**</td>
<td>0.95**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(7.46)</td>
<td>(5.59)</td>
</tr>
<tr>
<td>$Y_{t-2}$</td>
<td>$\phi_2$</td>
<td>-0.32*</td>
<td>-0.31*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-2.01)</td>
<td>(-2.00)</td>
</tr>
<tr>
<td>Dummy</td>
<td>$\gamma_1$</td>
<td>-0.07</td>
<td>-0.01</td>
</tr>
<tr>
<td>$y_1$</td>
<td></td>
<td>(-1.13)</td>
<td>(-0.09)</td>
</tr>
<tr>
<td>Dummy$y_2$</td>
<td>$\gamma_2$</td>
<td>-0.01</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.21)</td>
<td>(0.80)</td>
</tr>
<tr>
<td>Ljung-Box Q</td>
<td></td>
<td>17.43</td>
<td>17.32</td>
</tr>
<tr>
<td>Degree of Freedom</td>
<td></td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>$R^2$</td>
<td></td>
<td>0.98</td>
<td>0.74</td>
</tr>
<tr>
<td>SEE</td>
<td></td>
<td>0.09</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Note: Figures in parentheses are t-values. * denotes significance at the 10 per cent level and ** denotes significance at the 5 per cent level.
5.5 Conclusion

Since the P-W's seminal work, many researchers have examined the relevance of the displacement hypothesis to explain the time profile of public expenditure growth in several countries. They have investigated the evidence of displacement effect in government spending associated with major social upheavals. However, few studies have examined the displacement effect in the context of social disturbances caused by a non-global crisis. In this chapter, I examine the displacement effect on government expenditure in Korea associated with the two political crises - the first political crisis of 1961 and the second political crisis of 1979.

As explained in the literature review of the displacement hypothesis, previous econometric tests of the hypothesis suffered from some methodological shortcomings. All researchers except Pryor (1968) and Henrekson (1992) ignore the time dimension completely, although the original P-W hypothesis was primarily concerned with the development of government expenditure over time.

To examine the displacement effect, I employ an ARMA technique. As pointed out by Henrekson (1992), the ARMA technique used in this chapter is the appropriate method for examining the time-series behaviour of public expenditure. An ARMA (p, q) model with trend was fitted to the data to
examine the movement of the time-series behaviour of government expenditure. The results presented in previous section show that the estimated residuals are white noise and the model was adequately fitted.

Using dummy variables, I examine an upward shift of government expenditure after the two political crises in Korea. The empirical results provide no empirical support for the displacement effect in government expenditure associated with the two political crises of 1961 and 1979. Instead, the empirical findings indicate that the first political crisis of 1961 led to a downward shift in government spending (Go / N) and the second political crisis of 1979 also led to a downward shift of (insignificant).

These results disprove the hypothesised upward displacement. The experience for Korea in the 1953-1991 period is not compatible with the hypothesis that the political crises could cause an upward shift in public expenditure. However, it should be mentioned that empirical results of this study depend on the specification of the functional form and on the definition of public expenditure data.
Appendix. Data Sources and Definitions

Go is general government real total expenditure which includes all types of public spending at all levels of government. Go consists of government consumption expenditure, government transfer expenditure and government capital expenditure. Government consumption expenditure is deflated by the implicit GNP deflator, government transfer expenditure is deflated by implicit deflator for private consumption and government capital expenditure is deflated by its own deflator.

Chapter 6 Determinants of Government Expenditure Growth in Korea

6.1 Introduction

In the last few decades, the academic literature dealing with explanations for the growth of public expenditure has expanded greatly and new theories have appeared at a rapid rate. Numerous theoretical studies have attempted to explain the sources of government growth, while others have tried to test these explanations empirically. As far as empirical research on public expenditure growth is concerned, most studies have concentrated on Western developed countries (see Lowery and Berry (1983), Lybeck (1986), Lybeck and Henrekson (1988), Henrekson (1992), Gemmell (1993)).

Although the public sector played an important role during the development process, few studies have been devoted to the time-pattern growth of public expenditure in developing countries. Most empirical studies attempting to explain the growth of government in those countries are based on a cross-section approach. In the case of Korea, few empirical studies have been carried out to explain the growth of the public sector. Compared with the appearance of an increasing number of studies devoted to many Western developed countries, the Korean case has been neglected for a long period.
In this chapter, I will attempt to explain the growth of the Korean government sector with an exploratory positive analysis since the early 1960s. In the first section, I shall discuss six explanations suggested by theories of public finance and public choice. In the following section, these explanations are tested by econometric analysis with Korean data over the period from 1963 to 1991. The time period is chosen because of data availability. By using appropriate measures of the public sector, by testing the several models over the same time period, and by using the same estimation procedures, I shall try to identify the main determinants of public expenditure growth in Korea. Through these tests, in the final section, I will evaluate my empirical results and examine the limitations of my studies.

Before proceeding to my study, a few general comments are in need. First while I examine these six explanations as separate models, I realise that they are not a complete study of public sector growth in Korea. Since the theoretical literature in this field is so immense, I cannot test all possible models. I have chosen those that are most commonly cited in the public finance literature. Second an empirical analysis for Korean government growth is constrained by the lack of adequate data. Much reliable data have been published since the early 1960s (Especially consistent data about economically active population are available only after 1963). Therefore the empirical results of my studies are considered as preliminary work, and further research is needed on Korean government growth, for which few empirical studies exist.
6.2 Models of Government Growth

In western industrialised countries, the growth of the public sector has become an important issue and there have been a great variety of theoretical approaches to this issue. Despite this, only a few proposed theories have been developed to be subject to empirical tests. Some researchers stress economic development, while others emphasise the institutional factor and several authors emphasise political explanation. In the matter of explanations of public sector growth, there does not exist a single generally accepted theory. All theories are more or less partial in nature, and each of them have some relevance to explain the growth of the public sector.

In this section, among those various hypotheses concerning determinants of public expenditure growth, I will consider 'non-institutional' and 'institutional' explanation (Borcherding (1985), Neck and Schneider (1988), Hackl, Schneider and Withers (1993) ). The former approach (non-institutional explanation) contains economic variables of a structural character. This type of explanation involves a-political factors and it embraces theories of government activity such as Wagner's Law, Baumol's relative price hypothesis and the median voter model. The latter approach (institutional explanation) is a more institutionally oriented explanation. It involves the political and institutional structure of government
activity. It embraces theories of election and bureau-voting, interest group, fiscal illusion, stabilisation policy and centralisation of power.

6.2.1 Structural and Economic Determinants

To explain the causes of the expansion of government, a model is needed which can examine the predicted effects on public spending by changes in certain independent variables.

An economic structural model explains the determinants of government size by focusing on the underlying determinants of individual preferences for government produced goods and the cost conditions for publicly provided goods. For an empirical test, the main variables to be included in this model are relative prices, population and income. In a broader perspective, we may also include some long term structural variables (For an empirical test of the economic structural model of government activity, see Neck and Schneider (1988)).

The change in relative prices between the public and private sector will influence both the demand and supply side of public goods. Like the demand function for private goods, there is a price effect in the demand for public goods. As the prices of publicly provided goods increase, ceteris paribus, the demand for

\[^1\] In this chapter, the choice of explanatory variables is decided not only by theoretical considerations but also the availability of data. Hence, empirical results of this study is considered as preliminary work.
public goods will be reduced. Although it is possible to derive an implicit tax price for publicly provided goods, the prices of public goods are rarely observable. On the supply side, the effects of relative price changes on public expenditure have been studied by Baumol (1967). According to Baumol's hypothesis, due to the inherent nature of the public sector, productivity advances in the public sector are very difficult, so the relative cost of production of public goods tends to rise secularly. It will lead to an increase in the relative price of public output. This phenomena has been known as "Baumol's Disease" (for a more detailed explanation of the Baumol model, see Chapter 1). To test Baumol's relative price effect, I will use the relative price of public goods to GNP as measured by the ratio of the implicit deflator for public consumption expenditure to GNP deflator (RELAT). A positive effect on government expenditure is expected.

The income effect on public goods is typically hypothesised to be positive, because as income increases the demand for public goods rises by the same amount. In fact, Wagner (1883) formulated a law of expanding state activity, one of the most frequently mentioned explanations of government growth (for a more detailed discussion of the Wagner Law and an empirical test of the law, see Chapter 1 and Chapter 4). Wagner predicted that the growth in real income would result with the relative expansion of public expenditures on certain income-elastic demands such as spending on culture, education and the redistribution of income. He also asserted that economic development and modernisation would favour government growth being associated with real income growth. An increased complexity of social life and change in technology would require more state expenditures.
To test the income effect, I include real GNP (GNP), and the influence of real GNP on government expenditure is expected to be positive. In addition to real GNP, I also include another explanatory variables to capture the socio-economic effects on public expenditures. Many researchers have suggested the following indicators for structural economic changes: the share of manufacture product in total GNP, the share of self-employed in the labour force and the share of women in the labour supply (for example, Neck and Schneider (1988), Lowery and Berry (1983)).

In Korea, reliable data on self-employed persons are not available and the women's participation ratio in the total labour supply is very low. Thus, as proxies for structural economic changes, the share of manufacture product in total GNP (MANU) is added to the equation. Since we hypothesise that government expenditure will rise as the level of industrialisation, the share of manufacture product in total GNP seems to be the most plausible proxies for structural economic changes. Mann (1980) also points out that "The technological needs of an industrial economy require larger amounts of capital than are forthcoming from the private sector. Therefore, the state has to provide the necessary capital funds to finance large-scale capital expenditures" (p.189). During the rapid development process, the capital formation role of government was emphasised in Korea. Therefore, the influence of MANU on public spending (especially on government capital expenditure (GECAP)) is predicted to be positive.

Population is also an important determinant of public expenditure; i.e. the size of residential population influences public spending. In the public goods model, pure public goods can be supplied at zero marginal cost. Due to the characteristics of public goods (non-rivalness), adding more consumers of public goods does not
increase marginal costs. Furthermore, if economies of scale exist and it can induce lower costs of public goods, negative effects of population are expected. However, if public spending is not for pure public goods but for transfers expenditure, positive effects are expected. Due to low publicness of public goods, adding more consumers will lead to an increase in public expenditure.

As noted in Chapter 1, the effect of population increase on public spending can be measured by the following crowding parameter (see Brown and Jackson, 1990, p.138).

\[ G^{*}_{k} = G_{k} N^{-d} \]

where \( G^{*}_{k} \) are the utility services on the kth public good, \( G_{k} \) are the activities used to produce the kth public good, \( N \) is the size of population, and \( d \) is the crowding parameter. If \( d \) is zero, \( G \) represents a pure private good. On the other hand, if \( d=1 \), then it is a pure private good. Intermediate values \( (0<d<1) \) imply quasi publicness or quasi privateness in consumption. Given the existence of external costs of congestion, an increase in population (Popu) will result in an increase in expenditure, assuming that the level of output and quality of public services remain constant. Therefore, the coefficient of population is predicted to be positive. Population is measured as total resident population (POPU).

Finally, in addition to the previous variables, I include the lagged dependent variable (GEGOVt-1) in the model. The primary reason for this is that the previous level of public spending may be the principal determinant of current spending. According to the "incremental model" of budget decision-making, last year's budget is the largest determining factor of current year's budget. Neck and Schneider (1988) include the lagged dependent variable as the most important determinant of Austrian government size. Explaining the growth of government in
OECD countries, Saunders (1988) also includes the lagged dependent variable in the model because the lagged dependent variable reflects the historical and cultural influence on the growth of government expenditure in these countries. In Korea, the lagged expenditure term is considered as the major determinant of government size.

We can specify the non-institutional model of structural economic determinants as the following form:

\[ GEGOV_t = F(\text{GNP}_t, \text{POP}_t, \text{RELAT}_t, \text{MANU}_t, GEGOV_{t-1}) \]

For an estimable equation, I use the following logarithmic form so that the respective parameters show the influence on the logarithm of public expenditure:

\[
\log GEGOV_t = \alpha + \beta_1 \log \text{GNP}_t + \beta_2 \log \text{POP}_t + \beta_3 \log \text{RELAT}_t + \beta_4 \log \text{MANU}_t + \beta_5 \log GEGOV_{t-1} + U_t
\]

where \( GEGOV_t \) is government expenditure, \( \alpha \) is the intercept, \( \text{GNP}_t \) is real GNP in 1985 prices, \( \text{POP}_t \) is total population in thousand, \( \text{RELAT}_t \) is the ratio of the implicit deflator for general government consumption expenditure to the implicit GNP deflator, \( \text{MANU}_t \) is the share of the manufacture product in GNP, \( GEGOV_{t-1} \) is the lagged dependent variable and \( U_t \) is the error term. The expected parameter signs are \( \beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0, \beta_5 > 0 \).
6.2.2 Election and Bureau Voting

Unlike the previous structural economic model, the institutional (or political) model of government growth assumes that various fiscal institutions play an important role in expanding government expenditures beyond the size demanded by the median voter. This approach tries to explain government growth by focusing on the role of political institutions in determining the size of the public sector. The models developed in an institutional approach are especially concerned with elections and with the role of bureaucratic self interest voting behaviour for public sector expansion.

The effect of an election on the size of public expenditures has been studied under the model of 'political business cycle' (for a brief review of the political business cycle, see Chapter 1). This model assumes that the length of the time period prior to general elections has some influence on public spending because incumbent governments may pursue active policies to appeal to the electorate. Several researchers (Frey (1978), Frey and Schneider (1978)), for example, have found that elected officials adopt an expansionary policy to stimulate the economy during pre-election periods. To examine the effect of elections on government expenditures, we introduce dummy variables, DUMELECT and DUMEY. DUMELECT is a dichotomous variable taking the value in 1 in a presidential election year and 0 otherwise. And DUMEY is a dichotomous variable that equals 1 in a congressional election year (not presidential) and 0
otherwise. All coefficients of these dummy variables are expected to be greater than zero.

The election year variable in the preceding model may capture some of the effects of an election on public spending. To analyse electoral voting effect more clearly, we need to include the voting power of government employees to the model. In the 'Wagner squared' hypothesis, Buchanan and Tullock (1977) emphasised the effect of bureaucracy on budget growth. They argued that as public employees become a larger share of the workforce and voting population, this increased voting power enables public officials to extract higher wages. Niskanen (1971) has also argued the importance of bureaucratic influence on public spending levels. He suggested that due to the monopoly power of bureaucrats over the supply of their outputs and due to a desire for a larger budget, the government budget will be increased more than that of the median voter's preferences. Courant, Gramlich and Rubinfeld (1979) emphasised the role of public employees as voters in determining public spending. They argued that due to the expansionary motives of bureaucrats or public employees, there exist an inherent tendency toward overspending. Public employees may vote for increased government spending to raise their salaries, improve their job opportunities, or to extend their bureaucratic powers. They may have a greater desire for public goods and would vote for high government spending. To test the bureau voting explanation, I include the share of government employees in the total labour force (PUB) as a possible explanatory variable. Following Buchanan and Tullock (1977), we use the number of bureaucrats (government employees) as a proportion of the total labour force as the measure of bureaucratic power. The coefficient of this variable is expected to be positive.
Finally, lagged expenditure term is included in the model. The substantive justification for including lagged variable is that due to bureaucratic inertia in budget decision-making process, the budget in any given year is expected to marginal adjustments to the previous year. Last year's spending is one of the most important determinants of this year's spending. Such a relationship is formally represented in the lagged endogenous variable.

After allowing for lagged adjustment, one can specify the election and bureau voting model with the following equation:

\[ \text{GEGOV}_t = F(\text{PUB}_t, \text{DUMELECT}_t, \text{DUM}_t, \text{GEGOV}_{t-1}) \]

Taking logarithms and adding an error term yield the following estimable equation:

\[
\log \text{GEGOV}_t = \alpha + \delta_1 \log \text{PUB}_t + \delta_2 \text{DUMELECT}_t + \delta_3 \text{DUM}_t + \delta_4 \log \text{GEGOV}_{t-1} + U_t
\]

(2)

where \( \text{GEGOV}_t \) is government expenditure, \( \alpha \) is the intercept, \( \text{PUB}_t \) is the share of government employees in the total labour force, \( \text{DUMELECT}_t \) is a dummy variable taking the value of 1 in a presidential election and 0 otherwise, \( \text{DUM}_t \) is a dummy variable that equals 1 in a congressional election and 0 otherwise, \( \text{GEGOV}_{t-1} \) is the lagged dependent variable and \( U_t \) is the error term. The expected parameter signs are \( \delta_1 > 0, \delta_2 > 0, \delta_3 > 0, \delta_4 > 0 \),
6.2.3 Interest Groups

Other current research on the political institutional model examines the role of general income distribution and interest group in determining the size of government. According to Stigler (1970) Director's Law, public expenditures and taxes are linked to income class, and it is assumed that government expenditures are primarily directed to selfish rent-seeking transfers spending instead of traditional public goods spending. Director's Law (named after its discoverer, Aaron Director) states that "Public expenditures are made for the benefit primarily of the middle classes, and financed by taxes which are borne in considerable part by the poor and the rich" (Stigler, 1970, p.1). Tullock (1971) also points out that all redistributions appear to be from the lower- and upper- groups of society to the middle class. Therefore, according to the Tullock's study, the middle classes votes for more government expenditures because they are the principal beneficiaries of public expenditure programmes.

Meltzer and Richard (1978, 1981), Pelzman (1980) have supported Stigler's hypothesis with more sophisticated models. As explained in Chapter 1, Meltzer and Richard (1978, 1981) strongly assume that all government expenditures have a redistributive component. According to their study, "government grows when the franchise is extended to include more voters below the median income or when the growth of income provides revenues for increased redistribution" (Meltzer and Richard, 1978, p.114). Therefore, in the Meltzer and Richard model, increased inequality of income and the extension of suffrage are the
main determinants of the growth of government. Pelzman's model is more sophisticated than that of Meltzer and Richard. As noted in Chapter 1, Pelzman claims that the spread of education is an important factor in reducing the inequality of income and thus leading to the growth of government expenditure. In his model, increased equality of income is a major source of the growth of government.

Although they have different views on specific theoretical interpretation of how rents are sought and redistributed among different income class, they have attempted to derive propositions about the role of political process for enhancing redistribution in favour of special group. To test this hypothesis empirically, we need time-series data on income distribution, which is not available in Korea.

For this reason and due to the non-availability of suitable data for income distribution in Korea, I am going to examine the impact of interest groups on the size of government. In my model, I shall include several variables gleaned from the public choice literature. The basic hypothesis to be tested in this section is that the size of government is positively related to the number of interest groups. As the number of organised interest groups grows, we may expect an increase in the size of government because new interest groups bring more demands for publicly funded goods. Although there is no perfect measure of interest group strength, we want to examine the relationship between the number of interest groups and size of government under the assumption that interest groups are able to influence public policies so as to increase government size. Mueller and Murrell (1986) test hypotheses concerning the impact of interest groups on government size under the assumption that the impact of these other factors is additive. They claim that "the effect of interest groups on size of government
remains as predicted in the presence of additional institutional complexity, and begin to test this assumption by adding several of the variables which other studies have posited to be determinants of the size of government" (Mueller and Murrell, 1986, p.127).

According to the public choice argument, interest groups favour government interventions whose benefits are targeted directly at its members, and whose costs are distributed by all members of society. Interest groups favour tax reductions and they also support the expansion of government expenditures for its members. Each interest group may articulate demands for lower taxes and higher subsidies for its own membership at the expense of the majority of society. For example, an industry trade association, one of the typical cases of specialised interest groups, may demand more subsidies and more political protection for that industry from the government. Log-rolling leads to coalition with other interest groups to reach their goals. Each interest group tries to win favours for its own membership by exerting a large impact through financial contributions to a political party.

The preceding arguments suggest a hypothesis that the existence of specialised interest groups may lead to an increase of government expenditure. As noted previously, the task for an empirical test of the impact of interest groups on the relative size of government is to seek a measure of the 'strength' of the relevant interest groups over time. There are several difficulties in trying to construct an appropriate measure of each interest group. Many researchers have employed proxies to examine the impact of interest groups on the relative size of government.
In their cross-sectional studies, Mueller and Murrell (1985, 1986) used population, number of interest groups, size of bureaucracy, and start of modernisation as proxies for the strength of interest group. He found that the number of interest group is positively related to the relative size of government. Since they adopt cross-sectional data, its relevance for a time-series analysis seems questionable. Examining the growth of Swedish government, Henrekson (1988) used the degree of unionisation and the ratio of the sum of exports and imports to GDP to test for the interest group hypothesis. Recently, explaining the growth of the public sector in Australia, Hackl, Schneider and Withers (1993) used proxies by the share of agricultural employment in total population, the union share of total workforce and the degree of openness of the economy (measured as the ratio of the sum of imports and exports to GNP) as the measures of the strength of interest groups.

The above discussion suggests that some specific interest groups may tend to expand state activity in order to get benefits for their members. As pointed out by many researchers, it is very difficult to specify the strength of various interest groups. But we may identify some interest groups pursuing rent-seeking activities. In the Korean case, as proxies for the strengths of each interest group, I use the share of union member among total workforce (UNION), and the percentage share of manufacture employment in the labour force (MANUF) (see Henrekson (1988), Hackl, Schneider and Withers (1993)). The coefficients of these two variables are expected to be positive. In Korea, each of these groups seek to increase government outlays for their favour. Although we take these variables as proxies for a measure of strength, it must be remembered that relative numbers are imperfect measures of interest group strength.
A further argument on the importance of interest groups has been suggested by Cameron (1978). Using 18 nations cross-sectional data, Cameron examined five types of explanation - one economic, the second fiscal, the third political, the fourth institutional, and the fifth international - to account for the growth of government activity. He found that the degree of openness of the economy (the international explanation) is the main determinant of government growth in Western developed countries. Since a high degree of dependence on international trade weakens domestic control of macroeconomic policy, the resulting economic instability leads to an expansion of government activity. According to his study, there exists a strong positive relationship between the degree of openness and the expansion of the public economy. Cameron (1978) states that "governments can dampen the effects of the open economy on production, employment, and consumption by increasing the scope of the public economy" (p.1250).

Openness is interpreted as a proxy for industrial concentration and the influence of unions on government. In the empirical estimation for the interest group effect, I include the degree of openness as measured by the ratio of the sum of exports and imports to GNP (OPEN). In the interest group model, the increase of openness is interpreted to result in a high industrial concentration, and leads to efforts by producers to protect themselves by obtaining more subsidies and more political protection for that industry from the government. The impact of openness on public spending is expected to be positive.
The resulting estimating equation for this interest group model, allowing for lagged adjustment, is:

$$GEGOV_t = F(UNION_t, MANUF_t, OPEN_t, GEGOV_{t-1})$$

Since the logarithmic specification produces a better fit, the following logarithmic form is used to test the interest group hypothesis:

$$\log GEGOV_t = \alpha + \gamma_1 \log UNION_t + \gamma_2 \log MANUF_t + \gamma_3 \log OPEN_t + \gamma_4 \log GEGOV_{t-1} + U_t \quad (3)$$

where $GEGOV_t$ is government expenditure, $UNION_t$ is the share of union member among total work force, $MANUF$ is the percentage share of manufacture employment in the labour force, $OPEN_t$ is the ratio of the sum of exports and imports to GNP, $GEGOV_{t-1}$ is the lagged dependent variable and $U_t$ is the error term. The expected parameter signs are $\gamma_1 > 0$, $\gamma_2 > 0$, $\gamma_3 > 0$, $\gamma_4 > 0$. 

213
6.2.4 Fiscal Illusion

This explanation of public sector growth is fiscal in nature. As noted by many researchers, this explanation emphasised the structure of the revenue system as a determinant of public expenditure growth. If the structure of tax system becomes more complex, it can affect taxpayer's perceptions of the cost of public goods, and hence, the size of public sector. As the revenue system becomes more complex, taxpayers tend to underestimate the true tax burden, and it will lead to an expansion of public expenditure (for a more detailed discussion of the fiscal illusion hypothesis, see Chapter 1).

A number of illusion inducing fiscal structures have been analysed. Buchanan and Wagner (1977) argue that debt financing will create a fiscal illusion and will produce higher levels of public expenditure because taxpayers underestimate the future tax burden created by deficits. Wildavsky (1975) and Cameron (1978) suggest that a large reliance on indirect taxes can conceal the costs of public policy and it will produce higher levels of public expenditures. Another systematic bias of fiscal structures in favour of government growth is the fiscal drag or bracket creep effect. During a high rate of inflation, taxpayers will be moved into higher marginal tax brackets and it will automatically increase the true tax burden. Under progressive income taxation, the fiscal drag effect of inflation exists.
There have been several empirical studies which have examined the validity of the fiscal illusion hypothesis. Hackl, Schneider and Withers (1993) use a Herfindahl index of the complexity of the Australian tax system, the share of indirect tax in total tax revenues and fiscal drag (consumer price inflation) to test for the fiscal illusion hypothesis. Henrekson (1988) also includes the Herfindahl index, the share of direct taxes in total tax revenues and the rate of inflation to examine the validity of the fiscal illusion hypothesis in Sweden. Lowery and Berry (1983) use the amount of governmental debt, the complexity of tax system and the percentage of revenues collected through indirect taxes.

To test for the fiscal illusion hypothesis in Korea, I will use three variables. Following Wagner (1976), I include a Herfindahl index of the complexity of Korean tax system, HERF. The Herfindahl index will achieve its maximum value of unity if it generates all of its own revenues from a single source; the minimum possible would be one-fifth if revenues are divided equally among the five categories. According to the fiscal illusion hypothesis, the lower value of the index is associated with a higher complex revenue system so that a negative coefficient for HERF on public expenditure is expected. Fiscal illusion due to the invisibility of revenue system is measured by the share of indirect tax in total taxes.

\[ \text{HERF} = \sum_{i=1}^{5} R_i^2 \]

Where \( R_i \) is the share of revenue category \( i \) in total public revenue.

\[ \text{HERF} = \sum_{i=1}^{5} R_i^2 \]

\[ \text{HERF} = \sum_{i=1}^{5} R_i^2 \]

\[ \text{HERF} = \sum_{i=1}^{5} R_i^2 \]
INDIR; a positive effect is expected. To examine the fiscal drag effects of inflation, I include the rate of inflation (Consumer Price Index) among the independent variables. It is expected to exert a positive effect on the size of government.

The resultant fiscal illusion model for government growth is as follows, allowing for lagged adjustment:

\[ GEGOV_t = F(INDIR_t, HERF_t, CPI_t, GEGOV_{t-1}) \]

Taking logarithms and adding an error term, I specify the following equation reflecting the fiscal illusion explanation:

\[
\log GEGOV_t = \alpha + \omega_1 \log INDIR_t + \omega_2 \log HERF_t + \omega_3 \log CPI_t + \omega_4 \log GEGOV_{t-1} + U_t \quad (4)
\]

where \( GEGOV_t \) is government expenditure, \( INDIR_t \) is the share of indirect tax in total taxes, \( HERF_t \) is a Herfindahl index of the complexity of Korean Tax system, \( CPI_t \) is the rate of inflation (Consumer Price Index), \( GEGOV_{t-1} \) is the lagged dependent variable and \( U_t \) is the error term. The expected parameter signs are \( \omega_1 > 0 \), \( \omega_2 < 0 \), \( \omega_3 > 0 \), \( \omega_4 > 0 \).
6.2.5 Stabilisation Policy

This type of explanation of the growth of the public sector emphasises the stabilisation role of government. It tries to explain the growth of government as the process of macroeconomic policy-making.

Since the end of the Second World War, the primary task of government policies has been given on stabilisation of the economy. By varying public expenditure or by pursuing money supply targets, government tried to achieve major macroeconomic policy objectives. Since Keynesian economists though that fiscal policy could affect demand more powerfully than monetary policy, fiscal policy has been used more often to control the level of aggregate demand. Public expenditure played a significant role in economic stabilisation policy.

In Korea, short-term management of the economy and the control of aggregate demand have been important policy objectives since the early 1960s. At various times, incomes policies (including maximum price control), fiscal and monetary policy have been used as the instruments of stabilisation policy. Keynesian ideas have especially influenced Korean economic thinking since the late 1960s. Economic growth, price stability, full employment, and the balance of payments have been agreed to be the targets of macro-economic policy in Korea. Among these objectives, a high rate of economic growth has been considered as the most important objective of government policy. During the Korean modernisation
process, government has used expansionary fiscal policy to increase capital accumulation and to stimulate economic growth.

Since the Korean economy has pursued the small open economy, fiscal policy has been considered as the most important instrument which the government can control. The government has relied especially on the expenditure rather than revenue side of budget.

This model is closely related to the Election and Bureau Voting model. As noted previously, the incumbent government may adopt active policies to appeal to the electorate. Since the state of the economy influences voters attitudes and election outcomes, government manipulate the economy in order to increase their chances for re-election (for a brief review of the political business cycle theory, see Chapter 1). The important targets of short-run stabilisation policies are full employment, price stabilisation and the balance of payment. The government will adopt fiscal stabilisation policies to account for short-term fluctuations in the rate of unemployment and in the rate of inflation.

One can expect that public expenditure would increase when the rate of unemployment rises, and to decrease when either inflation or current account deficit rises. Therefore, public expenditure is expected to be positively related to changes in the rate of unemployment \((\Delta \text{UNEMP})\) and in changes in GNP \((\Delta \text{GNP})\), and negatively to changes in the rate of inflation \((\Delta \text{CPI})\).
A simple stabilisation model of government size can be specified as follows, including for lagged expenditure term:

$$GEGOV_t = F(\Delta GNP_t, \Delta CPI_t, \Delta UNEMP_t, GEGOV_{t-1})$$

To stabilise the variance of the dependent variable, government expenditure (GEGOVt) is transformed to logarithmic value. However, the first differences are used as explanatory variables. For an estimable equation, I propose the following dynamic specification of the simple stabilisation policy model:

$$\log GEGOV_t = \alpha + \psi_1 (GNP_t-GNP_{t-1}) + \psi_2 (CPI_t-CPI_{t-1}) + \psi_3 (UNEMP_t-UNEMP_{t-1}) + \psi_4 \log GEGOV_{t-1} + U_t$$  \hspace{1cm} (5)

where GEGOVt is government expenditure, $\Delta GNP_t (GNP_t-GNP_{t-1})$ is changes in GNP, $\Delta CPI_t (CPI_t-CPI_{t-1})$ is changes in rate of inflation, $\Delta UNEMP_t (UNEMP_t-UNEMP_{t-1})$ is changes in the rate of unemployment, GEGOVt-1 is the lagged dependent variable and $U_t$ is the error term. The expected parameter signs are $\psi_1 > 0$, $\psi_2 < 0$, $\psi_3 > 0$, $\psi_4 > 0$. 

219
6.2.6 Centralisation of Power

The final political institutional interpretation of the growth of government is the institutional centralisation explanation. This explanation suggests that the size of the public sector is positively related to the extent of fiscal centralisation; i.e., centralised governments are more likely to grow in the size of the public sector than those with decentralised governments.

The fiscal centralisation hypotheses have been put forth by Brennan and Buchanan (1977, 1980). In their book, Brennan and Buchanan (1980) claim that "Total government intrusion into the economy should be smaller, ceteris paribus, the greater the extent to which taxes and expenditures are decentralised" (p.185). According to the Leviathan view, a decentralised public sector limits the growth or size of government. Since then, several researchers have examined the impact of fiscal centralisation on public sector size.

There are several reasons why the size and growth of the public sector is positively related to the extent of fiscal centralisation. First, centralised government systems are thought to be better able to control public spending than decentralised government. Using 18 nations cross-sectional data, Cameron (1978) found that the growth of government was greatest in a unitary, highly centralised government structure. He concluded that "federalism tends to dampen the degree of expansion of the public economy and centralisation tends to facilitate that
expansion. ... A high degree of centralisation seems to facilitate the expansion of the public economy" (Cameron, 1978, p.1253).

Second, centralised systems are seen to reach an agreement to extract higher taxes for the citizens. Brennan and Buchanan (1980) argue that fiscal decentralisation is itself a powerful constraint on the growth of government. They state that "Within a constitutionally designed federal structure, one would predict that there would be constant pressure by competitive lower-level governments to secure institutional rearrangements that would moderate competitive pressures" (P.182). According to their view, fiscal decentralisation serves as a powerful constraint on Leviathan.

Empirical studies for the fiscal centralisation hypothesis have produced mixed results.

Peltzman (1980) found little evidence to the hypothesis and claimed that centralism had no effect on the size of government. Lowery-Berry (1983) tested the fiscal centralisation hypothesis by adopting the share of government revenues collected by the central government and inter-government aid as explanatory variables. They found disappointing results to the hypothesis. Oates (1985) measured fiscal centralisation as the share of central government tax revenues in total tax revenues. He regressed a measure of the size of the public sector on a fiscal centralisation ratio, and found a negative relationship between two variables. His study casts doubt on the usefulness of the fiscal centralisation hypothesis. Recently, Grossman (1992) examined the impact of fiscal centralisation on the size of the public sector in Australia. He measured fiscal centralisation as the share of local government expenditures in total general government expenditures and inter-governmental grants in total lower-level
governments' finances. Grossman found that fiscal centralisation is positively correlated with public sector size in Australia.

To test the fiscal centralisation hypothesis, I take two variables, a fiscal centralisation ratio (CENTX, central government tax revenues as a percentage of total tax revenues), and intergovernmental aid (AID, central government aid to local government as a percentage of total government expenditures). The coefficients of CENTX and AID are expected to be positive.

We can specify an institutional centralisation model with the following equation:

\[
GEGOV_t = F(CENTX_t, AID_t, GEGOV_{t-1})
\]

Taking logarithms, I can transform the above model into the following form:

\[
\log GEGOV_t = \alpha + \nu_1 \log \text{CENTX}_t + \nu_2 \log \text{AID}_t + \nu_3 \log \text{GEGOV}_{t-1} + U_t \tag{5}
\]

where GEGOV\(_t\) is government expenditure, CENTX\(_t\) is the central government tax revenues as a percentage of total tax revenues, and AID\(_t\) is the central government aid to local government as a percentage of total government expenditures, GEGOV\(_{t-1}\) is the lagged dependent variable and \(U_t\) is the error term. The expected parameter signs are \(\nu_1 > 0\), \(\nu_2 > 0\), \(\nu_3 > 0\).
6.3 Testing the Models

Having reviewed growth theories and presented several models of government growth, we now turn attention to developing a satisfactory set of tests.

As seen in Table 6.1 and Table 6.2, annual data were collected for the 29 year period of 1963 to 1991. Three different measures are used as dependent variables: general government consumption expenditure (GeCon), general government transfer expenditure (GeTra) and general government capital expenditure (GeCap) (see Table 6.1).

Table 6.1 Dependent Variables Applied to Explain Absolute Government Growth in Korea, 1963-1991

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Description of variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>GeCon</td>
<td>General government consumption expenditures deflated by the GNP implicit deflator</td>
</tr>
<tr>
<td>GeTra</td>
<td>General government transfer payments deflated by the implicit price deflator for private consumption</td>
</tr>
<tr>
<td>GeCap</td>
<td>General government capital expenditures deflated by its own deflator</td>
</tr>
</tbody>
</table>

3 For a detailed definition of the variables and data source, see Appendix
As already explained in Chapter 3, the different components of total government expenditures have shown different growth pattern (see Table 3.2, Figure 3.3 and Figure 3.4 in Chapter 3). Since the growth pattern of the different components of total government expenditures is dissimilar, we cannot explain all of the growth of the public sector in a single model. We need to attempt separate explanations of the three different components of total government expenditures. The dependent variables are listed in Table 6.1 - three different components of total expenditures.

In the previous section, we already identified explanatory variables for explanation of the growth of government in Korea. The indicators selected to measure the independent variables are listed in Table 6.2.
Table 6.2 Independent Variables Applied to Explain Absolute Government Growth in Korea, 1963-1991

<table>
<thead>
<tr>
<th>Explanation</th>
<th>Variables</th>
<th>Description of Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Economic Determinants</td>
<td>GNP</td>
<td>Real GNP in 1985 prices (million of won)</td>
</tr>
<tr>
<td></td>
<td>Popu</td>
<td>Total population in thousand</td>
</tr>
<tr>
<td></td>
<td>Relat</td>
<td>Ratio of the implicit deflator for general government consumption expenditure to the implicit GNP deflator</td>
</tr>
<tr>
<td></td>
<td>Manu</td>
<td>Share of Manufacture product in GNP</td>
</tr>
<tr>
<td>Election Bureau Voting</td>
<td>Pub</td>
<td>Share of government employees in total labour force</td>
</tr>
<tr>
<td></td>
<td>DumElect</td>
<td>Dummy variable that equals 1 in the year of presidential election and 0 otherwise</td>
</tr>
<tr>
<td></td>
<td>DumEy</td>
<td>Dummy variable that equal 1 in the year of congressional election and 0 otherwise</td>
</tr>
<tr>
<td>Interest Group</td>
<td>Union</td>
<td>Degree of unionisation measured by the share of union member among total work force</td>
</tr>
<tr>
<td></td>
<td>Manuf</td>
<td>Share of manufacture employment in total force</td>
</tr>
<tr>
<td></td>
<td>Open</td>
<td>Ratio of the sum of imports and exports to GNP</td>
</tr>
</tbody>
</table>
### Fiscal Illusion

<table>
<thead>
<tr>
<th>Indir</th>
<th>Share of indirect taxes in total tax revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herf 4</td>
<td>Herfindahl index of the complexity of the Korean tax system</td>
</tr>
<tr>
<td>CPI</td>
<td>Changes in the rate of consumer price index</td>
</tr>
</tbody>
</table>

### Stabilisation Policy

<table>
<thead>
<tr>
<th>Δ Unemp</th>
<th>Changes in the rate of unemployment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Δ CPI</td>
<td>Changes in the rate of Consumer Price Index</td>
</tr>
<tr>
<td>Δ GNP</td>
<td>Changes in Real GNP in 1985 prices</td>
</tr>
</tbody>
</table>

### Centralisation of Power

<table>
<thead>
<tr>
<th>Centx</th>
<th>Ratio of local government tax to total tax revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aid</td>
<td>Central government transfer to local government as a percentage of general government expenditure</td>
</tr>
</tbody>
</table>

---

4 To derive the Herfindahl index of the simplicity of the revenue structure in Korea, total taxes were divided into five major categories; namely direct taxes, indirect taxes, stamp revenue, customs duties, and a remaining category.
The methodology employed in this chapter consists of OLS (Ordinary Least Squares) regressions of the above measures of government size on variables. But an analysis of autocorrelation coefficients indicates that the residuals of six models have significant autocorrelation. Thus appropriate adjustments for first-order serial correlation are made by the Cochrane-Orcutt procedure.

Because the lagged dependent variables are included in each model, we search for significant levels of autocorrelation in the residuals. We report $\rho$-values in the Tables. Since $\rho$-values seem to be significant, the Cochrane-Orcutt procedure is applied to correct for the first-order autocorrelation. The parameter estimates have been adjusted accordingly.

Our study in this chapter aims at an identification of empirical regularities of growth theories which are suggested by many researchers. We do not fully specified our models in an exact way. A more sophisticated method for empirical estimation will be used in the later stage of our research.
### 6.4 Empirical Findings

Table 6.3 Structural and Economic Determinants (1963-1991)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>GeCon</th>
<th>GeTra</th>
<th>GeCap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.98</td>
<td>12.08</td>
<td>73.36</td>
</tr>
<tr>
<td></td>
<td>(0.18)</td>
<td>(0.23)</td>
<td>(1.21)</td>
</tr>
<tr>
<td>Real GNP</td>
<td>0.47**</td>
<td>0.96</td>
<td>0.98</td>
</tr>
<tr>
<td></td>
<td>(3.09)</td>
<td>(1.26)</td>
<td>(1.21)</td>
</tr>
<tr>
<td>Popu</td>
<td>0.03</td>
<td>-1.72</td>
<td>-7.74</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(-0.31)</td>
<td>(-1.17)</td>
</tr>
<tr>
<td>Relat</td>
<td>1.28**</td>
<td>0.92</td>
<td>2.37**</td>
</tr>
<tr>
<td></td>
<td>(6.35)</td>
<td>(1.10)</td>
<td>(2.87)</td>
</tr>
<tr>
<td>Manu</td>
<td>-0.18</td>
<td>0.62</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td>(-1.15)</td>
<td>(0.86)</td>
<td>(0.69)</td>
</tr>
<tr>
<td>Lagged Dependent</td>
<td>0.23*</td>
<td>0.14</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td>(1.73)</td>
<td>(0.27)</td>
<td>(1.58)</td>
</tr>
<tr>
<td>Total $R^2$</td>
<td>0.99</td>
<td>0.98</td>
<td>0.97</td>
</tr>
<tr>
<td>rho ($\rho$)</td>
<td>0.29</td>
<td>0.39</td>
<td>0.63</td>
</tr>
<tr>
<td>D.W. / h</td>
<td>2.19</td>
<td>2.05</td>
<td>3.91</td>
</tr>
</tbody>
</table>

Note: All variables are logged in the estimations.

Cochrane-Orcutt estimation, t-values in parentheses.

* and ** indicate significance at the 10, and 5% levels respectively.
Table 6.4 Election and Bureau Voting (1963-1991)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>GeCon</th>
<th>GeTra</th>
<th>GeCap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.04</td>
<td>-1.01</td>
<td>-1.15</td>
</tr>
<tr>
<td></td>
<td>(0.08)</td>
<td>(-0.91)</td>
<td>(-0.66)</td>
</tr>
<tr>
<td>Pub</td>
<td>0.16</td>
<td>1.22</td>
<td>1.73</td>
</tr>
<tr>
<td></td>
<td>(0.34)</td>
<td>(1.19)</td>
<td>(1.06)</td>
</tr>
<tr>
<td>DumElect</td>
<td>0.03</td>
<td>-0.09</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(0.68)</td>
<td>(-0.74)</td>
<td>(0.18)</td>
</tr>
<tr>
<td>DumEy</td>
<td>-0.04</td>
<td>-0.08</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>(-1.17)</td>
<td>(-0.88)</td>
<td>(-0.07)</td>
</tr>
<tr>
<td>Lagged Dependent</td>
<td>0.98**</td>
<td>0.92**</td>
<td>0.84**</td>
</tr>
<tr>
<td></td>
<td>(22.05)</td>
<td>(13.81)</td>
<td>(7.99)</td>
</tr>
<tr>
<td>Total R²</td>
<td>0.98</td>
<td>0.96</td>
<td>0.96</td>
</tr>
<tr>
<td>rho (ρ)</td>
<td>0.28</td>
<td>0.11</td>
<td>0.36</td>
</tr>
<tr>
<td>D.W. / h</td>
<td>1.65</td>
<td>0.64</td>
<td>1.66</td>
</tr>
</tbody>
</table>

Note: All variables are logged in the estimations except DumElect and DumEy. Cochrane-Orcutt estimation, t-values in parentheses. * and ** indicate significance at the 10, and 5% levels respectively.
Table 6.5 Interest Group (1963-1991)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>GeCon</th>
<th>GeTra</th>
<th>GeCap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.39</td>
<td>-0.42</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>(0.95)</td>
<td>(-0.58)</td>
<td>(0.46)</td>
</tr>
<tr>
<td>Union</td>
<td>-0.02</td>
<td>0.09</td>
<td>-0.44</td>
</tr>
<tr>
<td></td>
<td>(-0.11)</td>
<td>(0.25)</td>
<td>(-0.81)</td>
</tr>
<tr>
<td>Manuf</td>
<td>0.44</td>
<td>0.63</td>
<td>0.68</td>
</tr>
<tr>
<td></td>
<td>(1.51)</td>
<td>(1.01)</td>
<td>(0.86)</td>
</tr>
<tr>
<td>Openness</td>
<td>-0.07</td>
<td>0.23</td>
<td>0.90*</td>
</tr>
<tr>
<td></td>
<td>(-0.61)</td>
<td>(0.84)</td>
<td>(1.99)</td>
</tr>
<tr>
<td>Lagged Dependent</td>
<td>0.85**</td>
<td>0.66**</td>
<td>0.31</td>
</tr>
<tr>
<td></td>
<td>(10.86)</td>
<td>(4.48)</td>
<td>(1.68)</td>
</tr>
<tr>
<td>Total R²</td>
<td>0.99</td>
<td>0.97</td>
<td>0.97</td>
</tr>
<tr>
<td>rho (ρ)</td>
<td>0.12</td>
<td>0.04</td>
<td>0.76</td>
</tr>
<tr>
<td>D.W. / h</td>
<td>0.76</td>
<td>0.48</td>
<td>3.02</td>
</tr>
</tbody>
</table>

Note: All variables are logged in the estimations.

Cochrane-Orcutt estimation, t-values in parentheses.

* and ** indicate significance at the 10, and 5% levels respectively.
Table 6.6 Fiscal Illusion (1963-1991)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variables</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GeCon</td>
<td>GeTra</td>
<td>GeCap</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.63</td>
<td>1.84</td>
<td>-0.60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.71)</td>
<td>(1.15)</td>
<td>(-0.22)</td>
<td></td>
</tr>
<tr>
<td>Indtax</td>
<td>0.22</td>
<td>-0.30</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.82)</td>
<td>(-0.61)</td>
<td>(0.70)</td>
<td></td>
</tr>
<tr>
<td>Herfind</td>
<td>0.22</td>
<td>0.45</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.76)</td>
<td>(0.82)</td>
<td>(0.08)</td>
<td></td>
</tr>
<tr>
<td>CPI</td>
<td>0.03</td>
<td>-0.07</td>
<td>-0.11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.21)</td>
<td>(-1.23)</td>
<td>(-1.44)</td>
<td></td>
</tr>
<tr>
<td>Lagged Dependent</td>
<td>1.00**</td>
<td>1.03**</td>
<td>0.84**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(21.91)</td>
<td>(21.25)</td>
<td>(6.72)</td>
<td></td>
</tr>
<tr>
<td>Total R²</td>
<td>0.99</td>
<td>0.97</td>
<td>0.96</td>
<td></td>
</tr>
<tr>
<td>rho (ρ)</td>
<td>0.39</td>
<td>-0.11</td>
<td>0.55</td>
<td></td>
</tr>
<tr>
<td>D.W. / h</td>
<td>1.97</td>
<td>-0.43</td>
<td>1.81</td>
<td></td>
</tr>
</tbody>
</table>

Note: All variables are logged in the estimations.

Cochrane-Orcutt estimation, t-values in parentheses.

* and ** indicate significance at the 10, and 5% levels respectively.
Table 6.7 Stabilisation Policy (1963-1991)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GeCon</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.50*</td>
</tr>
<tr>
<td>(1.87)</td>
<td></td>
</tr>
<tr>
<td>ΔGNP</td>
<td>0.0006</td>
</tr>
<tr>
<td>(0.92)</td>
<td></td>
</tr>
<tr>
<td>ΔCPI</td>
<td>0.002</td>
</tr>
<tr>
<td>(1.44)</td>
<td></td>
</tr>
<tr>
<td>ΔUNEMP</td>
<td>0.03</td>
</tr>
<tr>
<td>(0.90)</td>
<td></td>
</tr>
<tr>
<td>Lagged Dependent</td>
<td>0.95**</td>
</tr>
<tr>
<td>(27.73)</td>
<td></td>
</tr>
</tbody>
</table>

| Total R²              | 0.99    | 0.98    | 0.97   |
| rho (ρ)               | -0.03   | -0.03   | 0.36   |
| D.W. / h              | 1.11    | 0.65    | 1.10   |

Note: Values in parentheses are t-values.
Cochrane-Orcutt estimation, t-values in parentheses.
* and ** indicate significance at the 10, and 5% levels respectively.
Table 6.8 Centralisation of Power (1963-1991)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variables</th>
<th>GeCon</th>
<th>GeTra</th>
<th>GeCap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td>0.34</td>
<td>-1.45</td>
<td>1.70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.12)</td>
<td>(-0.31)</td>
<td>(0.22)</td>
</tr>
<tr>
<td>Centx</td>
<td></td>
<td>0.09</td>
<td>0.11</td>
<td>-0.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.16)</td>
<td>(0.10)</td>
<td>(-0.10)</td>
</tr>
<tr>
<td>Aid</td>
<td></td>
<td>-0.19</td>
<td>0.36</td>
<td>-0.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-1.29)</td>
<td>(1.31)</td>
<td>(-0.20)</td>
</tr>
<tr>
<td>Lagged Dependent</td>
<td></td>
<td>0.99**</td>
<td>0.99**</td>
<td>0.92**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(25.52)</td>
<td>(25.17)</td>
<td>(11.43)</td>
</tr>
<tr>
<td>Total R²</td>
<td></td>
<td>0.99</td>
<td>0.97</td>
<td>0.96</td>
</tr>
<tr>
<td>rho (ρ)</td>
<td></td>
<td>0.35</td>
<td>-0.007</td>
<td>0.40</td>
</tr>
<tr>
<td>D.W. / h</td>
<td></td>
<td>1.79</td>
<td>0.01</td>
<td>1.87</td>
</tr>
</tbody>
</table>

Note: All variables are logged in the estimations.
Cochrane-Orcutt estimation, t-values in parentheses.
* and ** indicate significance at the 10, and 5 % levels respectively.
6.5 Empirical Results

Government Consumption

Concerning the structural and economic determinants, income variable (Real GNP) has a positive effect on the growth of government consumption expenditure. In equation 1, the GNP elasticity is less than unity, and has a positive significant effect. The coefficient of Real GNP is positive, as hypothesised, and significant at the 5% level. The positive correlation between Real GNP and GeCon is consistent with the Wagner hypothesis that public consumption expenditures will increase in growing economies (see Chapter 4). This evidence offers another support for Wagner's Law. Population (Popu) variable has the expected positive sign but insignificant even at the 10% level. Baumol's Disease is an important determinant of the expansion of government expenditure in Korea; Relative price term (Relat) is highly significant at the 5% level and positive. As explained in Chapter 2, the implicit price deflator for government consumption expenditure rose faster than the price index for GNP (see Table 2.3). In this section, we find another evidence of relative price effects in Korea. MANU has a negative sign, contrary to my hypothesis. The coefficient of the lagged dependent variable is positive and significant at the 10% level. This result supports the hypothesis that current year's government consumption expenditure depends on last year's government consumption expenditure.
For the election and bureau voting explanation, the only independent variable that is significantly different from zero is the lagged expenditure term. DumElect has expected positive sign but insignificant at the 10% level. In contrast, the coefficient of DumEy is negative and insignificant. The coefficient estimate of PUB is positive, supporting for the bureau voting model that public employees in Korea vote for higher government expenditures to raise their salaries or to extend their bureaucratic power. The coefficient of the lagged dependent variable is positive and significant at the 5% level. This evidence support for the Wildavsky hypothesis that the budget in any given year is extended to marginal adjustments to the previous year.

The empirical results of the interest group model are on the whole disappointing. The coefficient of UNION is negative, in contrast to the expectation of positive value. The reason of this negative finding is that the strength of labour union in Korea is not so strong as expected in the interest group model. During the development process, the Korean government did not admit the establishment of labour union in major export industries. The share of union member among total work force remained constant during the 1970s (see Corbo and Suh, 1992). MANUF has the hypothesises positive sign, although it is not significant. In contrast to the hypothesis, the proportion of openness in the economy (OPEN) appears to be inversely related to the size of government sector.

For the fiscal illusion explanation, Herfind has positive sign in contrast to the expectation of negative value. CPI has positive sign (but insignificant) as predicted by the theory, but its coefficient estimate is extremely weak. These results
suggest that a high rate of inflation has the illusion inducing character and these serve to increase the size of government.

As with the stabilisation policy model, estimation results are strikingly similar. The sign of the inflation coefficient (ΔCPI) is the opposite as predicted by the stabilisation policy model. Although public expenditure should be cut during a period of high rates of inflation, government consumption expenditure has been increased. The coefficient attaching to unemployment (ΔUNEMP) has positive sign. It suggests that government consumption expenditure increases when unemployment is high. Real GNP (ΔGNP) and lagged expenditure term have had a positive effect on the expenditure growth. These empirical results may indicate that the pursued macro economic policy in Korea has not been counter-cycle with respect to government consumption expenditure.

Finally, the empirical results offer little support for the institutional centralisation explanation. AID has negative sign, opposite to those predicted by the theory and insignificant.

Transfer Payments

In transfer payments, the empirical results of the structural and economic variables are on the whole not satisfactory. The GNP elasticity for transfer expenditure is greater than zero but insignificant at the 10% level. The coefficient of population (POPU) is negative, opposite to those predicted by the theory and insignificant at the 10% level. Relat has positive sign, supporting the relative
effect hypothesis but the coefficient is insignificant at the 5% level. The lagged dependent variable and MANU have also positive sign but insignificant at the 5% level.

For the election and bureau voting explanation, all of the coefficient estimates have signs opposite to those predicted by the theory. Especially the coefficients of election dummy variables (DumElect and DumEy) are negative, contrary to my hypothesis. It suggests that although presidential or congressional elections should have an expanding effect on public spending, transfer payments in Korea have been reduced during election years. During the 1970s and 1980s, the presidential election in Korea did not hold regularly. For example, there were only two presidential elections between 1970 and 1990 (one in 1971, the other in 1987). Since political power in Korea was concentrated in the hands of the late Presidential Chung-Hee Park and the incumbent government can manipulate the overall economic condition for an election, the coefficient of the election variable seems to have a opposite sign.

On the interest group model, UNION, MANUF and OPENNESS have the hypothesised positive sign, although these are not significant at the 5% level. Concerning the stabilisation policy, Real GNP has a positive and significant effect on the growth of transfer payments. In Korea, social security benefit, especially medical care and old age support, has grown considerably since the mid 1970s. The coefficient of CPI is significant at the 10% level but has a positive sign, contrary to our hypothesis. UNEMP has a positive sign but insignificant.
On the centralisation model, CENTX has a positive sign in contrast to the expectation of negative value and insignificant at the 10% level. AID has a positive effect, as hypothesised, but insignificant.

**Government Investment**

Like the different economic effects of different types of public expenditures, various types of public expenditures do not seem to respond to the same factors. The most obvious difference appears on the explanation of the growth of investment expenditure. Among the variables examined in the model, only a few variables are significant. The relative price, the openness of the economy and the lagged dependent variable have significant and positive effects.

Concerning the structural and economic determinants, Real GNP has a positive effect on government capital expenditure. Especially, like government consumption expenditure, relative price term (Relat) is positive and significant at the 5% level. It implies that the price index of government investment expenditure rose faster than the price index for GNP.

For the election and bureau model, the coefficients of PUB and DumElect are positive as hypothesised but insignificant at the 5% level. DumEy has a negative sign, contrary to my hypothesis. The lagged dependent variable has a positive sign and highly significant at the 5% level. This evidence supports the
hypothesis of "bureaucratic momentum" that the last year's budget determines this year's budget and the bureaucrats in Korea resist a cut in public expenditures.

For the interest group model, the coefficient of openness has a positive sign and significant at the 10% level. Since the early 1960s, Korea has pursued an export-led growth strategy. In open economy, the need to maintain export competitiveness may lead to more concentrated industries. To increase advantages of economies of scale in production, government need to increase public investment on the capital stock of the public sector. It may lead to a greater demand for public investment, and the positive effect of the relative price on supply side is consistent with Baumol's Disease theory.

Concerning the stabilisation model, all coefficients have excepted signs. GNP and UNEMP have a positive sign, CPI has a negative sign but insignificant at the 10% level.

For the fiscal decentralisation hypothesis, empirical results are on the whole disappointing. The coefficients of Centx and Aid are negative, contrary to my hypothesis and insignificant at the 10% level.
6.6 Reflections on the Growth of Public Expenditure in Korea

Whether measured by the absolute level of expenditure or relative to the economy, the Korean public sector has grown rapidly over the last three decades. During the rapid development process, the Korean government has exerted an enormous influence on the allocation of scarce resources in the economy and government involvement has increased substantially to promote export and economic growth. Many different analytical approaches have been used to account for the growth of public expenditure in Korea.

In this chapter, I reviewed six alternative theories of government growth which have been most commonly cited in the public finance literature. Since the literature concerning the growth of public expenditure is so large and so immense, my empirical study must be selective. My study has also been influenced by the active research of Western public finance economists. Compared with the rapid appearance of empirical studies devoted to many Western developed countries, few empirical studies have been carried out to explain the sustained growth of public expenditure in Korea. After reviewing six explanations of public expenditure growth, I analysed the applicability of these leading hypotheses on public expenditure behaviour with Korean data over the period from 1963 to 1991. Since reliable data on major explanatory variables (for example, the number of government employees in total labour force) have been compiled only after 1963, my study has focused on a period of about 30 years of between 1963 and 1991.
While I examined six explanations as separate models in this chapter, it should be noted that these models were not mutually exclusive. Six explanations are closely related and the explanatory variables identified in the various explanations may interact with one another in influencing the growth of public expenditure. Since many researchers have treated six explanations independently in their empirical studies, I have specified each as a separate model of public sector growth.

After a brief survey of six explanations of government growth, I identified explanatory variables of potential relevance in explaining the growth of public spending in Korea. Through an extensive reading of the literature of public expenditure growth, I attempted to identify some important independent variables which seemed to be of the greatest relevance for the case of Korea over the study period. Since the growth of government is a complex and multi-faced phenomenon, the process cannot be easily identified by a single indicator. Since my study in this chapter aimed at an identification of empirical similarities of growth theories, further research is needed on Korean government growth.

For the dependent variables, I adopted three different components of total government expenditures: government consumption expenditure, government transfer payment and government capital expenditure. The choice of independent variables differs from the share version (the ratio of government expenditure in GNP) in the previous chapters. A disaggregation has been made because three components represent the basic economic categories on which the national accounts are constructed, and the different components of aggregate spending have shown different growth pattern over the study period.
The Relevance of Six Explanations to the Korean Public Expenditure Growth

The empirical results of the tests of six different explanations are on the whole disappointing. Of the six explanations of government growth, only structural and economic determinants seem to be of great relevance in explaining the growth of public expenditure in Korea over the study period. These disappointing results question the validity of these leading hypotheses in the Korean case. In this subsection, I will discuss the relevance of these six explanations to the Korean public expenditure evolution.

(A) Structural and Economic Determinants; The results presented in Table 6.3 suggest that Structural and Economic Determinants are the main causes of the expansion of public expenditure in Korea. My empirical study shows that real GNP is the main determinant of public expenditure growth in Korea. As explained in Chapter 3, both government expenditure and real income have increased substantially for the period of 1963-1991. The empirical results seem to be prove the usefulness of Wagner's approach to Korea. Since Wagner's hypothesis was framed in reference to states where real income was increasing as a result of industrialisation, it seems to fit the Korean experience quite well after the early 1960s (see also Chapter 4).

My empirical study also shows that the lagging productivity between the public and private sector is another important determinant of the expansion of public expenditure in Korea. As noted in Chapter 2, the price deflator of government consumption expenditure rose faster than the implicit price deflator
for GNP. The positive sign displayed on the Relat variable in this chapter lends further support to the Baumol hypothesis and its relevance to the Korean public sector expenditure experience. In Korea, government is a labour-intensive sector and productivity increases in the public sector are presumed to be smaller than that of the private sector. Due to the low productivity of the Korean government sector, the relative cost of government services should rise over time, and this will lead to the expansion of the public sector. It is apparent that the Baumol hypothesis of unbalanced productivity growth is validated for the case of Korea.

(B) Election and Bureau Voting; The empirical results for the Election-Bureau Voting model are on the whole disappointing. Among five explanatory variables, four variables (Intercept, Pub, DumElect, DumEy) are statistically insignificant even at the 10% level. Contrary to the Election-Bureau Voting hypothesis, the coefficients of election dummy variables are negative. It may be claimed that the Election-Bureau model is not relevant for the case of Korea. In Western developed countries, electoral competition may lead to an increase in the public economy. The incumbent government attempts to stimulate the economy at the election time so as to improve its re-election chances. Politicians use public spending to buy off demands of the electorate and to increase their popularity. The frequency of electoral competition might have an inflationary impact on public expenditures. Compared to Western countries where representative democracy is well developed, presidential and congressional elections in Korea were not held regularly. Over the study period of 1963-1991, there were only three presidential elections. Partly due to the dictatorship in the Korean political system and partly due to the infrequency of presidential elections, the incumbent government did not need to provide favourable economic
conditions at the election time. In this respect, the impact of election on Korean public expenditure seems to be small.

For the election-bureau model, the only explanatory variable that is statistically significant is the lagged expenditure term. Due to bureaucratic inertia in budget decision-making process, this year's budget is incremental with the major proportion of expenditure being that of the previous year. In Korea, last year's budget is one of the most important determinants of this year's budget. Thus, the lagged expenditure variable is considered as the main determinant of government size in Korea.

(C) Interest Group; The empirical results of the interest model show that the impact of interest groups on the size of government in Korea is negligible. In Korea, there exist a number of interest groups: industry trade association, citizens' group, farmers' association and labour union. Each interest group demands more subsidies for its members and also supports for the expansion of public spending. In this chapter, I tested a hypothesis that the existence of interest groups leads to greater government expenditure. The important task is to find out an appropriate measure of the strength of the relevant interest group over time. Due to the non-availability of suitable data, I employed some proxies for the key variables to examine the validity of the interest group model. (Time-series data for the number of industry trade association, citizens' group and farmers' association are not available in Korea.) In doing so, I strongly assumed that these proxies represent the strength of the relevant interest groups over time. Although these proxies are imperfect measures of interest group strength, I include these variables in the test rather than omit them. By including these variables in the model, we can get some insights about the impact of interest groups on the size of government in Korea.
The results shown in Table 6.5 are on the whole disappointing. The coefficients of UNION and OPEN are negative, in contrast to the hypothesis and insignificant even at the 10% level. It may be claimed that the interest group model is irrelevant for the Korean public expenditure evolution. But my empirical results must be interpreted with caution. Due to the non-availability of alternative data and due to the omission of relevant variables, the model might be mis-specified and my empirical results of the effect of interest groups might be biased. Further research is needed to refine the testable theoretical model.

(D) Fiscal Illusion; Since the early 1960s, the Korean government has introduced many small taxes into the tax structure and the Korean public revenue system has become more complex. As the size of government has grown, public expenditures have raised from a more complex revenue structure over the last three decades. The other important characteristic of the Korean tax structure is that it relies very heavily on indirect taxes. More than 60% of total tax revenues were collected from indirect taxes until the late 1980s. Due to rapid inflation, Korean taxpayers were moved into higher marginal tax brackets and fiscal drag effect might exist. Due to the complex revenue structure and due to the fiscal drag effect of inflation, fiscal illusion might occur in Korea and this illusion might lead to an increase in public budgets.

I adopted three explanatory variables (HERF, INDIR, CPI) to examine the validity of the fiscal illusion hypothesis for Korea. The empirical results in Table 6.6 are on the whole disappointing. I found that the coefficients of the Herfindahl index were positive and statistically insignificant, suggesting that the fiscal illusion hypothesis did not apply to the case of Korea.

As noted in Chapter 2, Korean off-budget activities have grown rapidly since the mid-1960s. When the Korean government faced the choice between direct
public expenditure and off-budget means, executive government preferred the less visible method (off-budget expenditure). Due to the rapid increase of Korean extra-budget activities, budgets did not expand easily even though taxes were concealed in fiscal illusion. It also seems to be doubtful that Korean taxpayers have consistently misperceived their tax prices during the rapid development process.

(E) Stabilisation Policy; Like other developing countries, short-term management of the economy has become an important policy during the Korean modernisation process. Since the early 1960s, the Korean government has adopted fiscal stabilisation policies to achieve important policy objectives such as economic growth, price stability and full employment. To examine the applicability of the stabilisation policy model to Korea, I specified a simple stabilisation model.

Using annual data for the period of 1963-1991, I examined the simple stabilisation model. The empirical results shown in Table 6.7 are also weak. GNP and UNEMP have positive signs as predicted by the theory, but statistically insignificant. CPI has positive sign, opposite to the theory and statistically insignificant. Only, the coefficients of the lagged dependent variables were positive and highly significant at the 1% level.

These disappointing results cast doubt on the applicability of the stabilisation model to the Korean case. It might be claimed that Korean macro-economic policies have not been counter-cycle. Especially, during the period of the first and second oil shock, the Korean government intervened too late to stabilise the economy. Due to the policy lags (recognition and action lag), policy implementation failures existed. Due to the certainty of policy effectiveness,
Korean stabilisation policies resulted in changes that were unpredictable. In this respect, the simple stabilisation model seems to be irrelevant in explaining the size of government in Korea.

(F) Centralisation of Power; Finally, I examined the impact of fiscal centralisation on public sector size in Korea. Over the period of 1963-1991, the share of central government tax revenues in total tax revenues remained constant in Korea; about 80 per cent. To examine the applicability of the fiscal illusion hypothesis to Korea, I used two explanatory variables (CENTX, AID).

The empirical results shown in Table 6.8 offer no support for the fiscal illusion hypothesis. The coefficients of AID were negative, opposite to those predicted by the theory. The coefficients of CENTX were weak and the t-ratios remained quite small. Contrary to evidence for the US, fiscal centralisation is found to have no impact on public sector size in Korea.

The insignificance of fiscal centralisation as a determinant of public sector size in Korea is not surprising. According the fiscal centralisation hypothesis, it is competition that limits the revenue-maximising instincts of government. The voters have to face a wide range of choices, with a wider range of functions where these functions are carried out at localised levels of government. However, compared to Western developed countries, the number of lower-level of governments in Korea is small. At the local level, Korea had 245 local government authorities in 1991. Due to the small number of lower-level governments, competition among governments was not intensive and centralisation of power could not influence public sector size in Korea.

Furthermore, the economic importance of Korean local governments is very slight. Korean local governments have a limited range of functions and these functions are relatively unimportant. Local government own-source
financed expenditures accounted for only 20 per cent of total receipts in 1991. Partly due to the small number of lower-level governments and partly due to the relative economic insignificance of local governments, centralisation might be expected to have no significant effect on Korean public sector size.

Further Research

The disappointing empirical results in this study cast considerable doubt on the usefulness of these six explanations for the Korean case. Since the existing literature of government growth consists of a large number of simple and separate models, I specify each as a separate explanation of public sector growth. However, my study seems to be adding separate models together and it seems to be an ad hoc exercise. Furthermore, a number of other explanations of government growth were not tested in this chapter.

To overcome these problems, I need to develop an integrated model which may offer greater empirical support. Much further work is needed to extend the simple and separate models. Since the growth of government is the result of a complex interaction of forces acting on the demand and supply side, my future model must integrate the demand and supply side in a coherent manner. My public expenditure function can be simply specified as follows:

\[ G = f (G(D), G(S)) \]

where \( G \) is public spending, \( G(D) \) is the set of demand variables and \( G(S) \) is the set of supply variables which influences the size of public expenditure.
As noted previously, it seems to be inappropriate to test the six explanations separately. They may not be mutually exclusive. Therefore, I will test empirically an integrated model which brings the institutional and non-institutional approaches together. After including plausible explanatory variables of potential relevance in explaining the Korean experience, I can specify the following combined model.

\[
\frac{G}{GNP} = f\left( \text{PNP}, \text{MANU}, \text{RELAT}, \text{OPEN}, \text{PUB}, \frac{G}{GNP}_{t-1} \right)
\]

where \( G/\text{GNP} \) is the ratio of public expenditure in \text{GNP}, \( \text{GNP} \) is Real \text{GNP}, \( \text{MANU} \) is share of manufacturing product in \text{GNP}, \( \text{RELAT} \) is the ratio of the price deflator of government consumption expenditure to the \text{GNP} deflator, \( \text{OPEN} \) is the ratio of imports and exports to \text{GNP}, \( \text{PUB} \) is the share of government employees in total labour force and \( \frac{G}{GNP}_{t-1} \) is the lagged dependent term.

The above combined model may give us some useful insights in understanding why public expenditure has grown in Korea over the study period. My empirical study suggests that the growth of government in Korea can scarcely be explained in a simple model by economic factors alone. More theoretical and empirical analysis need to be carried out before I specify a meaningful public expenditure function. There is still a very long way to go.
6.7 Conclusion

In this chapter, I have tried to identify the important determinants of the growth of government expenditure in Korea since the early 1960s. Several possible explanations have been discussed and tested for the period 1963 to 1991. A disaggregation of total public expenditure into consumption, transfers and investment has been made because these three components had experienced different growth paths, and therefore different estimate parameters are needed for each.

Structural economic determinants of public sector growth have been identified. Real GNP and Baumol's Disease have had a positive effect on the growth of government consumption and investment expenditure. The empirical results of the tests of the institutional explanation are on the whole disappointing. The impact of election on government expenditure seems to be small. No serious indications of influences of interest groups could be found. The fiscal illusion model received little support, and the empirical results for the centralisation explanation are also disappointing.

Further research will need to refine the testable theoretical models and to improve the data base. It would be desirable to build "an integrated model", containing the different explanations of the size of public sector. The use of a more sophisticated method for empirical estimation and further variation of variables over a long period may lead a different finding.
Appendix Variables and Sources of Data

All expenditure data are drawn from the Korean National Accounts published by the Bank of Korea. The implicit deflators are constructed from the National Accounts. The following National Accounts publications are used; National Income in Korea (1982), New National Accounts (1986), National Accounts (1990, 1992, 1993).

Real GNP, MANU, INDIR, OPEN, CENTX and AID are likewise computed from the National Accounts.


Data necessary to construct INDIR and HERF are also drawn from Major Statistics of Korean Economy (Economic Planning Board, 1983, 1993).


Data on UNION and Election Year are from Social Indicators in Korea (The Korean Statistical Association, 1992).
Summary and Concluding Comments

As noted in the introduction, the purpose of this thesis was to explain why and how public expenditure has grown in Korea during the period 1953-1991. We adopted an inductive and deductive approach to explain the growth of public expenditure in Korea over the last four decades. By examining the time profile of government spending over the study period, we tried to identify the major determinants of public expenditure growth in Korea.

We started our study with an overview of the various theoretical approaches to the subject of government growth. In Chapter 1, we presented nine alternatives theories of public expenditure growth. The two most frequently cited explanations for the growth of public expenditures are "Wagner's Law" and the "Displacement Effect Hypothesis". We examined Wagner's Law as founded in his own writings. Although Wagner's original ideas were broad, we focused on the empirical verification of the law. We also discussed differences in subsequent interpretations of Wagner's hypothesis and their relevance for empirical testing. It provided the theoretical basis of our empirical analysis of Wagner's Law for Korea in Chapter 4. In contrast to Wagner's Law, Peacock and Wiseman introduced the supply side into the public expenditure determination process. We discussed the concept of the displacement and inspection effect in their own original writings. We also reviewed the displacement literature briefly with the purpose of explaining how the displacement effect had been interpreted by
various authors. This provided the starting point of our empirical study of the "Displacement Effect Hypothesis" for Korea in Chapter 5.

Whilst historical development models of government growth were useful studies to find out the factors which influenced the long-term trends in public spending, they were devoid of any appreciation of the theory of political process. Public choice models provided a solid foundation for the analysis of public expenditure growth and also produced testable hypotheses. We reviewed six formal models of political and economic institutions to account for the growth of public expenditure. One of the earliest formal political models of government activity is the median voter model developed by Downs (1957) and Black (1958). In the simple median voter model, the median voter's preferred expenditure level is the most important determinant of government expenditure. However, the median voter model holds only under very restrictive circumstances. The model ignores the supply side of the public sector, especially the role of politicians and bureaucrats. The most widely cited model of bureaucracy is that of Niskanen. The Niskanen model focuses on the behaviour of a budget-maximising bureaucracy and the bureaucratic mechanism will produce larger budget than the optimal level implied by the median voter model. The bureaucracy model provides an important proposition that the activity of bureaucrats is an important determinant of public expenditure growth. The central problem of the bureaucracy model is how to test for bureaucratic power growth over time. We also examined the Baumol model of unbalanced productivity growth. According to the Baumol hypothesis, there exists a productivity differential between the private and public sector, and the low rate of productivity increases in the public sector is the main determinant of the growth of the public sector. Due to the relative price effect, the relative price of
government services rises faster than the price of private sector output, and this could lead a steadily growing share of the public sector. In Chapter 6, we find support for the relative price effect hypothesis in Korea. Finally, we reviewed the political business cycle hypothesis briefly. The political business hypothesis presumes that governments pursue expansionary policies in order to aid in an election. In Western developed countries, politico-economic models are very popular and many authors have examined the validity of the political business cycle theory. Unfortunately, due to the lack of reliable data on government popularity (Gallop-type opinion polls), we could not examine the evidence for the political business cycle in Korea. The theories and empirical studies reviewed in Chapter 1 are rudimentary. None of the theories is sufficiently developed and the factors which influence the growth of the public sector are complex. More theoretical analysis needs to be carried out in this area of public expenditure growth.

After reviewing nine alternatives theories of public expenditure growth, we discussed about measurement issues in Chapter 2. When we investigate the growth of government activity over time, we suffer from measurement problems. There have been a variety of conceptions of government size and several different measures have been used to explain the growth of government in the economy. Due to the multidimensional nature of the scope of government intervention in the economy, no single measure is the right one to explain in all instances the size and growth of the public sector. In this Chapter, we have adopted public expenditure data which have been presented within the national accounts framework in Korea. This is partly due to the ease of measurement and availability of data via the Korean national accounting systems. However, the national accounts data do not encompass all of the important public sector
activities (especially, off-budget activities). Therefore, the use of the ratio of public expenditure to GNP in the national accounts understates the government involvement in the economy. As we mentioned, there are a lot of problems in designing a meaningful measure of public expenditure growth.

In Chapter 3, we gave a brief overview of the development of government spending in Korea from 1953 to 1991. Since the earliest reliable data on GNP and government spending go back to the year 1953, we focus on the growth of government expenditure only since the end of the Korean War. We were interested in the dynamic relationship between government fiscal activity and the growth of the Korean economy over the last four decades. We presented some statistical data and described briefly the evolution of the public sector during the Korean modernisation process. By studying the specific conditions of the Korean economy and examining the changes in the structure of government expenditure, we attempted to explain the changing role of government during the process of development. The description of the Korean economy and the evolution of the Korean public sector gave us the statistics which should be tested against the statistical evidence. The theoretical and empirical explanation of this changing role of government is the subject matter of the next three Chapters.

Having explained the long-run development of public spending in Korea, we proceeded to test for the two classical theories, namely Wagner's law and Peacock and Wiseman's displacement effect hypothesis. In Chapter 4, we analysed the applicability of Wagner's law on data taken from Korea during the period 1953-1991. We tried to assess briefly the possible contribution of Wagner's hypothesis to an understanding of the growth of public expenditure in Korea. Whilst many empirical studies using time series data have found support
for the Wagner law, we have argued that these findings are likely to be spurious because they adopted nonstationary variables. To overcome the econometric problems of previous studies, we attempted to test stationarity of each variable and to investigate the long-run relationship between real government expenditure and real GNP in terms of cointegration analysis. We found that both the public expenditure variables and the incomes variables are integrated of the same order one and there exists a long-run positive relationship between the two variables. Those positive income elasticities confirm the validity of Wagner's law for Korea during the study period. However, it should be noted that Wagner's original idea was broader than its modern interpretation of the income elasticity hypothesis. In this Chapter, we interpreted Wagner's law in narrow terms. More research is needed to examine Wagner's original hypothesis which attempts to explain the relationship between the process of economic development and the size of the public sector.

The other most frequently cited explanation of the growth of the public sector is the Peacock and Wiseman "displacement effect" hypothesis. In Chapter 5, we tested for the displacement effect on government expenditure in Korea associated with the political crises (or military coup). We reviewed the displacement literature, and assessed previous econometric tests of the displacement hypothesis, and found deficient. Since the original displacement hypothesis was concerned with the development of public spending over time, we needed to take account of the effect of time on public expenditure growth. To examine an upward displacement of government expenditure after the two political crises for the period of 1953-1991, we adopted a recent time-series modelling technique. Using an ARMA technique, we examined the relevance of the displacement hypothesis to explain the time profile of public expenditure
growth in Korea. Testing the hypothesis for Korea, we found no empirical support for the displacement effect on government expenditure associated with the two political crises of 1961 and 1979. We found that the two political crises in Korea led to a downward shift in government expenditure. There was no sharp increase in the level of government expenditure after the two political crises. These results disproved the displacement effect hypothesis. The Peacock and Wiseman displacement effect hypothesis cannot be taken to give a conclusive explanation of the growth of public expenditure in Korea.

At the final Chapter of this thesis (Chapter 6), we attempted to identify the main determinants of public expenditure growth in Korea. As previously noted, few empirical studies have been devoted to the time pattern growth of public expenditure. Six different explanations of government growth have been discussed and tested for the period 1963 to 1991. A disaggregation of total government expenditure has been made because the growth pattern of different components is dissimilar and we cannot explain the growth of public expenditure in a single model. Our empirical analysis shows that the income effect, the relative price effect and the lagged dependent variable are the main causes of the expansion of government expenditure in Korea. The positive income elasticity is consistent with the Wagner hypothesis which assumes a positive correlation between real government expenditure and real GNP. Baumol's Disease is another important source of the growth of public expenditure. As previously explained (Chapter 1 and Chapter 2), the relative price of government services rises faster than the price of private sector output. In Chapter 6, we found another evidence of the relative effect hypothesis. The lagged expenditure term is another main cause of government expenditure growth. It implies that last year's public spending is one of the most important
determinants of this year's public spending in Korea. However, since our thesis is not an econometric one and our study aims at an identification of empirical regularities of theories, our empirical studies are considered as preliminary work. Further research is needed to refine the empirical testable models and to improve the data base. The use of more sophisticated methods and further variation of variables are another topics for future research.

We hope that this thesis gives useful insights in understanding why and how public expenditure has grown in Korea over the last four decades. As previously noted, the growth of government is a complex process, and we cannot explain the process of public expenditure growth within a relatively small economic model. To understand the multi-faced and complex phenomenon of government, a broad research is called for, which focuses on how governments make their decisions and how governments behaviour on changes in the economic environment. This field of research is the subject matter of future research.
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281


283


