Chapter 1

Introduction

1.1. Background

During the period since the Second World War, development economics has gradually emerged as a new branch of economics. Initially, economists such as Harrod (1939), Domar (1946) and Lewis (1954) saw the development problem as one of maximisation of economic growth. Development theory was based on the belief that economic growth would lead to widespread improvements in mass welfare. The idea was that economic gains would trickle down to the population in the form of jobs and would stimulate the social investment necessary for improved welfare. However, during the 1970s, third world countries such as Brazil that had experienced relatively high rates of economic growth in the 1960s began to realise that such growth had brought little in the way of significant benefits to the poor. Levels of living, for those hundreds of millions of people in Africa, Asia and Latin America, seemed to stagnate and in some countries, even to decline in real terms. Unemployment increased and the distribution of incomes between rich and poor seemed to widen with each passing year. As a result the call for the dethronement of GNP as the main concern of economic policy was widely heard. In its place, the problems of poverty and equality became the main themes during the 1970s (see for example ILO 1972, and Chenery et al. 1974).

An enormous amount of research has got underway about the evolution of income distribution in the developing countries since the 1970s. Most studies analysing the relationship between development and income distribution have taken as point of departure the hypothesis originally advanced by Kuznets (1955, 1963). According to this hypothesis, during the development process, the secular behaviour of inequality follows an inverted U-shaped pattern with inequality first increasing when per capita income is relatively low and then decreasing when per capita income is relatively high. Starting from this point, researchers have considered other factors strongly related to the development process such as education and international trade.

The main problem in the empirical studies mentioned is that they have been usually based on cross section data. However, the relationship between development and income distribution should be studied in an explicitly historical context for particular countries. Unfortunately, time series data on the distribution of income, over any substantial period are simply not available for most developing countries. With limitations, researchers such as Ahluwalia (1976) have made a great effort to understand the relationship between development and income distribution using cross country data. Its understanding is of critical relevance to development policy. On the one hand, orthodox development economists such as Gary Fields (1984) are still claiming that since economic growth can reduce inequality, development strategies emphasising economic growth over alternative objectives can best promote a broadly shared rise in the standard of living.

On the other hand, others such as Chenery (1974) argue that development policies should incorporate equity objectives. They give two reasons for this. First, they question the orthodox view of automatic decrease in inequality in the course of economic growth. According to them, broad segments of the society may never reap growth's benefits unless equity is embedded in the structure of the economy. Second, they claim that even if economic growth can reduce inequality, the absolute and relative poverty of many for decades to come is intolerable.

A study of South Korea's income distribution would give a new vision in this confrontation. Several factors make this research very attractive. First, South Korea belongs to the so-called gang of four (with Singapore, Hong Kong and Taiwan). These countries have achieved remarkable economic growth since the 1960s. Second, Korea's income distribution has been recognised as one of the most equitable among developing countries. Finally, time series data on the distribution of income are available for South Korea. Therefore, it is possible to conduct an econometric analysis of the relationship between income distribution and development over a substantial period.

A number of studies on income distribution emerged in Korea during the 1970s. The best known are those by Oshima (1970), Adelman and Robinson (1978) and Rao (1978). The main objective of these studies have been to analyse the relationship between growth and equity. Except for the work by Adelman and Robinson (1978), these studies have presented mainly tabular evidence on Korea's income distribution

and its determinants. The paper by Adelman and Robinson (1978) used a General Equilibrium Model in its analysis. In contrast to previous studies, the present paper will use econometric analysis to study the relationship between development and income distribution. In addition, the present study will cover a longer period than previous studies. While previous studies used mainly data for the period from 1961 to the mid 1970s, this study will cover the period from 1961 to the early 1990s.

1.2. Aims and objectives

The main objective of this dissertation is to determine and analyse the major factors affecting income distribution in South Korea in the period 1961 to 1993. These factors are: Kuznets' hypothesis, rate of economic growth, intersectoral shifts, international trade, government, education and demographic changes. The effects of these factors are analysed under a well structured theoretical framework. Appropriate econometric techniques are used for empirical analysis. With knowledge of the influence of factors such as education or economic growth on income distribution, policy makers can design a better set of development policies.

1.3. Outline/Overview

In Chapter 2 a review of selected studies on income inequality is presented. These studies analyse the relationship between income distribution and several factors of the development process. Among those factors reviewed are: economic growth, education and international trade. Chapter 3 contains a discussion of Korea's

development experience in which the Korean economy in historical perspective is analysed. Similarly, Korea's development experience is examined and Korea's position in the world economy is discussed. In the last section, trends in Korea's income distribution are analysed. In Chapter 4, the details of the empirical model are given. These include, among other things, conceptual framework of the study, a description of the empirical model, full details of the handling and compilation of data, and techniques used to estimate the parameters of the model. Chapter 5 presents the empirical results. Finally, in Chapter 6 a summary of what has been achieved is provided and some conclusions are mentioned. This Chapter culminates by looking at implications of our findings for policy making and future research.

Chapter 2

Literature Review

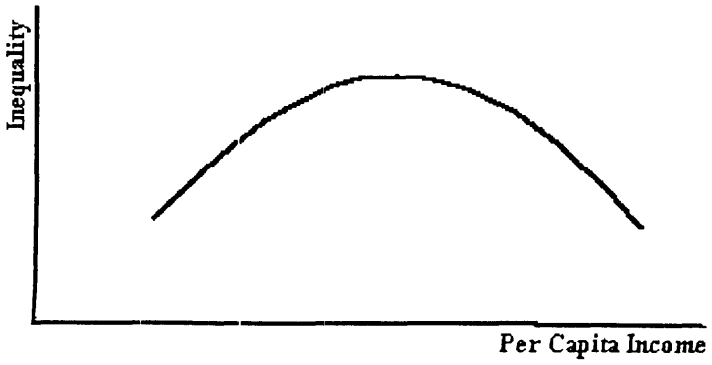
2.1. Introduction

The main purpose of this section is to review major studies on income distribution with particular attention to the empirical studies for developing countries. This Chapter comprises eight sections. Section 2.2 presents a review of the empirical tests on the Kuznets' hypothesis. Section 2.3 critically evaluates empirical studies on the relationship between structural changes of the economy and income distribution. In section 2.4 presents evidence about the impact of international trade on income distribution. Section 2.5 is concerned with the literature on the relationship between the government sector and income distribution. Section 2.6 summarises the evidence on the relationship between the rate of economic growth and income distribution. section 2.7 deals with the major studies on the effect of education on income distribution. Section 2.8. deals with previous evidence on the relationship between demographic factors and income distribution. The final section of this chapter summarises major contributions of previous studies and outlines the distinguishing features of this thesis compared to previous studies.

2.2. Kuznets' hypothesis.

In a pioneering study, Kuznets (1955) hypothesised an inverted U-shape relationship between income inequality and the stage of development. According to this hypothesis, income inequality widens in the early phases of economic growth when transition from the pre-industrial to the industrial civilisation is most rapid, becomes stabilised for a while and then narrows in the later phases. Graphically, the relationship between inequality and per capita income produces an inverted-U curve (see Figure 2.1.). Even though Kuznets (1955) did not formulate a theory to explain his hypothesis, he speculated about the possible causes for the U-inverted pattern. According to Kuznets (1955), it is the intersectoral shifts of employment from agriculture to non-agriculture that produces a pattern in which income inequality at first increases and then decreases. This topic will be again covered in section 2.3. Since the publication of Kuznets' 1955 paper, a vast literature has emerged to empirically test the Kuznets' hypothesis. This section reviews major empirical studies in this area of research.

Figure 2.1. Kuznets' U-inverted curve



2.2.1. Cross Sectional Studies

Kuznets' pioneering study (1955) was cross sectional in nature. He examined countries at different stages of development at approximately the same point in time and identified how the pattern of income distribution varied in moving from lower-income to successively higher income countries. Kuznets considered the income inequality of India, Ceylon, Puerto Rico, the United Kingdom and the United States. Kuznets observed that the income shares of the lower 3 quintiles were 28 per cent of the national income in India, 30 per cent in Ceylon and 24 per cent in Puerto Rico. Whereas for the developed countries, he found that the income shares for the lower 3 quintiles were 34 per cent of the national income in the United States and 36 per cent in the United Kingdom. Similarly, Kuznets found that the shares of the top quintile were 55 per cent of the income in India, 50 per cent in Ceylon, and 56 per cent in Puerto Rico. Whereas, for the developed countries, he found that the shares of the top quintile were 44 per cent of the income in the United States and 45 per cent in the United Kingdom. Therefore, Kuznets found greater inequality in the developing countries (Ceylon, Puerto Rico and India) than in the developed countries (the United States and the United Kingdom).

It was the result of his 1955 study that led Kuznets to suggest the U-inverted hypothesis. That is, there is "a long swing in the inequality characterising the secular income structure: widening in the early phases of economic growth when the transition from the pre-industrial to the industrial civilisation was most rapid;

becoming stabilised for a while, and then narrowing in the later phases" (Kuznets 1955, 18)[1]. The early studies on the Kuznets' hypothesis presented only tabular evidence on income distribution. An example of this kind of study is the work by Paukert (1973). Analysing the Gini coefficients of fifty-six countries, both developing and developed countries, Paukert found that there was a notable increase in inequality moving from countries in the lowest income group to those in the US$101-200 per capita income group, and a further but less notable increase as one moved on to the US$201-301 group. This group and the next US$301-500 group represented the peak of inequality. Paukert observed a substantial reduction in inequality in the US$501-1,000 group and further reductions in inequality as one moved to even higher income countries. Paukert's findings supported the U-inverted Kuznets' curve. Later cross-sectional studies on the Kuznets' curve estimated non-linear regressions of income inequality on per capita national income. An example of this kind of study is the work by Ahluwalia (1976). This study was based on a sample of 60 countries including 40 developing countries, 14 developed countries and 6 socialist countries. Ahluwalia (1976) estimated a non-linear regression of income shares of different percentile groups on per capita GNP. Ahluwalia, like Paukert (1973), found support for the Kuznets' hypothesis.

1. The Kuznets' hypothesis has been tested in a large number of cross sectional empirical studies. Those studies include Kravis (1960), Paukert (1973), Adelman and Morris (1973), Ahluwalia (1974, 1976), Chenery and Syrquin (1975), Cline (1975), Lydall (1977), Ahluwalia, Carter and Chenery (1979), Saith (1983), Cline (1975), Lydall (1977), Lindert (1990), Anand and Kanbur (1984, 1993) and Gradstein and Justman (1993).

Generally in cross section studies, both the tabular and regression analysis have given strong support for the Kuznets' hypothesis[2]. However there are a number of criticisms against these kinds of studies. Fields and Jakubson[3] (1994) recently questioned the findings from the traditional cross-sectional studies. According to them "what is going on within countries is different from what is going on across countries". Plotting the Gini coefficients of Brazil, Costa Rica, Pakistan, Hong Kong and Singapore against their per capita GNP, they found that only for Brazil did the data trace out an inverted-U relationship. For other countries, the data revealed either a U-shape relationship (Hong Kong and Singapore) or systematic pattern (Costa Rica and Pakistan). However, treating the data anonymously, as the procedure of the OLS in cross-sectional studies has done, an inverted-U relationship was found. Fields and Jakubson (1994) concluded that the U-inverted relationship, found in most of the cross-sectional studies, has nothing to do with growth per se. What it has to do with is the fact that for particular, historical, political and cultural reasons, Brazil and the rest of Latin American countries have higher inequality than do other developing countries.

2. Anand and Kanbur's study is a exception. Anand and Kanbur (1993), using regression analysis, did not find empirical support for the U-inverted curve.

3. Earlier criticisms of cross-sectional studies were provided by Saith (1983).

More recently Bruno, Ravallion and Squire (1995) suggested that country level determinants of inequality, such as differences in the type of data used by different countries, could lead to biased estimates in the traditional cross-sectional studies. For example, while income is a more common measure for inequality in Latin American countries, consumption is more common among the Asian economies. And since consumption inequality is bound to be lower than income inequality due to consumption smoothing, these differences alone would tend to shape a U-inverted curve even if none existed using the same welfare measure.

According to Bruno, Ravallion and Squire, if the country level effects were not a problem, then one would expect to see the U-inverted curve reappearing in later cross-section studies. Using data from 63 surveys spanning 1981-92 covering 44 countries, they replicated a number of the specifications for testing the U-inverted hypothesis found in the literature. In their analysis, they did not find evidence for the Kuznets' hypothesis. Bruno, Ravallion and Squire suggested that their results reflected how various omitted variables, during earlier compilations of distributional data, have evolved. According to them, the new data confirmed earlier concerns that these omitted variables were creating an appearance of a cross-country U-inverted curve which had little to do with the hypothesis.

2.2.2. Time series studies.

Kuznets' U-inverted hypothesis would be more appropriately tested using time series data on inequality. This would be the most direct evidence on whether inequality tends to rise in the early stages of economic development and then to fall. Two studies by Kuznets (1955 and 1963) are extensively cited as providing evidence in favour of the U-inverted curve. In his 1963 study, Kuznets analysed data overtime for the United Kingdom, Prussia, Saxony, West-German, Netherlands, Denmark, Norway, Sweden and the United States. Although, Kuznets found an U-inverted curve in his empirical analysis, Fields (1994) has questioned his interpretation of the data. He observed that in only two cases (Prussia and Saxony) the U-inverted curve found support; in the other seven (United Kingdom, Germany, Netherlands, Denmark, Norway, Sweden, and the United States) inequality fell.

The first multicountry study of time series data on income distribution in less developed countries was undertaken Weisskoff (1970). He examined data overtime for Puerto Rico and Mexico. However, he did not find a particular pattern on the relationship between inequality and development. During the period 1953-63, Puerto Rico experienced an increase of real income accompanied by an increase in inequality, as measured by the Gini coefficient. In Mexico, during the period 1950-1963, real income also increased. This was accompanied by an increase in inequality as measured by the Gini coefficient. Finally, in Argentina during the period 1953-1961 real income increased whereas the Gini coefficient showed an increase in inequality

between 1953 and 1959 with a movement to equality in the 1959-61 period. Similar results were also found by Oshima (1991) for a number of Asian countries. Oshima (1991) analysed time series data for Japan, Taiwan, Hong Kong, Korea, Singapore, Thailand, Philippines, Malaysia, Sri Lanka, Bangladesh and India. However, none of the countries followed the pattern of income distribution and per capita income observed by Kuznets in the western economies[4]. When analysing South Korea, Oshima (1991, 120) noted that income inequality in the late 1960s was falling when according to the Kuznets' hypothesis income inequality should be increasing since its per capita income was below $200, while income inequality was rising in the 1970s when it should be falling (with per capita rising to $1500 by 1980)[5].

4. Other time series studies have found mixed results. Fields (1994) analysing data for 5 developing countries found that only one (Brazil) exhibited the U-inverted pattern. Londoño (1990) found an U-inverted pattern for Colombia. However, U shape relationship was found for Taiwan (Fei, Ranis and Kuo 1978; Fields 1992). Similar results have been found for the now-developed countries. Williamson and Lindert (1980) found support for the Kuznets curve in the United States and Williamson (1985) found it for Great Britain. However, the Kuznets' curve did not fit for Germany (Dumke 1991) and Australia (Thomas 1991).

5. Other studies on income distribution in Korea noted previously that during the high growth period of the 1960s, Korea did not experience the typical decline in equality of household income implied by the Kuznet's curve (see for exmaple Oshima 1970, Adelman and Robinson 1978, and Rao 1978).

2.3. Intersectoral Shifts

Intersectoral shifts during the process of development can also influence income distribution. This was mentioned first by Kuznets (1963). According to Kuznets, economic development is usually related to a fast growth of the non-agricultural sector, which slowly absorb population from the low income, relatively stagnant, agricultural sector. Kuznets showed that during the early stages of development, the process of intersectoral shifts leads to an increase in relative inequality and, under certain conditions, generates the U-inverse relationship between inequality and development. Kuznets (1955, 7-8) assumes that "(a) the average per capita income of the rural population is usually lower than that of the urban; (b) inequality in the percentage shares within the distribution for the rural population is somewhat narrower than in that for the urban population". Based on these assumptions, Kuznets (1955, 7-8) concluded the following "first, all other conditions being equal, the increasing weight of urban population means an increasing share for the more unequal of the component distributions. Second, the relative difference in per capita income between the rural and urban populations does not necessarily drift downward in the process of economic growth: indeed there is some evidence to suggest that it is stable at best, and tends to widen because per capita productivity in urban pursuits increases more rapidly than in agriculture. If this is so, inequality in the total income distribution should increase".

According to Kuznets (1955, 17) after "the early turbulent phases of industrialisation and urbanisation have passed", a good number of factors contribute to improve the economic position of the lower income groups in the urban population i.e. in the nonagricultural sector of the economy. Thus, intersectoral shifts also generate the U-inverse relationship between inequality and development. The Lewis model provides a theoretical explanation to the process of intersectoral shifts and the Kuznets' hypothesis. According to this, early growth may be concentrated in the modern non-agricultural sector, where employment is limited but wages and productivity are high. Inequality in the expanding non-agricultural sector may be greater than inequality in the stagnant agricultural sector. As a result , the income gap between the modern and traditional sectors may widen quickly at first before beginning to fall as the economy grows (the Lewis model will be discussed again in chapter 4).

The effect of intersectoral shifts on income distribution has been discussed in a number of studies (see for example Bigsten 1983, 79 and Bruno, Ravallion and Squire 1995, 9). However, only Ahluwalia (1976) has empirically tested the influence of intersectoral shifts on income inequality using cross-sectional data for 40 developing countries, 14 developed countries and 6 socialist countries. In his regression analysis, the explanatory variables were: the share of agriculture in GDP, which declines with development as the non-agricultural sector grows and the share of the urban population, which rises as the population shifts away from the traditional sector. Ahluwalia claims that the two variables, although related, reflect different aspects of the process of intersectoral shifts. The share of agriculture in GDP reflects

the extent to which the income generating capacity of the economy has shifted into nonagricultural activity. On the other hand, the share of urban population reflects the degree to which the shift into nonagricultural activity has been accompanied by increased absorption of population into the nonagricultural sectors. The empirical results suggest that either of the intersectoral shift variables, when entered in quadratic form in the regression, generated an inverted U relationship. Ahluwalia's empirical results are summarised in the appendix A (Tables 1-3). They support Kuznets' arguments, that is, intersectoral shifts can also generate the U-inverse relationship between inequality and development.

2.4. International Trade

International trade can also cause changes in the pattern of income distribution. This is explained by the Stolper-Samuelson theorem which states: "with full employment both before and after trade takes place, the increase in the price of the abundant factor and the fall in the price of the scarce factor because of trade, imply that the owners of the abundant factor will find their real incomes rising and the owners of the scarce factor will find their real incomes falling" (Appleyard and Field 1995, 132).

Wolfgang and Samuelson developed the Stolper-Samuelson theorem in a paper published in 1941. Their argument goes as follows: with the assumption of no joint production and perfect competition, a change in commodity prices will be equal to the weighted average change in factor prices. Given this assumption, the percentage change in the price of a factor exceeds the percentage change in price of the good

which is intensive in that factor. Therefore in a labour-abundant country, when trade initiates, the real income of labour must rise, since the wage rate is rising faster than the price of the labour-intensive good and the price of the capital-intensive good is falling. Furthemore, the price of capital must be falling faster than the price of the capital intensive good. With wage rates rising, the price of capital must fall even faster than the price of the capital-intensive good so that the change in the price of the capital-intensive good is equal to the average change of the factor costs used in its production. Because the price of the labour-intensive good is rising and the price of capital is falling faster than the price of the capital intensive good, the real income of the capital owner must be falling. Therefore income distribution[6], in this case, moves in favour of the owners of labor. On the other hand, in a capital-abundant country income distribution moves in favour of the owners of capital. Even though the theory of international trade has emphasised relative endowments of capital and labour, recent variations in the model have considered relative endowments of skilled and unskilled labour. Recent empirical studies have been based on the latter. The belief is that developing countries are labour or unskilled-labour abundant and developed countries are capital or skilled-labour abundant. Therefore, as suggested by the Stolper-Samuelson theorem, with trade, income distribution in developing countries moves in favour of the owners of labour or unskilled-labour whereas, in developed countries, it moves in favour of the owners of capital or skilled-labour.

6. Earnings is only a component of income. Other components are investment income, transfers and capital receipts (Atkinson 1983, 38-39). Therefore income distribution will change, as predicted, only if the other factors of income do not influence considerably the pattern of income distribution.

Most of the research has been concentrated on the effect of trade on wage inequalities. In this context, the empirical tests of the Stolper-Samuelson theorem have produced mixed results. In explaining the pattern of increasing wage inequality in the United States since the 1980s, Borjas and Ramey, in two papers published in 1993 and 1994, claimed that the widening of the wage distribution occurred because the relative wages of less skilled workers fell dramatically during the decade of the 1980s. In their empirical work, they showed that trade in durable goods has increased wage inequalities in the United States. According to Borjas and Ramey, this happens because durable goods industries in the U.S. employ a disproportionately large number of less skilled workers and these workers receive relatively higher wages than workers in more competitive sectors of the economy. Therefore the increasing imports in durable goods has displaced workers in this sector and increased wage inequalities. However, Bhagwati (1995) argued that if globalization explained increased wage inequality then increased foreign competition should have driven down prices of unskilled-labour intensive goods, as predicted by the Stolper-Samuelson theorem.

However these prices have remained relatively flat. Braver and Hickok (1995), in an empirical study, showed that technical progress combined with an increase in the capital stock was more important than trade in explaining the demand -side influence on the growing inequality between the earnings of low-skill and high skill workers in the United States. The effect of globalization on wage inequalities of other developed countries has also been analysed. For example, Karunaratne (1996) analysed this in

the context of Australia. In his empirical work, he found that both exports and imports have widened wage inequalities in Australia. As mentioned, most of the research has tested the effect of trade on wage inequalities. However, little research has been done of the effect of trade on the size distribution of income. Papanek and Kyn (1986), used data for developing and developed countries to test the relationship between trade and income distribution. However, he did not find a significant effect of trade on inequality. Bourguignon and Morrison (1990) analysed the effect of trade on income distribution in third world countries. In their empirical analysis, they found that, in those developing countries where the contribution of mineral exports to GDP was greater than 5 percent, the income share of the bottom 40 percent decreased between 4 and 6 percent. Bourguignon and Morrison also found that, in those developing countries where the contribution of agricultural exports to GDP was greater than 5 percent, inequality increased only if such exports were produced on large, rather that on small and medium farms.

Fischer (1991) analysed the effect of trade on income distribution of the third world countries of Latin America and South-East Asia. In his empirical analysis, he found that in natural resource-abundant developing countries such as the Latin American ones, foreign trade increases income inequality. On the other hand, in labour-abundant developing countries, such as the South-East Asian countries, the effect of globalization is a more equal income distribution. Recently, Fieleke (1994) analysed the effect of globalization on income distribution for forty-eight countries for the 1980s. In his econometric model, an additional explanatory variable was the ratio of the international trade in goods and services to total GDP. The dependent variable

was the share of income accruing to the top 20 percent of the population. However, Fieleke did not find any significant relationship between the income share of the top 20 percent and the degree of globalization of the economies.

2.5. The role of government

Generally, a large private sector is associated with a relatively unequal distribution of income. This occurs because the return to capital is appropriated by individuals rather than the state (Bigsten 1983, 75). The available evidence shows that the income distribution in socialist countries is more even than in the capitalist economies (see for example Ahluwalia 1976 or Scott 1992). However, there is little direct evidence of the effect of a large government sector on income distribution. Ahluwalia (1976), in one of his cross sectional studies, used the ratio of tax revenue to GNP to analyse the effect of the scale of government activity on income distribution. However, he did not find a statistically significant relationship between the ratio of tax revenue to GNP and income distribution as measured by different income shares of the population. Government expenditure can reduce inequality through the provision of public goods such as education and health services (Bigsten 1983, 90-91). Several studies have analysed the effect of the government budget on the standards of living. Meerman (1979) found that the share of income of the poorest in Malaysia increases as much as 29% after government effects have been taken into account. Foxley et al (1979) found that, in Chile in the late 1960s, the 30% poorest families received only 7.6% of the original income but they received as much as 15-18% of government expenditures. As a consequence their income share increased to 10.5-11.8%.

On the other hand, government military expenditure is associated with income inequality. A primary argument claims that military expenditure on capital intensive, high technology weapons generates fewer unskilled employment gains. The argument also suggests that military contractors are very profitable companies. Therefore government military expenditure leads to a concentration of income in the hands of an elite group of primary owners, shareholders and highly skilled professionals. A second argument indicates that military personnel are usually compensated at rates above the average. Therefore government military expenditure leads to significant earnings differentials between military and non-military sectors and therefore to a less equal income distribution. Abell (1994) examined empirically, using data from the United States during the post-Vietnam War period, the impacts of military spending on the distribution of income. In his regression analyses, Abell found that increases in military spending were associated with a widening gap between the rich and poor.

2.6. The rate of economic growth

The evidence observed in some developing countries such as Brazil between 1960 and 1970 has caused economists to suggest that high growth rates could lead to an increase in income inequality. The belief is that there are short run pressures, caused by fast growth, which generate greater income inequality. According to this argument, as opportunities for accelerated growth arise in particular regions or sectors, economic expansion creates factor market disequilibria, because of the existence of lags in factor mobility across regions or sectors. Such disequilibria can generate significant

income differentials. Ahluwalia (1974) in a cross-sectional study tested the hypothesis that high rates of economic growth have an adverse impact on relative equality. He used the average growth rate of GDP over five years, preceding that for which income distribution was measured, as a regressor. The dependent variable was the income share accruing to different percentages of population. Ahluwalia, in his analysis, found that the average growth of GDP had a significant positive influence on the shares of the lowest 40 percent of the population. Therefore the hypothesis was rejected. Ahluwalia reached a similar conclusion using time series data. In addition, Ahluwalia (1974) examined the relationship between annual growth rate of income of the lowest 40 percent of the population and the annual rate of growth of GNP for eighteen industrial and developing countries. Ahluwalia (1974, 13) concluded that "there is no strong pattern relating changes in the distribution of income to the rate of growth of GNP. In both high-growth and low-growth countries, there are some which have experienced improvements and others that have experienced deteriorations in relative equality".

Later, Ahluwalia (1976) rejected, once again, the hypothesis that a faster rate of growth leads to greater inequality. Subsequently, Fields (1989), in another cross-sectional study found similar results. He used, in his analysis, data for developing countries to test the hypothesis that inequality is more likely to increase the more rapid is economic growth. The data used were the growth rates of GNP and Gini coefficients for the period 1960-86. In his analysis Fields (1989, 73) concluded "the results do not support the claim that inequality is more likely to increase the more rapid is economic growth".

2.7. Education

Education is believed to promote income equality in the long run. According to this argument, education creates additional productive skills and knowledge embodied in individuals. Under the assumption of a perfect competitive labour market, wages are equal to the value of worker's marginal product. The higher income received by better educated workers reflects the higher marginal product of skilled labour. A second assumption is that the marginal product of skilled labour is high and will remain high even though the supply of skilled labour increases[7]. Based on these assumptions, a greater supply of skilled labour, because of education, will produce a shift from low paid, unskilled employment to high paid, skilled employment. This shift, it is argued, produces higher labour incomes, a reduction in skill differentials and an increase in the share of wages in total output (Ahluwalia 1976, 321-322). A second argument is based on two assumptions. Firstly that physical capital is more unequally distributed than that from human capital. Secondly that the rate of growth of human capital exceeds the rate of increase in physical capital. Based on these assumptions educational expansion can have the effect of greater income equality.

7. The assumption that a greater supply of skilled labour will not produce a sharp decline in its marginal product is crucial. If the assumption is violated, a greater supply of skilled labour will not have much effect upon total output, and it may reduce relative wage differentials as well as the share of labour in total income thus contributing to an increase in overall inequality. Under these circumstances it is even likely that skill differentials will not narrow because of the resistance of organised labour, and the result will be either unemployment of skilled labour or displacement of unskilled labour by skilled labour in the informal sector of the market. The existence of over-educated labour force in many developing countries may reflect just such a phenomenon. Proponents of the importance of education are usually undismayed by this phenomenon and explain it away as an expansion in the wrong kind of education (Ahluwalia 1976, 321-322).

The evidence seems to support the hypothesis that education is a major factor in promoting the equality of income. Ahluwalia, in his cross-sectional study tested the relationship between education and income distribution. He used as dependent variables the income share of the middle 40 percent of the population and the income share of the lowest 40 percent of the population. The explanatory variables were the primary school enrolment rate and the secondary school enrolment rate. Ahluwalia found a significantly positive relationship between education and income equality. The primary school enrolment rate was more significant in explaining the income share of the lowest 40 percent of the population while the secondary school enrolment rate was more significant in explaining the income share of the middle 40 percent of the population.

In a later cross-sectional study, Ahluwalia (1976) also tested the relationship between education and income inequality. In this study, the explanatory variables representing education were the literacy rate, the primary school enrolment rate and the secondary school enrolment rate. The dependent variables were the income share of the top 20 percent, middle 40 percent, lowest 60 percent, lowest 40 percent and lowest 20 percent of the population. As in his previous study, Ahluwalia found a significantly positive relationship between the education variables and the income inequality variables. More recently, Morrison (1987), in an empirical study based on cross sectional data of 37 developing countries, found that education had a strong equalising effect.

Individual country-studies also support the hypothesis. Jung (1992) found that human capital in primary and secondary education had a significant effect on reducing the Gini coefficient in Korea, and increasing the share of the bottom 20 percent, whereas university education slightly increased the Gini and did not significantly affect the bottom share of the income distribution.

2.8. Demographic factors

Kuznets, in his 1955 classical paper, showed empirically that there is a relationship between population growth and development. From his analysis, Kuznets hypothesised that during the process of development a long swing would be observed in the rate of growth of population. The upward phase of the swing is represented by acceleration in the rate of population growth, reflecting early reduction in the death rate which was not offset by a decline in the birth rate. The downward phase of the swing came from a shrinking in the rate of population reflecting the more pronounced downward trend in the birth rate.

A faster population growth is associated with greater income inequality. This argument is related to the fact that different income groups have different population growth rates, with the lower income group usually experiencing a faster natural rate of increase in population growth. According to this argument, the process of development produces a 'demographic transition'. This transition usually takes the form of a reduction in the natural rate of population growth in each income group as

per capita income in the group rises. At low income levels there is a more pronounced response to this reduction in population growth than at high income levels. Therefore with development, declines in the rate of growth of total population will occur producing a narrowing of intergroup differentials in population growth. The argument, stylised by Ahluwalia (1976), suggests that countries with high growth rates of population suffer from larger intergroup differentials in population growth compared to countries with low growth rates of population. As a consequence, per capita income of the poorer groups in countries with high growth rates of population will grow more slowly compared to per capita income of the rich groups, leading to higher inequality at given levels of per capita GNP.

Little research has been done to test the relationship between population growth and income distribution. Ahluwalia (1974), in a cross-sectional analysis, found that the growth of population was positively related to income inequality as measured by the income share of the lowest 40 percent. Later, in another cross-sectional study, Ahluwalia (1976) found similar results. Ahluwalia (1976) noted in his empirical analysis that the rate of growth of population had a significant positive impact on the income share of the top 20 percent, and a significantly negative impact on the income shares of all other groups (except the lowest 20 percent for which group the negative coefficient on the population variable was not significant).

2.9. Conclusions

Most empirical studies have used cross-sectional data to test the Kuznets' hypothesis. A large number of these studies have found support of this hypothesis. However, there are a number of criticisms against these kind of studies. For example, Fields and Jakubson (1994) have questioned the procedure of OLS used to test the Kuznets' hypothesis in many cross-sectional studies. In their empirical study, they found an inverted-U when using the OLS method. However, plotting the data separately, most of the countries did not show an inverted-U curve. According to Fields and Jakubson "what is going on within countries is different from what is going across countries". On the other hand, empirical studies using time series data have given mixed results. Some country-specific studies have found support for the inverted U-shape relationship (for example Londoño 1990 for Colombia), whereas others have not found support for it (for example Weiskoff 1970 for Puerto Rico, Mexico and Argentina). Only Ahluwalia (1976) has tested the influence of intersectoral shifts on income inequality. He found that the process of intersectoral shifts is relevant in explaining the Kuznets curve.

Most of the research testing the Stolper-Samuelson theorem has been concentrated in analysing the effect of trade on wage inequalities. Although, the evidence has shown mixed results, some provocative studies have found support for the Stolper-Samuelson theorem. Among those are two by Borjas and Ramey, published in 1993 and 1994, for the United States, and another by Karunaratne (1996) for Australia.

Labour income is only a component of total income. However, research of the effect of trade on income distribution has been limited. The results of these studies have been mixed. Bourguignon and Morrison (1990) and Fischer (1991) found support for the Stolper-Samuelson theorem, while Papanek and Kyn (1986) and Fieleke (1994) did not find support for this theorem.

The evidence suggests that income distribution in socialist countries is more even than in the capitalist economies. However, there is little direct evidence of the effect of a larger public sector on income distribution. Empirical studies have analysed the effect of government expenditure on the standards of living of the population. For example, Meerman (1979) found that the share of income of the poorest in Malaysia increased as much as 29% after government expenditure was taken into account. Nevertheless, there is little evidence on the effect of government expenditure on income distribution.

Empirical studies have rejected the hypothesis that high rates of economic growth could lead to an increase in income inequality. Among those studies are two by Ahluwalia (1974, 1976). The evidence has shown that education is a major factor in promoting the equality of income (see for example Ahluwalia 1974, 1976). Finally, empirical studies by Ahluwalia (1974, 1976) have shown that high rates of population growth are associated with greater income inequality.

Ahluwalia (1974, 1976) was a pioneer in analysing empirically the relationship between development and income distribution. In his studies, cross-sectional in nature, Ahluwalia tested empirically the Kuznets' hypothesis. In addition, he

analysed empirically the influence of intersectoral shifts, government, the rate of economic growth, education and demographic factors on income distribution. The present study will follow closely Ahluwalia's empirical studies. Nevertheless there are distinguishing features between this study and those by Ahluwalia (1974, 1976). This study will also test empirically the relationship between income distribution and international trade. Such a relationship was not considered by Ahluwalia. While this study is based on time series data, those by Ahluwalia were cross-sectional in nature. Finally, the econometric model's functional forms are different in both studies. Indeed, this study is the first attempt in econometrically investigating Korean income inequality using time series data.

Chapter 3

The Korean Development Experience

3.1. Introduction

The main objective of this chapter is to discuss the development process of South Korea with particular attention to key indicators of development. The Korean economy in historical perspective is examined in section 3.2. The recent gains in Korea's development are discussed in section 3.3. An overview of Korea's income distribution is presented in section 3.4. Korea's position in the world economy with respect to per capita income, trade and income distribution will be discussed in section 3.5. And finally, conclusions will be drawn in section 3.6.

3.2. Korean Economy in Historical Perspective

Before the Japanese colonisation in 1910, Korea was almost completely an agrarian economy. During the colonial period from 1910 to 1945, the Korean economy suffered a rapid structural transformation. This occurred mainly during the 1930s, as Japanese war preparations and expansionist aspirations heightened. During this period, the share of manufactures in net commodity-products grew from less than 4 percent to over 20 percent.

The Japanese colonisation finished with World War II in 1945. Korea was divided into two parts, North and South. In economic terms, this division was disadvantageous for the South. While the North possessed most of the natural resources and heavy industry established by the Japanese, the South was primarily agricultural. From the end of World War II and until the establishment of the Republic of Korea's government in 1948, South Korea was occupied by U.S. military forces. The Korean War that followed (1950-53) was devastating. It destroyed almost two-thirds of the nation's productive capacity, and almost 1 million civilians were killed.

At the end of the Korean War, the South Korean economy commenced a solid recuperation. During the period 1953-57, GNP in real terms grew at about 5 percent per year. During this period, foreign aid was an important factor on the nation's economic growth. However, high economic growth rates during 1953-57 were accompanied by rapid inflation. The wholesale price index increased at an average annual rate of 20 to 30 percent during the period. As a result, the Korean government implemented a stabilisation program in 1957. The program was, in part, responsible for stagnant growth rates during the 1958-60 period. During this period, the economy grew at an average of 4 percent annually. The rapid economic development of South Korea commenced in the early 1960s. In the next section, the gains, in terms of development, obtained by South Korea during recent years will be discussed.

3.3. The Recent Korean Development Experience

Rapid economic development of South Korea commenced in the early 1960s. During this period, the Asian nation was suffering typical problems associated with a Third World country: widespread unemployment, underemployment and absolute poverty. Furthermore, internal savings was nonexistent. Therefore the little investment in the country was financed, mainly, by American aid. Korea, in contrast to other Third World countries, did not have resource-based exportable goods. In addition, in the early 1960s, it did not have an important industrial base. At that time, agricultural production dominated the economy. Therefore, exports were almost nonexistent in the early 1960s.

Several factors contributed to Korea's rapid economic development during the 1960s. On the one hand, because of a good political leadership during the 1950s, the Korean economy, by the early 1960s was totally recuperated from the devastating Korean War. On the other hand, South Korea has a rich historic and cultural heritage. The Koreans speak the same language. In addition, the Korean society is ethnic and culturally homogeneous. Culturally, Confucianism, with its great emphasis in education and social harmony was also important on South Korea's development. Next, a quantitative analysis of the recent Korean development experience will be made.

During the period from 1962 to 1994, the GNP real for South Korea grew at a rate of almost 8.5 percent per year (Table 3.1.). Because South Korea's population has grown at a decreasing rate over time, per capita income has increased at a real average annual rate of 6.88 percent over the period 1962-94. Considering this increase in per capita income as an indicator of an improvement in the standard of living, the conclusion is that the average Korean's economic condition has improved almost sevenfold during this 33-year period.

Table 3.1. Annual GNP and population growth rates, 1962-94 (percentages).

Year	GNP	Per capita GNP[a]	Population
1962	2.2	-0.5	2.9
63	9.1	6.1	2.8
64	9.6	7.1	2.6
65	5.8	3.3	2.6
66	12.7	9.5	2.5
Average 1962-66	7.9	5.1	2.7
67	6.6	4.4	2.4
68	11.3	8.8	2.3
69	13.8	11.3	2.3
70	7.6	8.3	2.2
71	8.6	11.0	2.0
Average 1967-71	9.6	8.7	2.2
72	5.1	3.0	1.9
73	13.2	11.0	1.8
74	8.1	6.2	1.7
75	6.4	5.0	1.7
76	13.1	11.4	1.6
Average 1972-76	9.2	7.3	1.7
77	9.8	8.0	1.6
78	9.8	8.2	1.6
79	7.2	5.7	1.6
80	-3.7	-5.1	1.6
81	5.9	4.4	1.6
Average 1977-81	5.8	4.2	1.6

Year	GNP	Per capita GNP[a]	Population
82	7.2	5.5	1.6
83	12.6	10.9	1.5
84	9.3	7.7	1.2
85	7.0	5.5	1.0
86	12.9	12.4	0.9
Average 82-86	9.8	8.4	1.2
87	13.0	11.9	0.9
88	12.4	11.3	1.0
89	6.8	5.7	1.0
90	9.3	8.0	0.9
91	8.4	7.5	0.9
92	5.03	4.07	0.9
93	5.84	5.00	0.9
94	8.22	7.25	0.9
Average 1987-94	8.62	7.59	0.92

a. Based on 1985 constant prices.

Source: Sakong 1993, 12; National Statistical Office. 1993. Major statistics of the Korean Economy; National Statistical Office. 1995. Korea figures in short. National Statistical Office. 1995. Social Indicators in Korea.

Table 3.2. illustrates some key indicators for South Korean economy during the period from 1962 to 1994. Nominal per capita GNP, during this period, grew from US$87 to US$8,483. The gains in real per capita GDP are also remarkable. Real per capita GDP grew from 625 wons in 1962 to 4,941 wons in 1993. Similarly, exports rose from US$54.8 million in 1962 to US$96.013 billions in 1994. On the other hand, imports increased from US$421.8 million in 1962 to US$102.348 billion in 1994. Because of this increase in imports and exports, South Korea has become one of the world's major trading nations. During the period analysed, the share of GDP produced by the mining and manufacturing sector increased from 16.4 per cent in 1962 to 27.2 per cent in 1994. This highlights the importance of the mining and manufacturing sector in Korea's economic development.

Table 3.2. Economic structure of Korea, 1962-1994

	1962	1967	1972	1977	1982	1987	1991	1994
GNP								
Billions of current dollars	2.3	4.3	10.7	36.8	71.3	128.9	281.7	376.9
Population (millions)	26.5	30.1	33.5	36.4	39.2	41.6	43.27	44.453
Per capita income								
Dollars (current)	87	142	319	1012	1824	3110	6510.2	8483
GDP								
Billions of Korean Won (1990 constant)	16334	24557	39164	54376	85130	138499	195936	217699[g]
GDP per capita in 1990 prices (Wons)	625	815	1169	1768	2165	3328	4528	4941[g]
Trade								
Export (millions of current dollars)	54.8	320.2	1624	10047	21853	47281	71737	96013
Export (percentage of GNP)	2.4	7.4	15.0	27.2	30.7	36.7	25.0	25.0
Import (millions of dollars, current)	421.8	996.2	2522	10811	24251	41020	81496	102348
Import (percentage of GNP)	18.3	23.3	23.6	29.4	34.0	31.8	29.0	27.0
Industrial structure (percentage)								
Agriculture, forestry and fishing	37.0	30.6	26.8	22.4	14.7	10.5	8.0	7.0
Mining and Manufacturing	16.4	21.0	23.5	28.9	30.4	33.0	28.6	27.2
Other	46.6	48.4	49.7	48.7	54.9	56.5	66.50	65.80
Labour								
Unemployment (percentage)	8.2[a]	6.2	4.5	3.8	4.4	3.1	n.a.	2.4
Nonagricultural unemployment (percentage)	16.3[a]	10.9	7.5	5.8	6.0	3.8	n.a.	n.a.
Absolute poverty (percentage)	n.a.	40.9[b]	n.a.	14.8[c]	9.8[d]	n.a.	4.5[e]	2.1[f]

n.a.= not available
a. 1963 data
b. 1965 data
c. 1976 data
d. 1980 data
e. 1990 data
f. 1992 data
g. 1993 data

Source: Sakong 1993, 8; National Statistical Office Republic of Korea, Major Statistics of Korean Economy 1993; National Statistical Office Republic of Korea, Social Indicators in Korea 1995; National Statistical Office Republic of Korea, Korea figures in short 1995; IMF, International Financial Statistics Yearbook 1981 and 1995. United Nations Development Programme, Human Development Report 1995.

The unemployment rate fell during the period 1962-94. The unemployment rate was 8.2 percent in 1962, whereas it was 2.4 percent in 1994. The fall in the unemployment rate was larger in the nonagricultural sector than in overall. This implies that the unemployment rate in the agricultural sector increased during the period analysed. A final observation from Table 3.2 is that, as a result of the economic growth, absolute poverty in South Korea has declined remarkably. Table 3.3 shows major social indicators for South Korea during the period from 1960 to 1993. It is notable that these indicators have improved substantially over this period. Life expectancy increased from 54.4 years in 1960 to 71.3 years in 1993. Crude birth rates, crude death rates and infant mortality rates fell. Similarly, the number of people per physician has also fallen. In 1960 there were 3540 Koreans per physician, whereas in 1993 there were 855. Education indicators have also improved. The primary school enrolment ratio increased from 94.0 percent in 1960 to 102.0 percent in 1993. More notable is the improvement in the secondary school enrolment rate. This rose from 27 percent to 93.0 percent. Similarly, the adult literacy rate also improved.

Table 3.3. Social Statistics

	1960	1965	1970	1975	1980	1985	1990	1993
Crude birth rate (per thousand)	42.7	35.6	30.3	26.2	23.9	16.4	15.5	15.2[a]
Crude death rate (per thousand)	13.4	11.0	9.1	8.0	7.1	6.3	6.0	5.8
Life expectancy (years)	54.4	57.3	60.3	62.8	65.4	69.0	70.1	71.3
Population per physician	3540	2740	2240	2100	1690	1379	1007	855
Infant mortality rate (per thousand)	78.3	64.2	50.1	39.7	34.1	32.6	n.a.	10.6

	1960	1965	1970	1975	1980	1985	1990	1993
Primary school enrolment ratio	94.0	101.0	103.0	107.0	109.0	97.0	107.0	102.0
Secondary school enrolment ratio	27.0	35.0	42.0	56.0	80.0	90.0	88.0	93.0
Adult literacy rate	70.6	n.a	87.6	n.a.	n.a.	n.a.	n.a.	n.a.

n.a.=not available
[a] Data for 1994

Source: the World Bank, World Tables, various years; National Statistical Office Republic of Korea, Korea figures in short 1995; UNESCO, Unesco Statistical Yearbook 1995; Suh and Yeon 1992.

3.4. Income Distribution

In this section, trends in Korea's income distribution will be analysed. The period from 1961 to 1993 will be covered in the analysis. Official estimates in Korea's income distribution have been published only since 1980. In addition, the official estimates do not cover totally the 33 years period of this study. However, estimates in other studies allow us to have a good compilation of Gini coefficients[1].

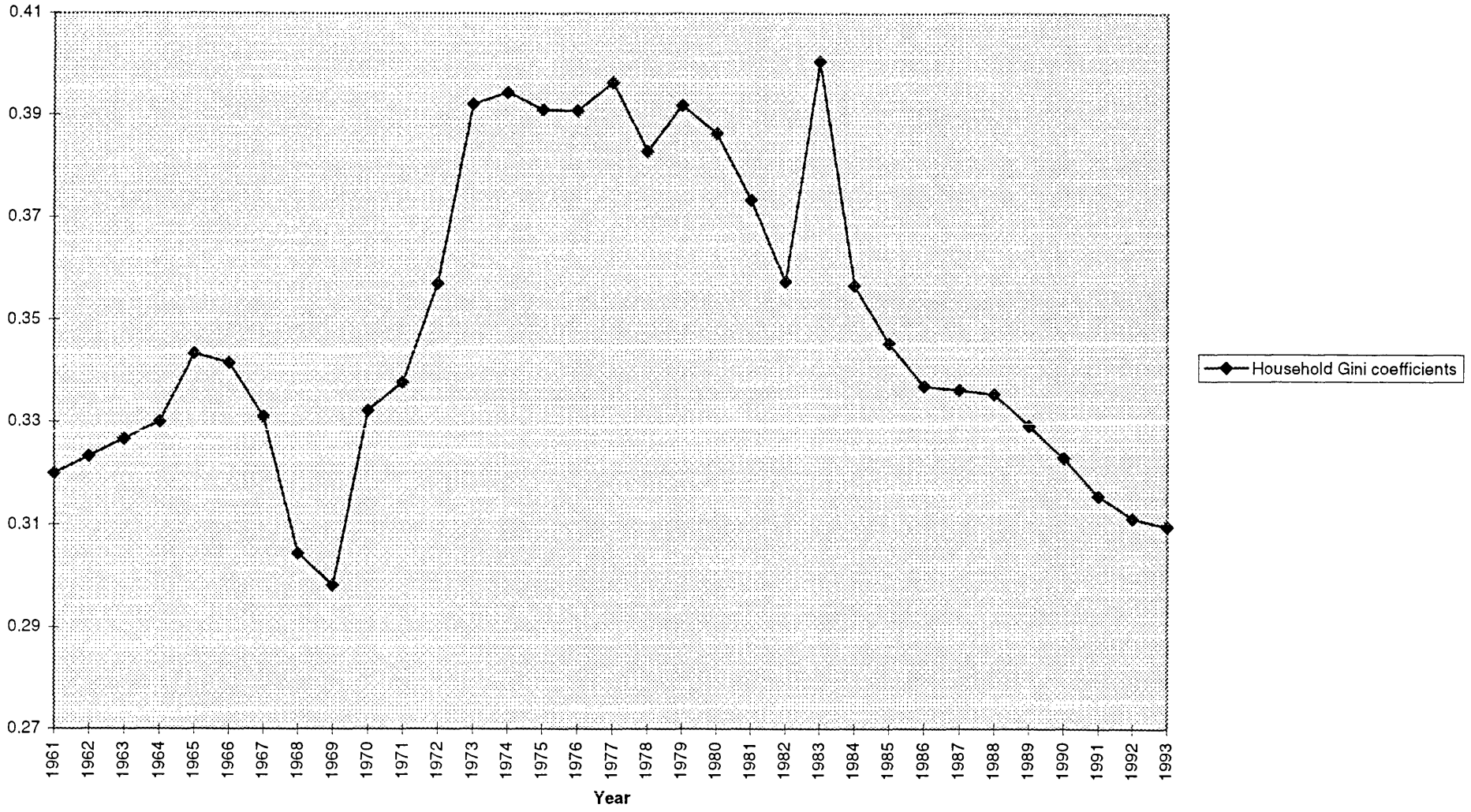
1. The Gini coefficient is a measure of income inequality, with a higher value indicating greater inequality; the measure is based on the Lorenz curve. The Lorenz curve plots the cumulative distribution of households on the horizontal axis and the cumulative distribution of income on the vertical axis. If all households have the same income, this curve will be coincide with the 45-degree line. The greater the amount of inequality, the further the curve will be beneath the 45-degree line. The Gini coefficient is the area between the 45-degree line and the Lorenz curve, divided by the total area under the 45-degree line. The Gini coefficient ranges from 0.0 (perfect equality) to 1.0 (perfect inequality, that is, all income accrues to one household). A graphic explication of the Gini coefficient will be given in Chapter 4.

Figure 3.1. illustrates trends in Korea's income distribution from 1961 to 1993. During the 1960s income distribution in South Korea improved. In 1961 the Gini coefficient was 0.32. Whereas in 1969 it was 0.2982. The belief is that this relative equal income distribution during the 1960s reflects the overall poverty of Korea at that time and the extensive land distribution after the Japanese occupation[2]. Another factor influencing the relatively egalitarian distribution of income in Korea during the 1960s was the shift to export-led development in the 1960s. This was based initially on the promotion of the exports of labor-intensive goods.

After 1969 and until around 1979, Korea's income distribution became less equal. In 1969, as mentioned, the Gini coefficient was of 0.2982. Whereas it was of 0.3919 in 1979. The belief is that the less equal distribution of income during the 1970s was due, in part, to the shift in industrial policy from labor intensive export promotion to targeted development of capital-intensive industries under the Heavy and Chemical Industry Program launched in 1973. This channelled low-cost loans to a small number of large firms. The program possibly accelerated industrial development but it also concentrated the ownership of industrial assets in the hands of a few families. In addition, accelerated inflation during this period could also have aggravated the distribution of income even further.

2. Land reform in Korea proceeded in two stages. Under American supervision in 1947, land once held by Japan was redistributed reducing the full-time tenancy rate from 70 percent to 33 percent within one year and improving tenancy conditions with a 33-percent ceiling on rents. A second, purely domestic land distribution in 1950 redistributed Korean landlord holdings with nominal compensation and virtually eliminated tenancy. In this study, land distribution will not be referred as an important determinant of Korea's income distribution since this occurred before the period of analysis.

Figure 3.1. Trends in Korea's income distribution



Source: As specified in the methodology

After 1979 and until 1993, Korea's income distribution became more equal. The Gini coefficient in 1979 was of 0.3919. However, this was of 0.3097 in 1993. During the period subsequent to 1979, the political economy by the Korean government could be an important factor in this trend. During this period, the government eliminated various subsidies and preferential policies. Furthermore, it brought the nation's rampant inflation under control.

3.5. Korea in the World Economy

When compared to other countries, Korea's development gains seem to be also remarkable. For example, Korea's real per capita GDP grew from $958 in 1962 to $5,156 in 1988 (Table 3.4). This represents a fivefold increase. During the same period real per capita GDP for the United Kingdom, West. Germany and the United States represented less than a twofold increase. An exception among the most advanced nations was Japan, where real per capita GDP nearly quadrupled. Real per capita GDP for Japan grew from $3,249 in 1962 to $12,209 in 1988.

Table 3.4. Real GDP per capita for selected countries in 1985 international prices, 1962-88 (US dollars)

		Selected Asian Nations			
Year	Korea	Sri Lanka	Malaysia	Thailand	Philippines
1962	958	1,442	1,950	1,037	1,274
1967	1,300	1,367	2,204	1,310	1,395
1972	1,893	1,395	2,680	1,463	1,556
1977	2,860	1,384	3,570	1,855	1,865
1982	3,278	1,701	4,931	2,183	2,116

		Selected Asian Nations			
Year	Korea	Sri Lanka	Malaysia	Thailand	Philippines
1987	4,699	1,959	4,288	2,594	1,820
1988	5,156	2,012	4,727	2,879	1,947

		Selected Latin American Nations		
Year	Korea	Argentina	Brazil	Mexico
1962	958	3,459	2,045	2,915
1967	1,300	3,897	2,079	3,632
1972	1,893	4,459	3,048	4,255
1977	2,860	4,658	4,045	4,756
1982	3,278	4,092	4,110	5,794
1987	4,699	4,193	4,441	5,005
1988	5,156	4,030	4,438	4,996

		Selected industrialised countries			
Year	Korea	Japan	UK	W. Germany	US
1962	958	3,249	6,504	6,422	10,418
1967	1,300	4,998	7,438	7,258	12,381
1972	1,893	7,381	8,388	9,095	13,645
1977	2,860	8,518	9,227	10,140	14,677
1982	3,278	10,058	9,737	10,903	14,968
1987	4,699	11,620	11,495	12,124	17,735
1988	5,156	12,209	11,982	12,604	18,339

Source: Summers, R. and A. Heston (1991).

On the other hand, most of Third World countries did not perform well relative to South Korea. Four Asian countries -the Philippines, Thailand, Sri Lanka and Malaysia- had, in 1962, a real per capita GDP higher than that of South Korea. However, in 1988, Korea had, among them, the highest real per capita GDP. Similarly, Argentina, Brazil and Mexico, three of the most important Latin American countries had, in 1962, a real per capita GDP more than two to three times higher than Korea's. Nevertheless, this trend was reversed in late 1980s.

Ranking Korea's development indicators relative to the rest of world, we obtain a better picture of its position in the world economy. The Republic of Korea has an area of around 99,000 square kilometres. Therefore, in physical size, it is ranked 89 among the world nations (Table 3.5). In terms of total population, Korea ranked 25th in 1994. The total population of Korea in 1995 was 44.851 million. Similarly, in terms of population density Korea ranked 5th in 1994. Korea's population density was, in 1995, 453 per square kilometre. In terms of economic size, as measured by GNP, Korea improved its ranking between 1962 and 1994, moving from 34th to 13th. Similarly, in terms of per capita income, Korea improved its rank from 56th in 1962 to 25th in 1994. In terms of trade volume, Korea moved its rank from 58th in 1962 to 13th in 1994.

Table 3.5 Korea in the world economy, ranks for 1962, 1988 and 1994.

	1962[b]	1988	1994
Total trade[a]	58	11	13
Export	94	11	13
Import	49	14	13
Population	23	23	25
Area	104	104	89
Population density	7	5	5
Total GNP	34	17	13[c]
Per capita GNP	56	40	25

a. The trade and GNP ranking exclude the former USSR and all of Eastern Europe.

b. 1962 GNP data for several countries are not available. China and Japan data are based on national income; for Fiji, Kenya, and Zimbabwe, 1963 are used.

c. Ranking based on total GDP

Source: Sakong 1993, 21; the World Bank, World Development Report, various years.

Korea's household income distribution has been considered to be one of the most egalitarian among developing nations. Its income distribution is even comparable to or even better than that of some developed countries[3]. This can be seen from Table 3.6. Korea's income distribution, as given by the Gini coefficient, is more equitable than that for Asian developing countries: Sri Lanka, Malaysia, Thailand and Philippines. Similarly, Korea's income distribution is less unequal than Latin American developing countries: Argentina, Brazil and Mexico. Finally, as mentioned, Korea's income distribution is even better than that of some developed countries. For example, Korea has a more egalitarian income distribution than Japan, the United Kingdom and the United States. Only West Germany in the 1960-1970s and the United Kingdom in the 1980-1990s, of those developed countries listed in Table 3.6., had a better income distribution than Korea. In the next Chapters, the objective will be to determine the main factors affecting income distribution during Korea's economic development.

3. There are several difficulties associated with an international comparison of income distributions, the data of which are generally subject to large errors, whose magnitude differs from country to country. In addition, the reliability of data and the definitions of income and income units are problematic. Thus conclusions from international comparisons have severe limitations.

Table 3.6. Gini coefficients for Selected countries

Country	Household Gini coefficient	Year	Household Gini coefficient	Year
Korea	0.360	1971	0.3097	1993
Sri Lanka	0.378	1969/70	0.43	1985
Malaysia	0.504	1970[a]	0.484	1989
Thailand	0.385	1970[b]	0.462	1992
Philippines	0.494	1971	0.407	1988
Argentina	0.437	1961	n.a.	
Brazil	0.574	1970	0.634	1989
Mexico	0.524	1967/68	0.503	1992
Japan	0.393	1968	0.35	1985
UK	0.362	1968	0.273	1980s[c]
W. Germany	0.334	1969	0.358	1980s[c]
US	0.406	1970	0.41	1985

a. Population: per capita

b. Population: urban households

c. Decadal average

n.a.=not vailable

Source: Kakwani 1980; the World Bank, World Development Report, various years; Oshima 1992; Krongkaew 1994; Bruno et al 1995; Sundrum 1990.

3.6. Conclusions

South Korea's rapid economic development commenced in the early 1960s. Since then and until 1993, the nation obtained important gains in terms of development. Both nominal and real per capita GNP grew. Unemployment and absolute poverty fell. Crude birth rate, crude death rate and infant mortality rates fell. Similarly the number of people per physician fell. Education indicators such as primary school

enrolment rate, secondary school enrolment rate and adult literacy also improved. When compared to other countries, Korea's development gains also seem remarkable. Korea's income distribution has also changed during its development. During the 1960s income distribution improved. However, during 1969-79, this became less equal. From 1979 and until 1993 Korea's income distribution became more equal. Several factors were suggested for these changes. Finally, Korea's income distribution was compared to that of other nations. The main observation is that relative to other nations, Korea's income distribution seems to be relatively egalitarian. In the next sections, the main objective will be to present a model of income distribution for Korea.

Chapter 4

Methodology of the study

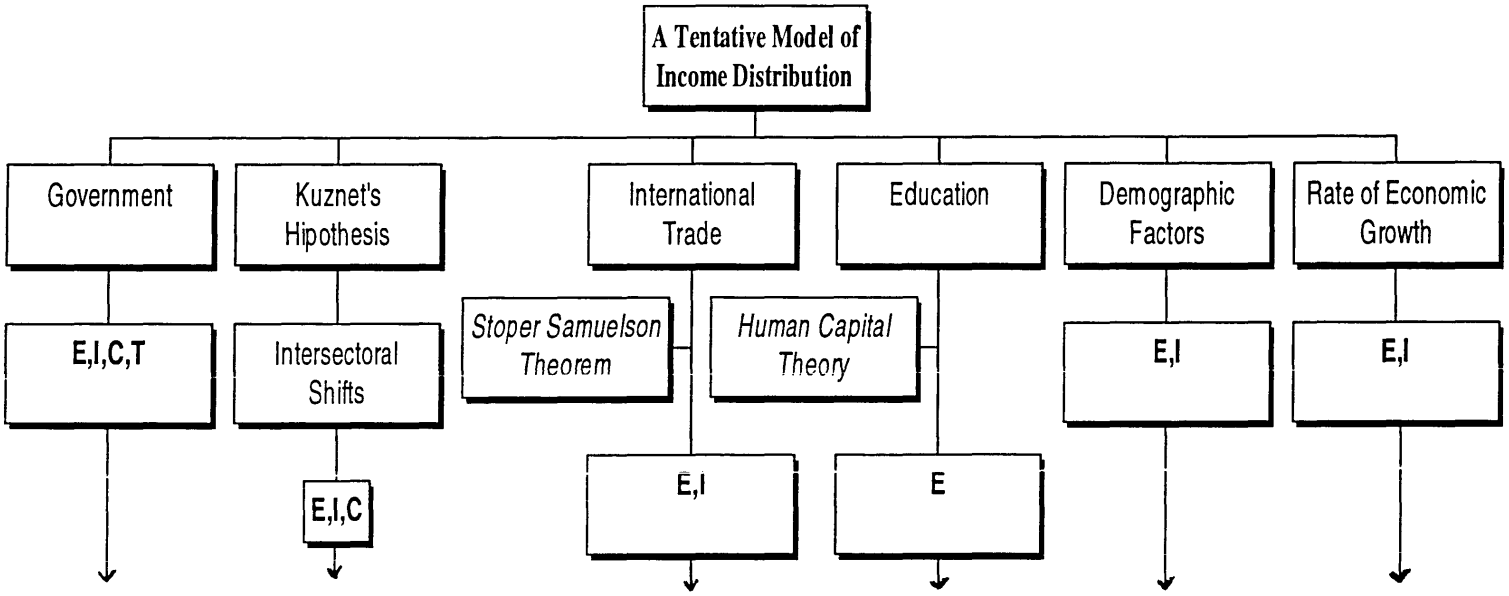
4.1. Introduction

The purpose of this Chapter is to present the methodology of the study. Section 4.2. presents a conceptual framework of the model. Section 4.3 includes a description of the empirical model. In section 4.4 there is a discussion of the handling and compilation of data. Some of the limitations of the methodology and data are outlined in section 4.6.

4.2. Conceptual framework

Based on the labor-surplus growth model of W. Arthur Lewis, a tentative model of income distribution for South Korea can be derived (see Figure 4.1). The labour-surplus model assumes that there are two sectors, a non-agricultural and an agricultural sector. While the non-agricultural sector is capitalistic, the agricultural sector consists mainly of self employed, mainly peasants. It is assumed that there is a surplus of labour in the agricultural sector, in the sense that withdrawing labour from the agricultural sector will not reduce the output of that sector. Another assumption is that wages in the non-agricultural sector do not fall below the average product of

Figure 4.1 A model of income distribution for Korea



E= Distribution of Earnings

I= Distribution of Investment Income from the Asset a Person Owns

T= Distribution of Transfers from Government

C= Distribution of Capital Receipts (Legacies and Gifts)

labour in the agricultural sector. Under this assumption workers in the agricultural sector will look for work in the non-agricultural sector because they can earn at least as much as they could earn on a family farm. Given an unlimited supply of labour, employment in the modern non-agricultural sector will increase. The labour-surplus model suggests that inequality first increases and later diminishes as development takes place. The model gives two explanations why an initial rise in inequality might be expected at the beginning of the development process. Firstly, the income share of the capitalists rises as the non-agricultural sector expands. Secondly, the model assumes that inequality in the distribution of labour income is zero when all the workers are employed in the agricultural sector, and tends to zero again at the end of the process of development when all the workers are employed in the modern sector. Therefore, during the early period of the development process, when increasing but still relatively small numbers of labourers are moving from the agricultural to non-agricultural sector, inequality in the distribution of labour income also rises.

According to the labour-surplus model, income inequality declines when all the surplus labour is absorbed into the modern sector. Then, labour income becomes a scarce factor of production, and further increases in demand requires increases in real wages to bid labour away from marginal uses. According to Lewis, a distribution of income that favours high-income groups contributes to the economic growth because these groups save to obtain funds for expanding their enterprises. Thus, any attempt by the government to redistribute income 'prematurely' runs the risk of stifling economic growth. Therefore the model also encourages income inequality through

the accumulation of capital receipts. A challenging question is can the government in a developing country afford to wait for the labour-surplus to work or will poverty and political instability require interventions to redistribute income sooner. In the latter case the government can offset the cumulative effect of concentration of savings on the high-income groups. For example, this may limit the cumulation of property through inheritance taxes or explicit taxes in earnings and investment income. A large private sector is usually associated with a relatively unequal distribution of income. This occurs because the return to capital is appropriated by individuals rather than the state. Similarly, the government can redistribute income through cash transfers such as unemployment benefits and old age pensions. The government can also reduce income inequality through the provision of public goods such as education and health services. Therefore the government has potential to reduce income inequality during the development process, although it can have a negative effect on growth. On the other hand, some activities of the government can have a negative effect on income distribution. For example, government military expenditure is usually associated with income inequality.

The labour-surplus model is consistent with the Kuznets' hypothesis and the intersectoral shifts in the sense that income inequality first increases and then declines during the process of development. A challenging question is to know how fast will the non-agricultural sector absorb labour from the agricultural sector since it may be using capital-intensive technology inappropriate to the factor endowment of a labour surplus country. If the economy is following a development strategy based on the exports of capital-intensive goods, the non-agricultural sector will slowly absorb

labour from the agricultural sector. The Stolper-Samuelson theorem suggests that international trade can affect income distribution through changes in earnings distribution and investment income distribution. According to this theorem, the exports of capital intensive goods, while importing labour intensive goods, moves income distribution in favour of the owners of capital. If the economy is following a development strategy based on capital intensive production, the activities in the non-agricultural sector will require skilled rather than unskilled labour. Thus a large differential emerges between the wages of skilled non-agricultural industrial workers and agricultural labour. This differential attracts agricultural workers to the non-agricultural sector looking for a high wage. Nevertheless, most migrants are not qualified for skilled jobs and they end up unemployed in the urban 'informal sector. Under this condition, educational expansion leads to a reduction in skill differentials and to a more equable income distribution. The theoretical justification in the relationship between education and income distribution is provided by human capital theory. This suggests that education can influence income distribution through changes in earnings distribution.

As explained, a basic assumption of the labour-surplus model is that of an elastic supply of labour. Such assumption is valid, considering that most of the developing countries are densely populated. Nevertheless, the model assumes that there is some maximum level of population growth which is restricted to the rate of growth of food production. If population rises without any increase in food production, the average amount of food available per capita falls. Except for employers who want to keep wages low and profits high, population growth is an unqualified disaster. Wages fall

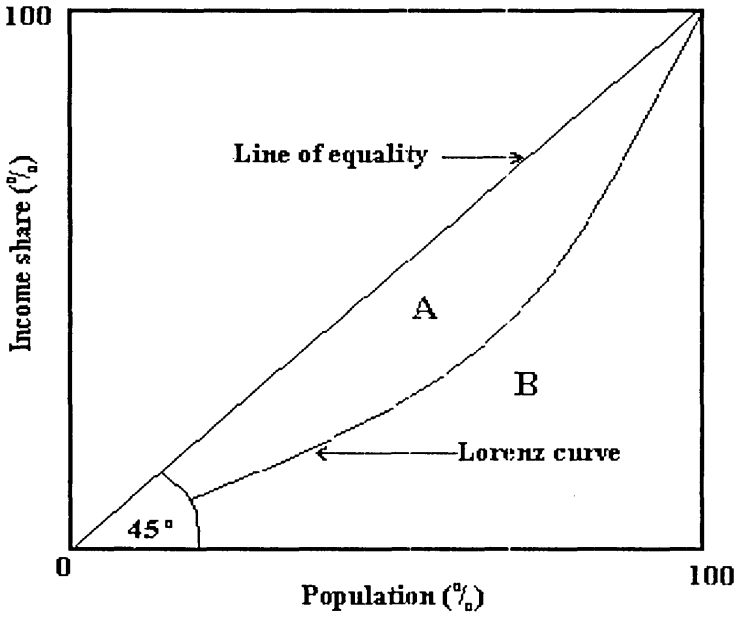
in the urban areas, and the overall distribution of income gets worse. Another argument is related to the fact that lower income groups usually experience a faster natural rate of increase in population growth than higher income groups. Under this assumption, a faster population growth is associated with greater income inequality. Demographic factors therefore, influence income distribution through changes in earnings and investment income distribution. Finally, if the development process is fast, income distribution can also be affected. There is the belief that high growth rates could lead to an increase in income inequality. The argument claims that economic expansion creates factor market disequilibria which contributes to income inequality. Therefore, according to this argument, high growth rates can affect income distribution through changes in earnings and investment income distribution.

4.3. The empirical model

4.3.1. The dependent variable

In this study, the household Gini coefficient is used as a dependent variable. Among the inequality indices, the Gini coefficient is, possibly, the most frequently used. In the case of South Korea, there are no time series data available for other inequality indices. The Gini index is defined as the ratio of the area between the line of equality and the Lorenz curve, ie., (A)/(A+B) in Figure 4.1. The Gini coefficient has a value of between zero and one. A Gini coefficient of one implies perfect inequality.

Figure 4.1. The Gini coefficient



4.3.2. The Kuznets' hypothesis

Anand and Kanbur (1993) presented a formalisation of the Kuznets' hypothesis and the process of intersectoral shifts. Based on the analysis of intersectoral shifts, they derived a functional form to test the Kuznets' hypothesis. They divided the economy into two sectors indexed by $i=1, 2$. Sector 1 is the modern (non-agricultural) sector of the economy, while sector 2 is the traditional (agricultural) sector. Kuznets (1955, 7-8) assumed that "(a) the average per capita income of the rural population is usually lower than that of the urban; (b) inequality in the percentage shares within the distribution for the rural population is somewhat narrower than that for the urban population". Such assumptions are represented by Anand and Kanbur as:

$Y_1 > Y_2$ and $G_1 > G_2$ (4.1)

Where:

Y_1= the mean income in the modern (non-agricultural) sector of the economy,

Y_2= the mean income in the traditional (agricultural) sector,

G_1= Gini coefficient, in the modern sector, and

G_2= Gini coefficient, in the traditional sector.

In addition, Kuznets (1955, 7-8) states, 'first all other conditions being equal, the increasing weight of urban population means an increasing share for the more unequal of the two component distributions. Second, the relative difference in per capita income between the rural and urban populations does not necessarily drift downward in the process of economic growth: indeed, there is some evidence to suggest that it is stable at best, and tends to widen because per capita productivity in urban pursuits increases more rapidly than in agriculture. If this so, inequality in the total income distribution should increase". The overall mean income is represented by Anand and Kanbur as:

$$Y=\gamma Y_1+(1-\gamma)Y_2 \qquad (4.2)$$

Where:

Y=the mean income in the economy,

γ=the fraction of the total population in the non-agricultural sector

1-γ=the fraction of the total population in the agricultural sector

Under condition (4.1) national income per capita increases with γ,

$$\partial Y/\partial \gamma = Y_1 - Y_2 > 0 \qquad (4.3)$$

Anand and Kanbur represent overall inequality, as given by the Gini coefficient, as a function of the sectoral means, the sectoral inequalities, and the sectoral population shares (s):

$$G = f(Y_1, Y_2, G_1, G_2, \gamma) \qquad (4.4)$$

Where:

G=overall Gini coefficient in the economy

The condition indicating that inequality will increase at the start of the development process implies that $(\partial G/\partial \gamma)_{\gamma=0} > 0$ Similarly the condition for the existence of a turning point is: $(\partial G/\partial \gamma)_{\gamma=1} < 0$.

The functional form of the inequality-development relationship, as derived by Anand and Kanbur, is expressed as[1]:

$$G = \beta_0+\beta_1 Y+\beta_2(1/Y) \qquad (4.5)$$

Where:

$$\beta_0=[(Y_1^2-Y_2^2)-2Y_1Y_2(G_1+G_2)]/(Y_1-Y_2)^2$$

$$\beta_1=[Y_1(1-G_1)-Y_2(1+G2)]/(Y_1-Y_2)^2$$

$$\beta_2=Y_1Y_2[Y_1(1-G_2)-Y_2(1+G_1)/(Y_1-Y_2)^2$$

The condition for turning point is:

$$(1+G_1)/(1-G_1)<0$$

In this study of Korea, equation (4.5) will be used to test the Kuznets' hypothesis. Per capita GDP in constant 1990 prices (in wons) and its inverse will be used as the independent variables of equation (4.5).

1. Since sector-specific time series data for Gini coefficients are not available for Korea, equation (4.5) will be used for empirical investigation

If the Kuznets' hypothesis is applicable to Korea, we expect $\beta_1<0$ and $\beta 2<0$. Nevertheless, The literature has also used a quadratic model to test the Kuznets hypothesis[2]. To decide if the model (4.5) is adequate a specification test needs to be used. A simple test in determining the correct functional form is to run a 'nested' or 'hybrid' model and test for the statistical significance of the explanatory variables. This can be expressed as follows:

$$G = \beta_0+\beta_1 Y+\beta_2(1/Y)+v_3(Y)^2 \qquad (4.6)$$

Where,

$(Y)^2$=the square of real per capita GDP

4.3.3 Intersectoral shifts

In deriving equation (4.5), Anand and Kanbur (1993) took into consideration the relationship between the process of intersectoral shifts and the Kuznets' hypothesis. Nevertheless, indicators of structural changes can be used to capture some of the aspects of the relationship between intersectoral shifts and development. They are the share of agriculture in GDP, which declines with development as the non-agricultural sector grows at an accelerated rate, and the share of urban population, which can be expected to rise as population shifts away from the traditional agricultural sector.

2. For example see Perumal (1989)

Both the share of agriculture in GDP and the share of urban population are highly related. However they show different aspects of the same process. The share of agriculture in GDP shows the extent to which the income generating capacity of the economy has shifted into nonagricultural activities. On the other hand, the share of the urban population reflects the extent to which this shift has been accompanied by increased absorption of population into the non-agricultural sector (Ahluwalia 1976, 318). In this study, the share of agriculture in GDP is measured as the ratio of the total agricultural production to gross domestic product. The ratio is transformed to percentage. Similarly, the share of urban population in the total population is given as a percentage. Since the process of intersectoral shifts explains in some degree the Kuznets' hypothesis, its relationship with income distribution can be tested using alternative versions of (4.5).

$$G=\alpha_1 AGDP_t+\alpha_2 1/AGDP_t \qquad (4.7)$$

$$G=\lambda_1 urban_t+\lambda_2 1/urban_t \qquad (4.8)$$

Where:

G=Gini coefficient

AGDP=agricultural production as a percentage of gross domestic product

urban=urban population as a percentage of total population

If the relationship between intersectoral shifts and income distribution is applicable to Korea, it is expected that $\lambda_1<0$, $\lambda_2<0$, $\alpha_1<0$ and $\alpha_2<0$.

4.3.4. The role of government

To test the relationship between government and income distribution, the relative size of the government sector in the economy can be represented in many ways. In this study two alternative measures of the size of the government sector are used: the share of government expenditure in GDP (GEX) and the share of government revenue in GDP (GREV). In addition, the share of government military expenditure in total government expenditure was included in the model to test its effect on income distribution. The model including an indicator of government activity (GEX or GREV) and the share of government military expenditure in total government expenditure (Gmilit) can be expressed as:

$$G = \beta_0+\beta_1 Y+\beta_2(1/Y)+\beta_3 G+\beta_4 Gmilit \qquad (4.9)$$

Where:

G=an indicator of government activity

Gmilit=share of government military expenditure in total government expenditure

A large public sector is usually associated with a relative equal income distribution. Therefore, it is expected that $\beta_3<0$. On the other hand, since government military expenditure is believed to increase income inequality, it is expected that, $\beta_4>0$.

4.3.5. International trade

Three explanatory variables and five alternative models are considered to test the Stolper-Samuelson theorem in the context of Korea. Total exports plus total imports as a ratio of gross domestic product is used as a measure of the globalization of the Korean economy. The other two explanatory variables will try to analyse the direct relationship between the exports of capital-intensive goods and income distribution. Using an index of capital intensity goods exportable are classified into capital intensive and labour intensive goods. Capital intensive goods items ranked in the index above the average are considered in this study. From these exportable capital intensive goods items were selected for which time series data were available. The index of capital intensity is shown below.

Table 4.1

Index of capital intensity, 1979.	
Mfg=100	
Heavy industries	342
Iron and steel	590
Industries chemicals	245
Nonferrous metals	210
Nonmetal products.	169
Medium industries.	106
Transport equipment	139
Machinery	127
Glass products	107
Paper products.	96
Other chemicals.	88
Metal products.	79
Printing	78
Light industries.	57
Textiles	76
Wood products.	69
Electrical products.	53
Rubber products.	51
Leather products.	50
Plastic products.	48
Pottery.	43
Furniture.	40
Manufactures.	33
Clothing and footwear.	18
Natural resource industries.	197
Petroleum and coal products.	324
Tobacco products.	204
Beverages.	200
Food products.	88
All manufacturing.	100
Source: Dollar and Sokoloff 1990, 313.	

The exported capital intensive goods chosen are classified as follows: iron and steel, transport equipment, machinery, non-ferrous metals, chemicals, petroleum and coal products. The first of the explanatory variables is expressed as the share of capital intensive goods exported in total exports. The second explanatory variable is expressed as the ratio of the exports of iron and steel in total exports. As seen in the index of capital intensity, iron and steel goods are the most capital intensive in Korea. The models which consider an indirect test of the Stolper-Samuelson theorem can be expressed as:

$$G = \beta_0+\beta_1 Y+\beta_2(1/Y)+\beta_3 G+\beta_4 Gmilit+\delta_5 XMGDP \quad (4.10)$$

$$G = \beta_0+\beta_1 Y+\beta_2(1/Y)+\beta_3 G+\beta_4 Gmilit+\delta_6 Kx1 \quad (4.11)$$

$$G = \beta_0+\beta_1 Y+\beta_2(1/Y)+\beta_3 G+\beta_4 Gmilit+\delta_7 Kx2 \quad (4.12)$$

$$G = \beta_0+\beta_1 Y+\beta_2(1/Y)+\beta_3 G+\beta_4 Gmilit+\delta_5 XMGDP+\delta_6 Kx1 \quad (4.13)$$

$$G = \beta_0+\beta_1 Y+\beta_2(1/Y)+\beta_3 G+\beta_4 Gmilit+\delta_5 XMGDO+\delta_7 Kx2 \quad (4.14)$$

Where:

XMGDP=exports plus imports as a percentage of gross domestic product

Kx1=exports of capital intensive goods as a percentage of total exports

Kx2=ratio of the exports of iron and steel in total exports

The expansion of Korea's exports expansion has been accompanied by an increase in the exports of capital intensive goods. On the other hand, the share of imports of

labour intensive goods has been increasing over time. Therefore, as suggested by the Stolper-Samuelson theorem, it is expected that $\delta_5>0$. Similarly, since the exports of capital intensives goods should lead to a less equal income distribution, it is expected that $\delta_6>0$ and $\delta_7>0$.

4.3.6. Education

The primary school enrolment rate and secondary school enrolment rate are used to analyse the effect of education on income distribution . The model, including primary school enrolment rate and secondary school enrolment rate as additional explanatory variables, can be expressed as:

$$G = \beta_0+\beta_1 Y+\beta_2(1/Y)+\beta_3 G+\beta_4 Gmilit+\beta_5 Itr+\beta_6 penr+\beta_7 senr \quad (4.15)$$

Where:

Itr=a trade index, which will be specified based on the statistical acceptance of one of the models from (4.10)-(4.14)

penr=primary school enrolment rate

senr=secondary school enrolment rate

There is a consensus among economists in relation to the effect of education on income distribution. The belief is that education is a major factor in promoting the equality of income. Therefore, it is expected that $\beta_6<0$ and $\beta_7<0$.

4.3.7. Economic growth

The annual growth rate of GDP per capita (GDPg) is used to analyse the relationship between economic growth and income distribution. The model, including GDPg as an additional explanatory variable, is expressed as:

$$G = \beta_0+\beta_1 Y+\beta_2(1/Y)+\beta_3 G+\beta_4 Gmilit+\beta_5 Itr+\beta_6 penr+\beta_7 senr+\beta_8 GDPg \qquad (4.16)$$

Where:

GDPg=real per capita gross domestic product growth rate

If a high rate of economic growth causes a more unequal income distribution, it is expected that $\beta_8>0$.

4.3.8. Demographic factors

Two variables, total population (pop) and population growth rate (popg) are used to test the relationship between demographic effects and income distribution. The model, including an indicator of demographic changes (pop or popg), is expressed as:

$$G = \beta_0+\beta_1 Y+\beta_2(1/Y)+\beta_3 G+\beta_4 Gmilit+\beta_5 Itr+\beta_6 penr+\beta_7 senr+\beta_8 GDPg+\beta_9 D \quad (4.16)$$

Where:

D=an indicator of demographic changes

Demographic factors are associated with a less equitable income distribution. Therefore it is expected that $\beta_9>0$. The econometric models will be estimated using appropriate techniques.

4.4. The data

Time series data for the period 1961-1993 are used in this study. The Gini coefficient was compiled from different sources. Martin Ravallion, from the Policy Research Department at the World Bank, and Gary Fields, from Cornell University, provided compilations of Gini coefficients. In addition, other published sources such as the Economic Planning Board in South Korea are used. A list of the original sources for household Gini coefficients is outlined below:

Year of estimate	Original source
1961	Martellaro 1989
1964	Martellaro 1989
1965	Choo 1985
1966	Jain 1975

Year of estimate	Original source
1967	Kim 1983
1968	Kim and Ahn 1987
1969	Jain 1975
1970	Choo 1985
1971	Kim and Ahn 1987
1972	Kim and Ahn 1987
1973	Kim and Ahn 1987
1974	Kim and Ahn 1987
1975	Choo 1979
1976	Choo 1985
1977	Kim and Ahn 1987
1978	Kim and Ahn 1987
1979	Kim and Ahn 1987
1980	National Statistical Office
1981	Kim and Ahn 1987
1982	Choo 1985
1984	Suh and Yeon 1992
1985	National Statistical Office
1986	Choo 1992
1988	National Statistical Office
1990	Choo 1992
1993	National Statistical Office

There was no information available for the years 1962, 1963, 1983, 1987, 1989, 1991 and 1992. The Gini coefficients for these years, were estimated using a linear growth equation. The information of per capita GDP in constant 1990 prices was compiled from the publication International Financial Statistics by the International Monetary Fund. The data to measure the share of agriculture in GDP was collected from the World Tables by the World Bank. For the years 1961, 1962, 1963, 1964 and 1966, the data were obtained from the Korea Statistical Yearbook. The data for 1965 was obtained from the World Tables. The information of the share of urban population was also compiled from the World Tables. For the years 1961, 1962, 1963, 1964, 1966, 1967, 1968 and 1969 there was no information available. Therefore estimates were made using a linear growth equation. The information for 1965 was obtained from the World Tables.

The data for government revenue and government expenditure were obtained from the International Financial Statistics. The data for government military expenditure was collected from two sources. For the period 1971-1993 the data were collected from the Government Finance Statistics Yearbook. For the period 1961-1970, the information was obtained from the Korea Statistical Yearbook. The data for exports and imports were obtained from the International Financial Statistics Yearbook. The data for exports of capital intensive goods were obtained from the Yearbook of International Trade Statistics. However, there was not complete information available for the year 1961. For this year, the exports of non-ferrous metals was estimated by summing the exports of electrolytic copper, brass and bronze, and

bismuth, unwrought. Similarly, the exports of iron and steel are based only on the exports of pig iron. The information used to estimate the exports of non-ferrous metals and iron and steel for 1961 was obtained from the Korea Statistical Yearbook. The data for primary and secondary enrolment rates came from two main sources: World Tables and UNESCO Statistical Yearbook. For the single years 1961, 1962, 1963 and 1964, the primary and secondary enrolment rates were estimated using a linear growth equation. The annual growth rate of GDP per capita was estimated from the per capita GDP series given in the International Financial Statistics. The data of total population came from the International Financial Statistics.

4.6. Limitations of the methodology and data

A limitation of this study is the lack of recognition of the role of the institutional framework in which development takes place. The distribution of income in a nation is the result of a complex interaction between economic and social-political factors. However, social-political factors can not be easily quantified in regression analysis. In this study, several social-political factors are not considered. For example factors such as South Korea's homogenous society, Korea's strong Confucian cultural heritage or the nationwide student revolt in April 1960 which led to the resignation of President Syngman Rhee. These factors could also affect the trend of Korea's income distribution. Even though the quality of data in South Korean is reasonably good relative to that in other third world countries, there are limitations to its usefulness. National accounts data in general are subject to errors. Gini coefficients were compiled from different sources. We know very little about the conditions in which

they were estimated. But we trust in the good judgement of academics and researchers who worked to estimate the Gini coefficients. However, we will mention some of the problems with the data base of the Korean Government. It is assumed that some or all of the Gini coefficients were estimated using this data base. Therefore, it is important to know its limitations.

Since 1963 the Korean government has made separate annual income surveys of city and farm households. Until 1977, the urban survey excluded households on public assistance (that is, those who were legally 'low-income class). Similarly, households with income above a certain level were also excluded from the urban survey. These exclusions finished in 1977. However other groups have been identified as being excluded in the surveys after 1977. For example, the urban survey does not include income data for self-employed and employer households ; however, expenditure data includes those households. Also rural nonagricultural households are not covered by the annual survey. Because of these exclusions, estimates of Gini coefficients based on Korean Government surveys have to be made under different assumptions to cover those ommited (Leipziger et al 1992). Therefore, the margin of error in measurement is potentially high.

Chapter 5

Results of the empirical analysis

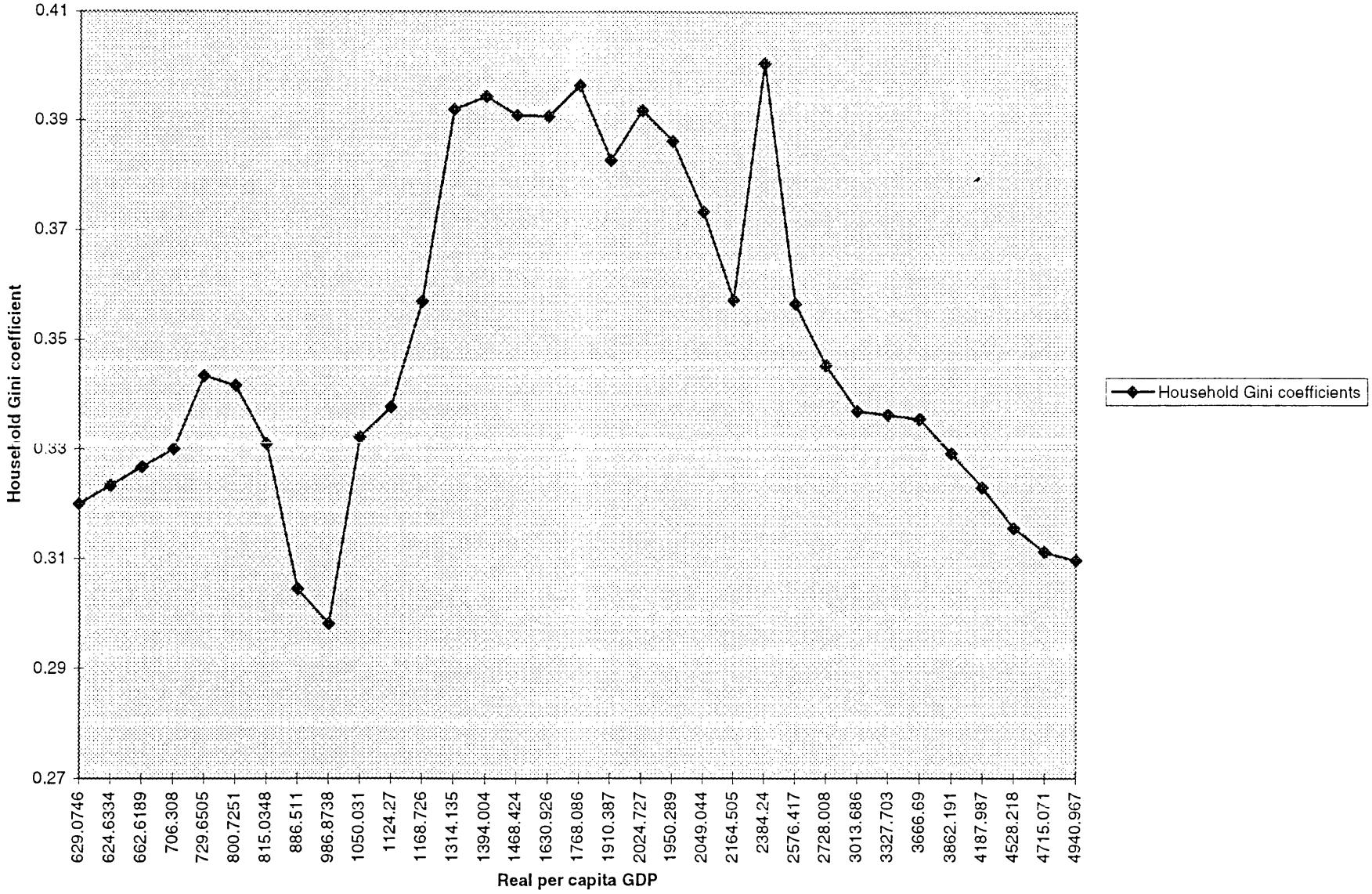
5.1. Introduction

The main objective of this Chapter is to present the results of the empirical analysis. The discussion will include both a statistical and an economic interpretation of the results. These are reported under 5 sub-sections (sub-sections 5.2-5.6).

5.2. Kuznets' hypothesis

According to the Kuznets' hypothesis income inequality increases in the early phases of economic growth, becomes stabilised for a while, and then narrows in the later phases (Kuznets 1955, 18). Graphically, the relationship between income inequality (on the vertical axis) and average income (on the horizontal axis) shapes an inverted-U curve. Figure 5.1 illustrates the relationship between the household Gini coefficient and real per capita GDP for South Korea over the period 1961-1993. The Figure shows an inverted-U curve for the period 1970-93. However, prior to 1970, during Korea's early phase of economic growth, income inequality fell. During the 1960s, Korea had a relatively egalitarian distribution of income. The distribution of income fell between 1961 and 1969.

Figure 5.1. The relationship between income inequality and average income for Korea



Source: As specified in the methodology

The relatively equal income distribution during the 1960s reflects the overall poverty of Korea at that time, the extensive land distribution after the Japanese occupation of 1910-45, and the export-led development strategy, based on the promotion of labor-intensive goods. During this period real GDP per capita increased from 629 wons in 1961 to 987 wons in 1969. Between 1970 and 1979, Korea's income distribution became less equal. The household Gini coefficient increased during this period. The increase in income inequality was due to the shift in industrial policy from labour extensive export promotion to targeted development of capital-intensive industries under the Heavy and Chemical Industry Program, launched in 1973. This channelled low-cost loans to a small number of large families. The program possibly accelerated industrial development but it also concentrated the ownership of industrial assets in the hands of a few families. Accelerated inflation during this period could also have aggravated the distribution of income even further. Real GDP per capita during this period increased from 1050 wons in 1970 to 2025 wons in 1979.

From 1980 to 1993 Korea's income distribution improved. The Gini coefficient during this period fell. The political economy of the Korean government could be an important factor in this trend. During this period, the government eliminated subsidies and preferential policies. Furthermore, it brought the nation's rampant inflation under control. Real GDP per capita was still increasing during this period from 1950 wons in 1980 to 4941 wons in 1993. The functional form to test the Kuznets' hypothesis was presented in Chapter 4. The estimates of the model are presented in Table 5.1. The independent variables, real per capita GDP and the

inverse of real per capita GDP are individually significant in explaining the variation in the Gini coefficient. Similarly, the signs of the coefficients are adequate to shape a U-inverted curve. The R-square adjusted is 0.5751 which indicates that the independent variables as a whole explain satisfactorily the variation in the Gini coefficient. Nevertheless, the estimate of the Durbin Watson statistic suggests that there is a serious problem of positive first-order serial autocorrelation.

Table 5.1.* The Kuznets' hypothesis

Constant	Y	1/Y
0.48502	-0.00003297	-97.007
(23.38)	(-6.491)	(-6.483)

Notes: R-square estimate: 0.6016; R-square adjusted: 0.5751; Durbin-Watson Statistic: 0.43425; Durbin-Watson P-value: 0.00; F-value:22.655; Critical t-value at 5 % level (one tail): 1.697.

* t-statistics in parentheses.

Y=real per capita gross domestic product
1/Y=inverse of real per capita GDP

Since in the presence of serial autocorrelation the OLS estimators are inefficient, it is important to look for remedial measures. The Cochrane-Orcutt iterative estimation is a possible solution to the problem of autocorrelation[1]. New estimates using the Cochrane-Orcutt method are presented in Table 5.2. The independent variables are individually significant in explaining the Gini coefficient. Similarly, the signs of the coefficients are negative to give form to a U-inverted curve.

Table 5.2. The Kuznets' hypothesis (model re-estimated)*

Constant	Y	1/Y
0.45766	-0.00002675	-77.203
(11.41)	(-2.891)	(-2.765)

*t-statistics in parentheses.

1. This method was proposed by Cochrane-Orcutt [1949, as cited in White (1993, 134)] and it will be extended to include the first observation with the Prais-Winsten transformation. The estimation will be iterated until a convergence criteria is satisfied. In this way the computational program solves the problem of autocorrelation.

The results in Table 5.2. suggests that the Kuznets' U-inverted hypothesis find support in South Korea during the period 1961-1993. Several studies on income distribution in Korea have concluded that during the high growth period of the 1960s, Korea did not experience the typical increase in income inequality implied by the Kuznets' curve[2]. As mentioned, the relative egalitarian income distribution during the 1960s reflected, in part, the export-led development strategy based on the promotion of the exports of labour intensive goods. Between 1970 and 1993 the data shows an inverted-U curve (see Figure 5.1.). The shift in industrial policy from labour extensive promotion to capital intensive production could be the main reason of the U-inverted pattern. Kuznets (1955) based his hypothesis on data analysis of western countries. Nations like United Kingdom, West Germany and the United States have based their economic growth on capital intensive production. Therefore the evidence suggests that a development strategy based on capital intensive production is an important determinant of the U-inverted Kuznets' curve. On the other hand, Taiwan following a export-led development strategy based on the export of labour intensive goods, has not followed the U-inverted pattern (see Fei, Ranis and Kuo 1978, Fields 1992). Labour intensive production leads to rapid absorption of labour in the modern-urban sector during the development process. This prevents the formation of landless rural labourers, or urban shoe-shine boys, car guarders etc. As a result income distribution also improves.

2 See for example Oshima 1970, Adelman and Robinson 1978 and Rao 1978.

The literature has also used a quadratic model to test the Kuznets' hypothesis[3]. To decide if the model used was adequate a specification test needs to be used. A simple test in determining the correct functional form is to run a 'nested' or 'hybrid' model and test for the statistical significance of the explanatory variables. The estimates of a nested model are shown in Table 5.3. The estimate of the Durbin-Watson statistic suggests that there is a serious problem of autocorrelation in the model. As a possible solution to the problem of autocorrelation, the Cochrane-Orcutt iterative estimation was used. The estimates corrected for autocorrelation are shown in Table 5.4. The conclusion is that since the parameter for real per capita GDP at the square is insignificant, the model used to test the Kuznets' hypothesis was the correct one.

Table 5.3. Nested model*

Constant	Y	1/Y	$(Y)^2$
0.47550	-0.000027765	-92.492	-0.00000000075361
(7.322)	(-0.8173)	(-2.814)	(-0.1550)

*t-statistics in parentheses

Notes: R-square estimate: 0.6020; R-square adjusted: 0.5608; Durbin-Watson Statistic: 0.43406; Durbin-Watson P-Value: 0.000; F-Value: 14.620.

$(Y)^2$=the square of real per capita GDP

Table 5.4. Nested model (model re-estimated)*

Constant	Y	1/Y	$(Y)^2$
0.42955	-0.000011374	-64.306	-0.0000000021018
(4.105)	(-0.2143)	(-1.226)**	(0.2904)

* t-statistic in parentheses.
** significant at more than 10% level

3. See for example Perumal 1989

5.3. Intersectoral shifts

Theories of economic dualism such as the seminal labour-surplus model of W. Arthur Lewis suggest that as countries develop, the proportions of GDP and employment accounted for by agriculture must decline. This process is usually accompanied by a transfer of human resources from rural to urban areas. Intersectoral shifts during the process of development can also affect a country's income distribution.

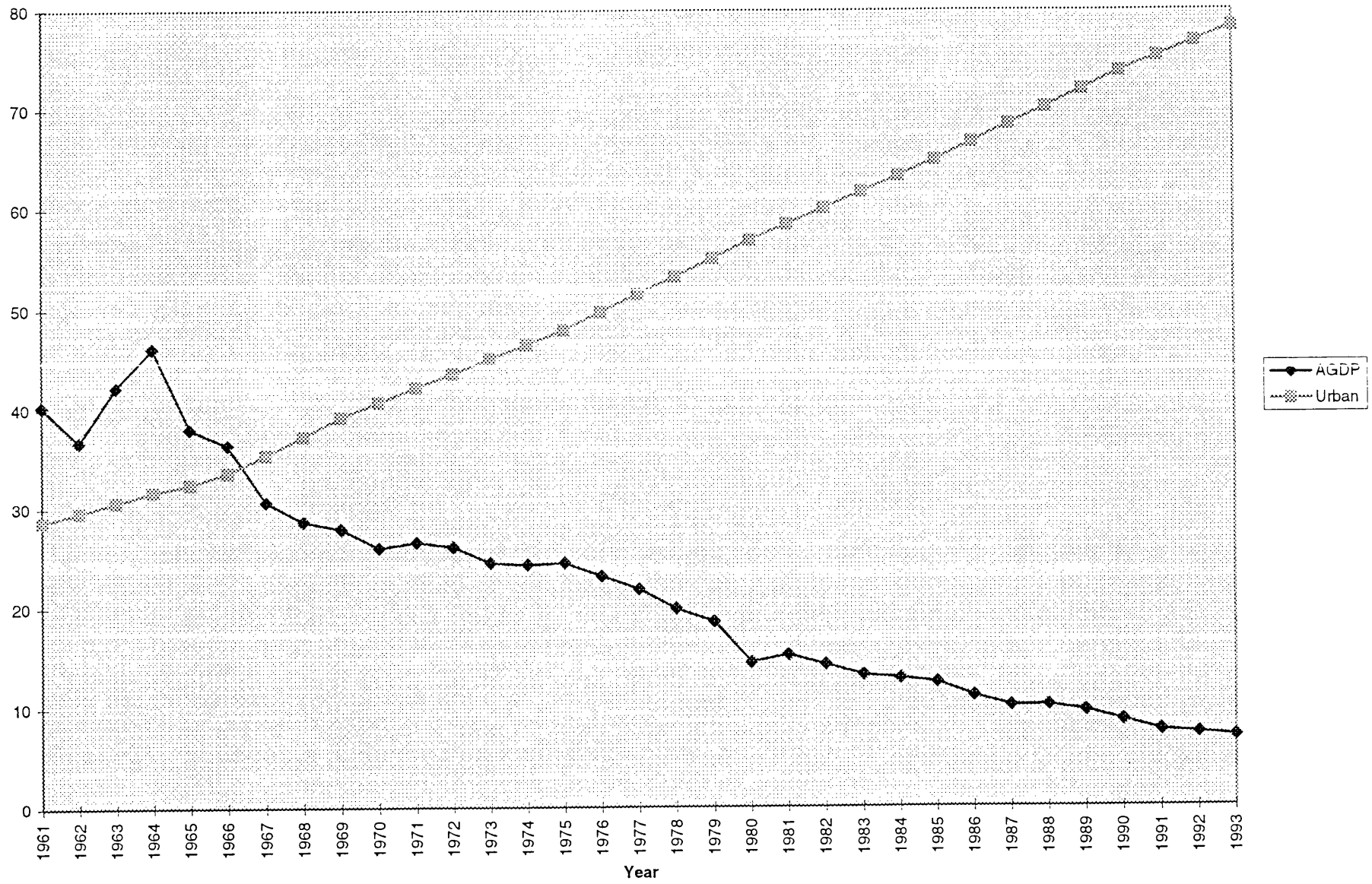
Based on the assumptions that average per capita income of the rural population is usually lower than that of the urban, and that income inequality within the rural population is somewhat narrower than in that for the urban population. The process of intersectoral shifts during the process of development leads to an increase in relative inequality, which in turn generates the U-inverse relationship between inequality and development. According to this argument, an increase in urban population during the process of development implies an increase in the share for the more unequal component of the distribution. Therefore, inequality in the total income distribution increases.

After the main phase of industrialisation and urbanisation have passed, a rise in the income share of the lower income group within the nonagricultural sector of the population contributes to improve the economic position of this income group in the urban population. Thus intersectoral shifts generate as well the U-inverse relationship between inequality and development. As mentioned in Chapter 4, two variables

capture some aspects of the relationship between intersectoral shifts and development. The share of agriculture in GDP, which declines with development as the non-agricultural sector grows at an accelerated rate and the share of urban population, which can be expected to rise as population shifts away from the traditional agricultural sector. The historical pattern of these variables in the context of Korea is shown in Figure 5.2. The proportion of GDP accounted by agriculture in Korea fell from 40 percent in 1961 to 7 percent in 1993. On the other hand, the share of urban population in total population increased from 29 percent in 1961 to 78 percent in 1993.

The essence of the structural change is industrialisation. Kuznets (1966) explained that today's developed nations were industrialised 1 to 6 percent points per decade during their economic growth. Industry's share of GDP in Korea increased about 10 percent points per decade during the 1960s and 1970s. Between 1960 and 1970 industry's share of GDP increased from 20.1 percent to 29.2. In 1980 this reached 41.3 percent of GDP. However, the industrialisation process slowed after 1980 reaching 43 percent in 1987 (Sakong 1993, 13). Therefore Korea has shown the structural change experienced by most developed nations during its development. Table 5.5 presents empirical results on the relationship between intersectoral shifts and income distribution. The independent variables are individually significant in explaining the variation in the Gini coefficient in each of the specifications. Similarly, the signs of the coefficients are adequate to shape an U-inverted curve. The adjusted R-square is satisfactory in each model. Nevertheless, the estimate of the Durbin-Watson statistic suggests that there is a serious autocorrelation in the two models.

Figure 5.2. The share of agriculture in GDP and the share of urban population in Korea



Source: As specified in the methodology

Table 5.5. Intersectoral shifts and income distribution*

Constant	AGDP	1/AGDP
0.50618	-0.0037100	-1.2708
(16.33)	(-4.857)	(-5.209)
Notes: R-square estimate: 0.4771; R-square adjusted: 0.4422; Durbin-Watson Statistic: 0.39546; Durbin-Watson P-value: 0.000; F-value: 13.686; Critical t-value at 5% level (one tail): 1.697		
Constant	urban	1/urban
0.87211	-0.0051502	-12.161
(9.479)	(-5.582)	(-5.745)
Notes: R-square estimate: 0.5240; R-square adjusted: 0.4922; Durbin-Watson Statistic: 0.37617; Durbin-Watson P-value: 0.0000, F-value: 16.51 ; Critical t-value at 5% level (one tail): 1.697.		

*t-statistics in parentheses.

AGDP=share of agriculture in GDP
urban=share of urban population

As a possible solution to the problem of autocorrelation, the Cochrane-Orcutt iterative estimation was used. The estimates corrected for autocorrelation are shown in Table 5.6. The coefficients are individually significant. Furthermore the signs of the coefficients are negative which yield an U-inverted curve.

Table 5.6. Intersectoral shifts and income distribution (model re-estimated)*

Constant	AGDP	1/AGDP
0.42648	-0.0017417	-0.71547
(9.992)	(-1.758)	(-2.136)
Constant	urban	1/urban
0.74798	-0.0040469	-9.0198
(4.527)	(-2.436)	(-2.439)
Notes: Table t-value at 5% level (one tail): 1.697.		

*t-statistics in parentheses.

Kuznets (1963) and Ahluwalia (1976) showed empirically that during the early stages of development, the process of intersectoral shifts leads to an increase in relative inequality which in turn generates the U-inverse relationship between inequality and development. The results of Table 5.6 support their claims. During the early stages of Korea's development, the process of intersectoral shifts seems to have led to an increase in relative inequality and generated the U-inverse relationship between inequality and development. Kuznets (1955) hypothesised an U-inverted relationship

between income inequality and average income. According to Kuznets, it is the process of intersectoral shifts of employment from agriculture to non-agriculture which generates this U-inverted curve. Since Kuznets' paper, a vast literature has tested the relationship between income inequality and development. However, very few studies have analysed the relationship between intersectoral shifts and income distribution.

Intersectoral shifts is part of the development process and is closely related to the U-inverted hypothesis as noted in Kuznets (1955). There is the suspicion that the Kuznets' hypothesis has been tested in developing countries in which the process of intersectoral shifts has not been relevant. On the other hand, intersectoral shifts have, perhaps, stopped being relevant in developed countries where industrialisation and urbanisation have reached their peak. The evidence suggests that the Kuznets' curve is relevant in growing economies such as Korea's, in which economic growth has been accompanied by the process of intersectoral shifts and, as stated in section 5.2, by a development strategy based on the capital intensive production.

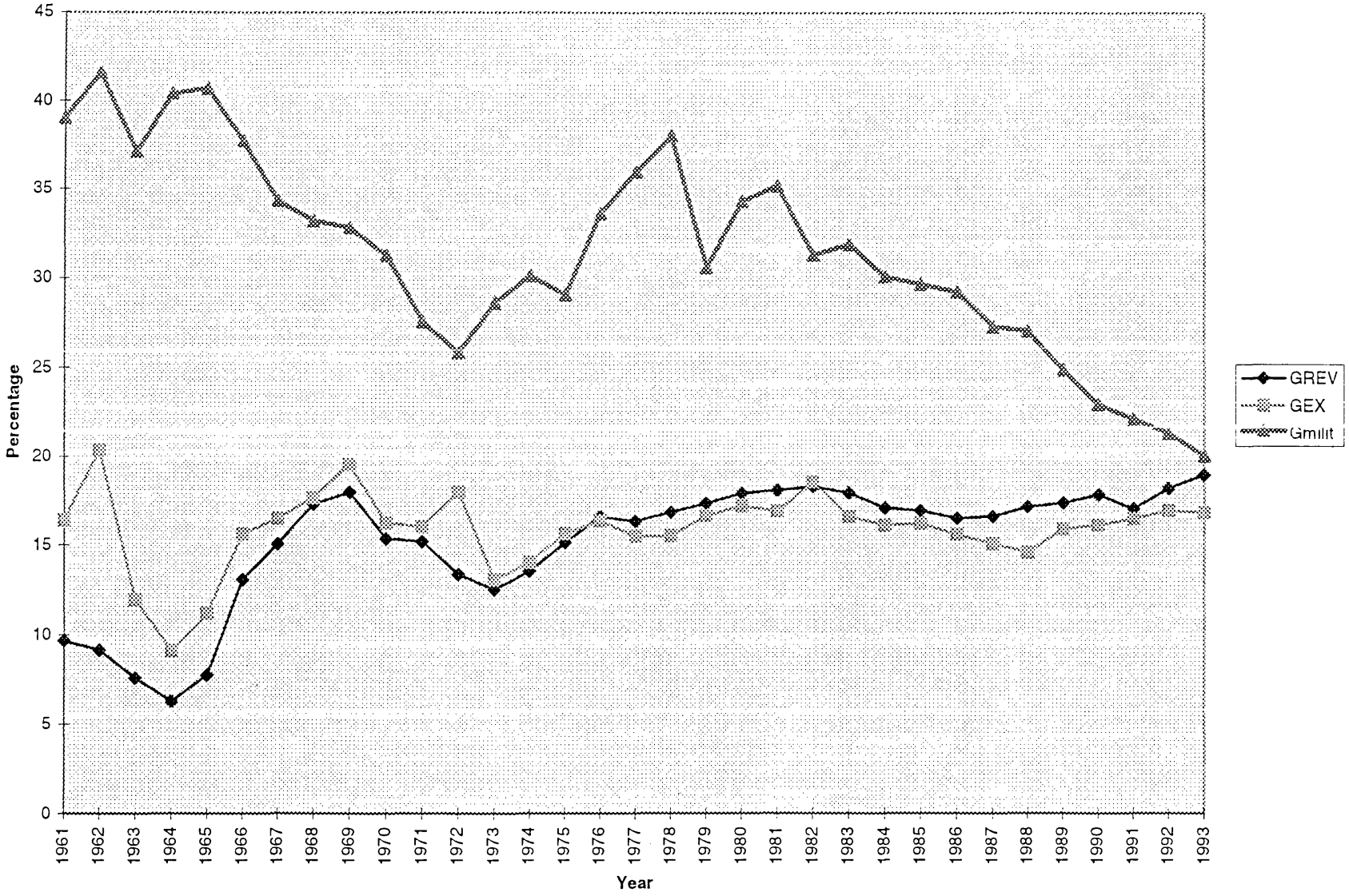
5.4. The role of government

Government activity can affect income distribution in different ways. A large private sector is associated with a relatively unequal distribution of income. This occurs because the return to capital is appropriated by individuals rather than the state (Bigsten 1983, 75). Government expenditure on some public goods such as education and health services can help to reduce income inequality. On the other

hand, military expenditure can have a negative effect on income distribution. The importance of the economic activities performed by the Korean government has increased in parallel with economic growth. Figure 5.3 illustrates trends of three variables measuring the role of government activity on the economy. These are the share of government revenue in GDP, the ratio of government expenditure to GDP and the share of government military expenditure in total government expenditure. The share of government revenue to GDP (the tax burden) in Korea increased from about 10 percent in 1961 to 19 percent in 1993. This suggests that relative to the government sector, the private sector has become smaller. On the other hand, the ratio of government expenditure to GDP has been stable over time. This was about 16 percent in 1961 and, about 17 percent in 1993.

Government spending can be classified according to its purposes. This is the functional classification of government spending. The functional classification of government spending shows the types of activities in which the government is engaged. In 1994, the shares of the general government expenditure were: general administration 11.1%, national defence 23.7%, education 19.3%, social development 9%, economic development 23.1% and others 13.8%. It is evident that defence expenditure is the most important item of spending. The share of government military expenditure in total government expenditure has fallen over time. While in 1961 it was 39 percent, in 1993 it was 20 percent. Several authors (see for example Abell 1994 and Atkins 1996) have shown that government military expenditure can lead to an increase in inequality. Therefore, it is important to analyse the relationship between income inequality and government military expenditure in South Korea.

Figure 5.3. The role of government activity on the economy



Source: As specified in the methodology

The reasons for a large military expenditure in Korea are well known. At the end of the World War II, Korea was divided into two parts, North and South, a division which disadvantaged the South. The North kept most of the natural resources and heavy industry while the South was primarily agricultural. The real impact of partition did not lie in the direct effect caused by the disruption of established economic links between the North and South but in the Korean War (1950-53) and the continuing military confrontation that has existed on the Korean Peninsula ever since. The Korean War was devastating because it destroyed almost two-thirds of South Korea's productive capacity, and almost 1 million civilians were killed. Since then, continuing North-South hostility has led to large military budgets not only in South Korea but also in North Korea. Hence it is important to evaluate the impact of government expenditure/revenue on income distribution. The share of government revenue to GDP[4] is included in the basic model as an additional explanatory variable. Table 5.7 presents the relevant empirical results.

Table 5.7. government and income distribution*

Constant	Y	1/Y	GREV
0.62162	-000037620	-147.47	-0059475
(16.27)	(-8.726)	(-8.382)	(-3.990)

Notes: R-square estimate: 0.7428; R-square adjusted: 0.7162; Durbin-Watson Statistic: 0.51983; Durbin-Watson-value: 0.000; F-value: 27.920. Critical t-value at 5% level (one tail): 1.699

*t-statistics in parentheses.

GREV=share of government revenue to GDP

4. The ratio of government expenditure to GDP and the share of government military expenditure in total government were also included separately in the model. However, the ratio of government expenditure to GDP was highly correlated with other explanatory variables. On the other hand, the share of government military expenditure in total government expenditure was insignificant in explaining the variation in the Gini coefficient. The regression analysis in the relation between government military expenditure and income distribution is shown in the Appendix B.

The adjusted R-square is 0.7162 which indicates that the independent variables as a whole satisfactorily explain the variation in the Gini coefficient. Similarly the explanatory variables are significant at the 5% level. Nevertheless, the Durbin-Watson statistic indicates a serious problem of autocorrelation in the model. New estimates, using the Cochrane-Orcutt method, are shown in Table 5.8. All explanatory variables are individually significant in explaining the pattern of income distribution in South Korea. This is evident from the high value of the t-ratio for each of the explanatory variables. Similarly, the signs of the coefficients are according to expectations.

Table 5.8. government and income distribution (model re-estimated)*

Constant	Y	1/Y	GREV
0.56527	-0.000029845	-117.03	-0.0046873
(12.71)	(-4.070)	(-4.731)	(-3.274)

*t-statistics in parentheses; table t-value at 5% level (one tail): 1.699.

While a large private sector is associated with a relatively unequal distribution of income, a large public sector is associated with a more egalitarian income distribution. The findings for Korea support this argument. The increase in the share of government revenue to GDP has resulted in a reduction in income inequality.

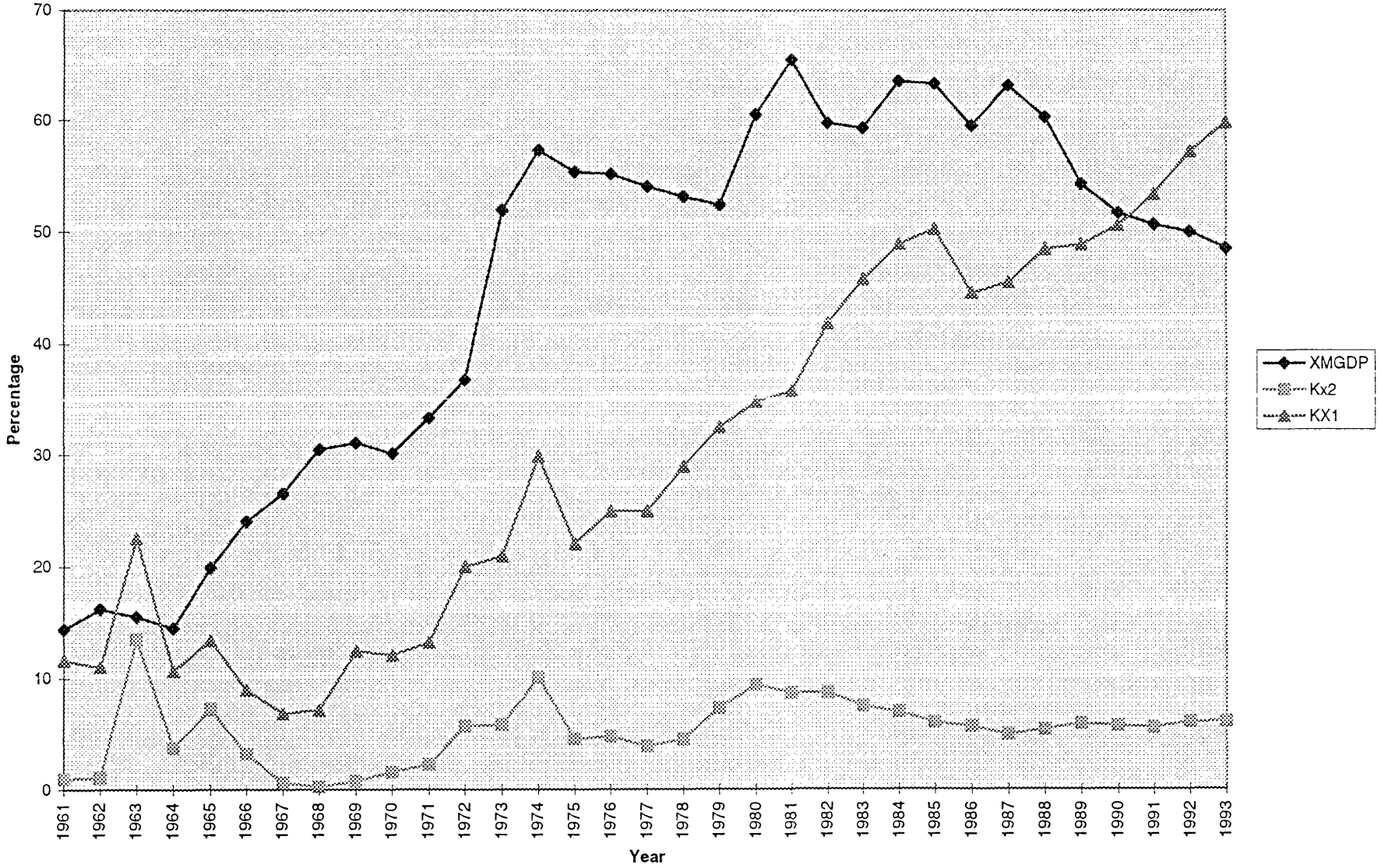
5.5. International Trade

International trade can also lead to changes in the pattern of income distribution. This is suggested by the Stolper-Samuelson theorem which states: "with full employment both before and after trade takes place, the increase in the price of the abundant factor and the fall in the price of the scarce factor because of trade imply that the owners of the abundant factor will find their real incomes rising and the owners of the scarce factor will find their real incomes falling" (Appleyard and Field 1995, 132).

South Korea adopted an outward-looking development strategy in the 1960s. At that time an import substitution based development strategy was widely recommended by development economists. With this outward-looking strategy, South Korea succeeded beyond expectations. Figure 5.4. illustrates trends of three variables measuring South Korea's trade pattern. These are the ratio of exports plus imports to GDP, the share of capital intensive goods exported in total exports, and the ratio of the exports of iron and steel to total exports[5]. The ratio of exports plus imports to GDP increased from 14 percent in 1961 to 49 percent in 1993. Similarly, the share of capital intensive goods in total exports increased from 11 percent in 1961 to 60 percent in 1993. Finally, the ratio of the exports of iron and steel to total exports increased from 1 percent in 1961 to 6 percent in 1993.

5. According to the index of capital intensity (see Chapter 4), iron and steel goods are the most capital intensive in Korea.

Figure 5.4. International Trade



Source: As specified in the methodology

In 1962, Korea's total trading volume was US $477 million. However, by 1994, it reached US $198.361 million. Exports rose from US $55 million in 1962 to US $96 billion in 1994. The ratio of exports to GNP increased from 24 percent in 1962 to 25 percent in 1994. Similarly, imports increased from US $422 million in 1962 to US $102 billion in 1994. The share of imports in GNP increased from 18.3 percent in 1962 to 27 percent in 1994. Because of this record in imports and exports, South Korea has become one of the world's major trading nations. Export-promotion incentives have been very important in South Korea's export performance (see Table 5.9). Exchange rate adjustments in the early 1960s were also important in Korea's initial export expansion.

Table 5.9. Major export promotion incentives

Types of incentives	Duration
Tax incentives	
Commodity tax exemption	April 1950-1973
Business tax exemption	January 1962-1973
Reduction of corporation and income tax by 50 percent on earnings from exports	January 1961-December 1972
Accelerated depreciation on allowance for fixed capital directly used for export production in mining, fishing and manufacturing	January 1961-1973
Tax credit for foreign market development expenditures	August 1969-1973
Foreign market development reserve system expanded	1973
Overseas business loss reserve system established	1973
Overseas investment loss reserve established	1973
Tariff incentives	
Tariff exemptions on capital equipment for export production	March 1964-December 1973
Tariff payments on an instalment basis for capital equipment used in export production	January 1974-
Tariff exemptions on raw material imports for export production	April 1961-June 1975
Tariff drawback on imported raw materials used for export production	July 1975
Wastage allowance	July 1965
Deferred payment system for tariff	July 1975-October 1988

Types of incentives	Duration
Financial incentives	
Financing for export sales	February 1948-July 1955
Export shipment financing	June 1950-July 1955
Export promotion fund financed by counterpart fund	November 1959-January 1964
Financing imports of materials to be used in export production	October 1961-February 1972
Export credits (trade credit before 1961)	June 1950-
Financing suppliers of U.S. offshore military procurement	September 1962-
Fund to promote the export industry	July 1964-September 1969
Fund to convert small- and medium size firms into export industries	February 1964-
Fund to prepare exports of agricultural and fishery products	September 1969-
Foreign currency loans	May 1967-
Financing exports on credits	October 1969-
Automatic export financing ceiling for large exporters	1976-
Overall export financing system introduced	October 1985-
Differentiated export financing for large versus small and medium companies	October 1986-
Other promotion schemes	
Foreign exchange deposit system	June 1949-January 1961
Trading license based on export performance	January 1953
An export bonus with preferential foreign exchange	1951-May 1961
Payment of export subsidy	1954-1955 and 1960-1965
Discount on railroad freight rates	1958-
Monopoly rights on exports of specific items to specific areas	April 1960-November 1980
Creation of exporters associations for various export products	September 1961-
Financing KOTRA (Korea Trade Promotion Corporation)	March 1962-
Export-import link system	November 1962-March 1965-1966
Discount on electricity rates	1965-1976
Waiver issuance for shipping	1965-
Local L/C system	March 1965-
Differential treatment of traders based on export performance	February 1967-
Export insurance	January 1969
General trading company	May 1975
Export-import bank	June 1976-
Special loan privileges for small and medium exporters' raw material imports	August 1987-
Export financing for big corporations discontinued	February 1988-

Source: Sakong 1993.

On the import side commercial imports were controlled by the Korean government during the 1960s. However, total imports increased due mainly to increasing imports of food and grain as well as capital goods. Since the mid-1970s commodity imports

have been gradually liberalised. The overvaluation of the won from time to time has also contributed to the expansion of imports since 1961. As a result of South Korea's industrialisation, the rapid growth of exports was accompanied by a substantial change in the composition of exports (see Table 5.10.). In 1961 Korea's exports were mostly primary goods such as iron ore, tungsten and raw silk. In 1970, Korea was exporting mainly textiles and garments, reflecting the nation's push into light industry. In 1993, electronic products were Korea's single largest exporter as the nation moved more firmly into higher value-added production. The expansion of Korea's exports has also been accompanied by an increase in the exports of capital-intensive goods. In 1991 and 1993 capital-intensive goods were among the top exports such as steel products, ships, chemical products, general machinery, automobiles and petroleum products (see index of capital intensity in Chapter 4).

Table 5.10. Top exports

Export	1961 millions of dollars	percen-tages	Export	1970 millions of dollars	percen-tages
1. iron ore	5.3	13.0	1. textiles & garments	341.1	40.8
2. tungsten	5.1	12.6	2. plywood	91.9	11.0
3. raw silk	2.7	6.7	3. wigs	90.1	10.8
4. anthracite	2.4	5.8	4. iron ore	49.3	5.9
5. squid	2.3	5.5	5. electronic products	29.2	3.5
6. other fish	1.9	4.5	6. confectionary	19.5	2.3
7. graphite	1.7	4.2	7. footwear	17.3	2.1
8. plywood	1.4	3.3	8. tobacco and products	13.5	1.6
9. grain	1.4	3.3	9. steel products	13.4	1.5
10. animal fur	1.2	3.0	10. metal products	12.2	1.5

Export	1980 millions of dollars	percen-tages	Export	1993 millions of dollars	percen-tages
1. textiles	5,014	28.6	1. electronic products	18,170	18.92
2. electronic products	2,004	11.4	2. textiles	16,337	17.02
3. steel products	1,854	10.6	3. machinery	10,326	10.75
4. footwear	904	5.2	4. motor vehicles	5,758	6.00
5. ships	618	3.5	5. steel products	5,525	5.75
6. synthetic resin products	571	3.3	6. vessels and floating structures	4,945	5.15
7. metal products	433	2.5	7. footwear	1,488	1.55
8. plywood	352	2.0			
9. deep-sea fish	352	2.0			
10. electric products	324	1.9			

Source: Sakong 1992; National Statistical Office, Korea, figures in short 1995.

On the other hand, the share of imports of labour intensive goods has been increasing. This is suggested by the change in the geographical distribution of the origin of these imports. For example, Korea's imports share from the United States and Japan dropped from nearly 71 percent in 1961 to around 45.90 in 1994. In contrast, Korea's imports from Asian developing countries increased from 11.5 percent in 1965 to 24.3 percent in 1991.

Table 5.11 shows the empirical analysis on the impact of trade on income distribution. Five models are shown in the Table 5.11. Model 1 explains better the relationship between international trade and income distribution. The adjusted R-square is 0.7405 which indicates that the independent variables as a whole explain satisfactorily the variation in the Gini coefficient. Similarly, the ratio of exports plus imports to GDP was individually significant in explaining Korea's income distribution. Nevertheless,

the estimate of the Durbin Watson statistic in the models suggest that there is a serious problem of autocorrelation.

Table 5.11. International trade and income distribution*

Model 1

Constant	Y	1/Y	GREV	XMGDP
0.49340	-0.000028503	-80.724	-0.0052507	0.0011280
(6.496)	(-4.540)	(-2.095)	(-3.570)	(1.926)

Notes: R-square estimate: 0.7729; R-square adjusted: 0.7405; Durbin-Watson Statistic: 0.48699; Durbin-Watson P-Value: 0.000; F-Value: 23.823; Table t-value at 5 % level (one tail): 1.701.

Model 2

Constant	Y	1/Y	GREV	Kx1
0.62343	-0.000037333	-148.29	-0.0059911	-0.000037708
(13.16)	(-6.082)	(-6.830)	(-3.628)	(-0.06681)

Notes: R square estimate: 0.7429; R-square adjusted: 0.7061; Durbin-Watson Statistic: 0.52035; Durbin-Watson P-Value: 0.000; F-Value: 20.222; Table t-value at 5% level (one tail): 1.701.

Model 3

Constant	Y	1/Y	GREV	Kx2
0.58728	-0.000036431	-134.73	-0.0049151	0.0013138
(12.06)	(-8.245)	(-6.467)	(-2.820)	(1.128)

Notes: R-square estimate: 0.7540; R-square adjusted: 0.7189; Durbin-Watson statistic: 0.59387; Durbin-Watson P-Value: 0.0000; F-value: 21.456.; Table t-value at 5% level (one tail): 1.701.

Model 4

Constant	Y	1/Y	GREV	XMGDP	Kx1
0.47662	-0.000018083	-69.288	-0.0059088	0.0016293	-0.00083740
(6.279)	(-1.824)	(-1.780)	(-3.861)	(2.371)	(-1.346)

Notes: R-square estimate: 0.7872; R-square adjusted: 0.7478; Durbin-Watson statistic: 0.56681; Durbin-Watson P-Value: 0.000; F-value: 19.972; Table t-value at 5% level (one tail): 1.703.

Model 5

Constant	Y	1/Y	GREV	XMGDP	Kx2
0.48604	-0.000028716	-79.913	-0.0047131	0.0010151	0.00077290
(6.268)	(-4.522)	(-2.052)	(-2.778)	(1.647)	(0.6567)

Notes: R-square estimate: 0.7765; R-square adjusted: 0.7351; Durbin-Watson statistic: 0.52086; Durbin-Watson P-Value: 0.000; F-value: 18.757; Table t-value at 5% level (one tail): 1.703.

*t-statistics in parentheses

XMGDP=ratio of exports plus imports to GDP
Kx1=share of capital intensive goods exported in total exports
Kx2=ratio of the exports of iron and steel in total exports

New estimates using the Cochrane-Orcutt method are shown in Table 5.12. Model 1 explains better the relationship between international trade and income distribution. An increase in the openness of the economy increases income inequality. All explanatory variables in the model are significant at the 5 percent level. On the other hand, as seen from models 1-5, Kx1 and Kx2 are insignificant in explaining the variation in the Gini coefficient.

Table 5.12. International trade and income distribution (model re-estimated)*

Model 1

Constant	Y	1/Y	GREV	XMGDP
0.46239	-0.000021524	-63.231	-0.0046889	0.0010428
(7.416)	(-2.662)	(-1.872)	(-3.498)	(2.195)

Notes: Table t-value at 5 % level (one tail): 1.701.

Model 2

Constant	Y	1/Y	GREV	Kx1
0.56623	-0.000029643	-117.47	-0.0047038	-0.000026553
(11.86)	(-3.550)	(-4.513)	(-3.173)	(-0.05775)

Notes: Table t-value at 5% level (one tail): 1.701.

Model 3

Constant	Y	1/Y	GREV	Kx2
0.56410	-0.000030694	-118.00	-0.0045535	0.00030230
(12.28)	(-4.470)	(-4.877)	(-2.993)	(0.4523)

Notes: Table t-value at 5% level (one tail): 1.701.

Model 4

Constant	Y	1/Y	GREV	XMGDP	Kx1
0.46777	-0.000019757	-65.639	-0.0048629	0.0011230	-0.00026828
(7.457)	(-2.214)	(-1.956)	(-3.499)	(2.245)	(-0.6036)

Notes: Table t-value at 5% level (one tail): 1.703.

Model 5

Constant	Y	1/Y	GREV	XMGDP	Kx2
0.46322	-0.000022074	-64.151	-0.0046359	0.0010359	0.000093686
(7.283)	(-2.776)	(-1.884)	(-3.259)	(2.111)	(0.1520)

Notes: Table t-value at 5% level (one tail): 1.703.

*t-statistics in parentheses

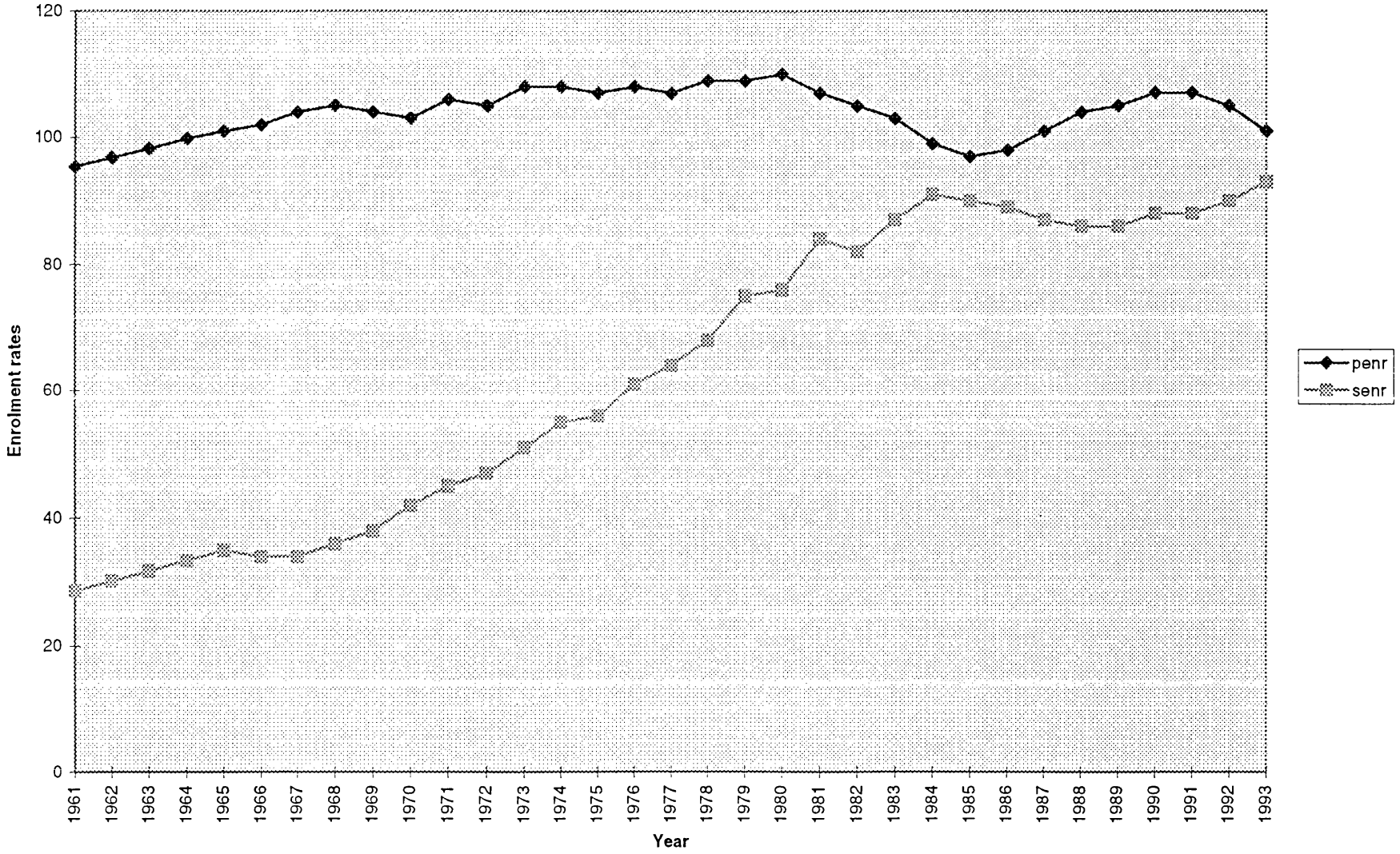
The Stolper-Samuelson theorem suggests that the exports of capital-intensive goods, while importing labour-intensive goods, moves income distribution in favour of the owners of capital. The results of model 1 provides implicit support for this argument. The ratio of exports plus imports to GDP had a positive effect on the Gini coefficient in Korea during the period 1961-1993.

5.6. Education

Education is believed to promote income equality in the long run. According to this view, education creates additional productive skills and knowledge embodied in individuals. Under the assumption of a perfectly competitive labour market, wages are equal to the value of worker's marginal product. The higher income received by better educated workers is seen as a payment to their additional contribution to output. Therefore, a greater supply of skilled labour will produce a shift from paid, unskilled employment to highly paid, skilled employment. This shifts produces a reduction in skill differentials and an increase in the share of wages in total output. Another argument claims that if the rate of growth of human capital exceeds the rate of growth of physical capital, educational expansion can have the effect of greater income equality. This argument is based on the assumption that physical capital is more unequally distributed than that from human capital.

The educational expansion in Korea during the last years have been very impressive. For example, secondary school enrolment rate increased from 29 percent in 1961 to 93 percent in 1993. The level of primary enrolment rate has also been maintained at high levels (see Figure 5.5.). The educational expansion in Korea passed through three main phases. In the first phase, from 1910 to 1945 primary education was introduced by the Japanese colonial government and expanded rapidly. The enrolment in primary schools increased from 45,00 in 1912 to 1,695,000 in 1942. The second phase in educational expansion began in 1945, with the independence of Korea, and finished in the mid 1960s. During this period, the major aims of the government were to eradicate illiteracy in Korea and to faster widespread informal adult education. The school enrolment in primary schools increased from 1,366,000 in 1945 to 4,941,300 in 1965. Enrolment in middle schools increased from 83,500 in 1945 to 588,900 in 1965. Similarly, enrolment in colleges and universities increased from 7,800 to 141,600 during the same period. In the third phase, beginning in the late 1960s, the educational attainment shifted towards secondary and higher education. Between 1965 and 1993, the student population of middle schools increased from 1,318,800 to 2,410,874. Similarly, enrolment in high schools increased from 426,500 in 1965 to 2,069,210 in 1993. Finally, the student population of colleges and universities increased from 141,600 in 1965 to 1,669,823 in 1993.

Figure 5.5. Educational expansion in Korea



Source: As specified in the methodology

Table 5.13 reports the results for the relationship between education and income inequality in Korea. Education is represented by the primary school enrolment rate[6]. The adjusted R-square is 0.8316 which indicates that the explanatory variables as a whole explain satisfactorily the variation in the Gini coefficient. However, the estimate of the Durbin-Watson statistic suggests that there is a serious problem of positive autocorrelation.

Table 5.13. Education and income distribution

Variable	Estimate	T-Ratio
Constant	0.11380	1.011
Y	-0.000017196	-2.972
1/Y	-25.113	-0.7393
GREV	-0.0055669	-4.765
XMGDP	0.0016821	3.422
penr	0.0028678	4.020

Notes: R-square estimate: 0.8579; R-square adjusted: 0.8316; Durbin-Watson Statistic: 0.98023; Durbin-Watson P-Value: 0.000023; F-Value: 32.608. Table t-value at 5 % level (one tail): 1.703.

penr=primary school enrolment rate

Table 5.14. shows new estimates using the Cochrane-Orcutt method. The primary school enrolment rate is individually significant in explaining changes in the Gini coefficient. Although higher primary school enrolment rates tend to be associated with lower inequality, the sign of the coefficient in Table 5.14. suggests that the expansion of primary school enrolment rate has led to an increase in income inequality in South Korea during the period 1961-1993.

Table 5.14. Education and income distribution (model re-estimated)

Variable	Estimate	T-Ratio
Constant	0.26968	2.273
Y	-0.000020616	-3.173
1/Y*	-51.242	-1.528
GREV	-0.0051357	-3.863
XMGDP	0.0011918	2.425
penr	0.0017563	2.061

Notes: Table t-value at 5 % level (one tail): 1.703, table t-value at 10% level (one tail): 1.314.
* significant at 10% level

6. Secondary school enrolment rate was insignificant in explaining changes in the Gini coefficient.

The emphasis on capital accumulation in South Korea has led to increased capital intensity. As a consequence, the marginal productivity of labour in the capital-intensive sector, which is assumed to demand mainly skilled labour, could have increased. This, perhaps, led to an increase in the wage rates in the capital-intensive sector and to an increase in the income gap between the skilled employees of the capital-intensive sector and the unskilled employees of the labour-intensive sector. The argument suggests that both the expansion of education and the increasing demand for skilled labour by the capital-intensive sector could lead to a less equal income distribution.

A second argument claims that if a greater a supply of skilled labour, caused by expansion in education, produces a sharp decline in its marginal product, output will not increase considerably. This may reduce relative wage differentials between skilled and unskilled labour as well as the share of labour in total income thus contributing to an increase in overall inequality. The results can be either unemployment of skilled labour or displacement of unskilled labour by skilled labour in the informal sector of the market. A final argument suggests that if the rate of growth of physical capital exceeds the rate of growth of human capital, educational expansion can have the effect of greater income inequality.

5.7. Conclusions[7]

The Kuznets' U-inverted hypothesis finds support with South Korean data. The evidence in South Korea and in western countries such as the United States and the United Kingdom, suggests that a development strategy based on the production of capital intensive goods is an important determinant of the U-inverted curve. The empirical analysis shows that the process of intersectoral shifts is also an important determinant of the U-inverted curve.

While a large private sector is associated with a relatively unequal distribution of income, a large public sector is associated with a more egalitarian income distribution. The evidence in Korea supports this argument. Similarly, the empirical analysis found indirect support for the Stolper-Samuelson theorem. Therefore the exports of capital intensive goods in South Korea has led to a less equal income distribution. Finally, although higher primary school enrolment rates are thought to be associated with lower inequality, the evidence suggests that the expansion of primary school has led to an increase in income inequality in South Korea during the period 1961-1993.

7. The annual growth of GDP per capita was used to analyse the effect of the rate of economic growth on income distribution. However, this was insignificant in explaining the variation in the Gini coefficient. Similarly, the population growth rate and the total of population were used to test the effect of demographic effects on income distribution. Nevertheless, the population growth rate was insignificant in explaining the dependent variable. On the other hand, the total of population was highly correlated with real per capita GDP and its inverse. Therefore this could not be included in the model. The correlation coefficient of the total of population with real per capita GDP was 0.91817 and with the inverse of real per capita GDP was -0.98707.

Chapter 6

Conclusions

The main objective of this dissertation was to identify and analyse the major factors affecting income distribution in South Korea over the period 1961 to 1993. The factors considered were classified into Kuznets' hypothesis, intersectoral shifts, international trade, the size of government, education, rate of economic growth and demographic changes. Regression analysis was used for empirical investigation.

According to the Kuznets' hypothesis income inequality increases in the early phases of economic growth, becomes stabilised for a while, and then narrows in the later phases (Kuznets 1955, 18). The regression analysis found support for the Kuznets' hypothesis in South Korea during the period 1961-1993. Several studies on Korea's income distribution had concluded that during the high growth period of the 1960s, Korea did not experience the typical increase in income inequality implied by the Kuznets' curve. At that time, South Korea was following a development strategy based on the promotion of the exports of labour-intensive goods. Nevertheless, with the shift in development strategy from labour intensive to capital intensive production, the Kuznets' curve has appeared in Korea. The graphic evidence showed an inverted-U curve for Korea in the period 1970-1993.

Kuznets (1955) based his hypothesis on data analysis of western countries such as United Kingdom, West Germany and the United States. These countries based their economic growth on capital intensive production. Therefore the evidence suggests that a development strategy based on capital intensive production is an important determinant of the U-inverted Kuznets' curve. On the other hand, Taiwan, following a development strategy based on the exports of labour intensive goods, has not followed the U-inverted pattern. Labour intensive production leads to rapid absorption of labour in the modern-urban sector during the development process. This prevents the formation of landless rural labourers, or urban shoe-shine boys, car guarders etc. As a result income distribution also improves.

The relationship between intersectoral shifts and income distribution was analysed in section 5.3. Theories of economic dualism such as the seminal labour-surplus model of W. Arthur Lewis suggest that as countries develop, the proportions of GDP and employment accounted for by agriculture must decline. This process is usually accompanied by a transfer of human resources from rural to urban areas. According to Kuznets (1955), the process of intersectoral shifts of employment from agriculture to non-agriculture leads to an increase in relative inequality and which in turn generates the U-inverted curve. The regression analysis supports Kuznets' claims for South Korea in the period 1961-1993. Intersectoral shifts are part of the development process and are closely related to the Kuznets' hypothesis. There is the suspicion that the Kuznets' hypothesis has been tested in developing countries in which the process of intersectoral shifts has not been relevant.

On the other hand, intersectoral shifts have, perhaps, stopped being relevant in developed countries where industrialisation and urbanisation have reached their peak. The evidence suggests that the Kuznets' hypothesis is relevant in growing economies such as Korea's, in which economic growth has been accompanied by the process of intersectoral shifts and by a development strategy based on capital intensive production.

The effect of government activity on income distribution was analysed in section 5.4. Government activity can affect income distribution in different ways. A large private sector is associated with a relatively unequal distribution of income. This occurs because the return to capital is appropriated by individuals rather than the state (Bigsten 1983, 75). Similarly government expenditure on some public goods such as education and health services can help to reduce income inequality. The regression analysis for Korea supports the claims of a negative relationship between income distribution as represented by the Gini coefficient and government activity. On the other hand, government military expenditure is usually associated with a less equal income distribution. Nevertheless, the regression analysis for Korea does not support this argument. The share of government military expenditure in total government expenditure was insignificant in explaining the variation in the Gini coefficient.

The effect of international trade on income distribution was analysed in section 5.5. The Stolper-Samuelson theorem suggests that exports of capital-intensive goods, while importing labour intensive goods, moves income distribution in favour of the owners of capital. Korea's exports expansion has been accompanied by an increase in the exports of capital-intensive goods during the period 1961-1993. On the other hand, the share of imports of labour intensive goods has also been increasing. The regression analysis for South Korea provides implicit support for the Stolper-Samuelson theorem over the period 1961-1993.

Section 5.6 presented the analysis of the effect of education on income distribution. Although educational expansion tend to be associated with lower income inequality, the regression analysis found that the expansion of primary school education as measured by primary school enrolment rate, led to an increase in income inequality in South Korea during the period 1961-1993. One explanation is that both the expansion of primary education and the increasing demand for skilled labour by the capital-intensive sector could lead to an increase in the wage rates in the capital intensive sector. The consequence is an increase in the income gap between the skilled employees of the capital-intensive sector and the unskilled or semi-skilled employees of the labour intensive sector. A second argument suggests that if a greater supply of educated labour produces a sharp decline in its marginal product, output will not increase considerably. This may reduce relative wage differentials between the skilled and unskilled labour as well as the share of labour in total income thus contributing to an increase in overall inequality.

The results can be either unemployment of skilled labour or displacement of unskilled labour by skilled labour in the informal sector of the market. A final argument suggests that if the rate of growth of physical capital exceeds the rate of growth of human capital, educational expansion can have the effect of greater income inequality. The reason is that physical capital is more unequally distributed than human capital.

There are limitations in this study. One limitation is the lack of recognition of social-political factors in the regression analysis For example, factors such as South Korea's homogeneous society or Korea's strong Confucian cultural heritage could also be determinants of Korea's income distribution. However, these factors can not be easily quantified in a regression analysis. Similarly, there are limitations in the use of the Korean data. National accounts data and all kinds of data in general are subject to measurement errors. Nevertheless, substantial effort has been made to understand the relationship between the development process and income distribution. Such a relationship should be studied using time series data for a particular country. Conclusions emerged from cross-sectional studies should be taken with reservation. This thesis is one of few existing studies analysing the determinants of income distribution for a specific developing country in an historical context. Therefore, there is still considerable potential for future research of this broad topic, particularly, as time series data becomes available for other developing countries.

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Appendix A

Table 1. Intersectoral shifts and inequality (log per capita GNP).[a]

Dependent Variable		Estimated coefficients on explanatory variables			
Income shares of:	Constant	log per capita GNP	[log per capita GNP]^2	Socialist Dummy	R square adjusted
(1) Top 20 percent	-57.58	89.95	-17.56	-20.15	0.58
F=27.9	(2.11)	(4.48)	(4.88)	(6.83)	
(2) Middle 40 percent	87.03	-45.59	9.25	8.21	0.47
F=18.6	(4.81)	(3.43)	(3.88)	(4.20)	
(3) Lowest 60 percent	119.4	-73.52	14.06	17.52	0.61
F=31.4	(5.85)	(4.90)	(5.23)	(7.95)	
(4) Lowest 40 percent	70.57	-44.38	8.31	11.95	0.59
F=29.8	(5.38)	(4.61)	(4.82)	(8.45)	
(5) Lowest 20 percent	27.31	-16.97	3.06	5.54	0.54
F=24.3	(4.93)	(3.71)	(3.74)	(8.28)	

[a] t-Statistics in parentheses.

Source: Ahluwalia 1976, 311.

Table 2. Intersectoral shifts and inequality (Share of agriculture in GDP).[a]

Dependent variable		Estimated coefficients on explanatory variables			
Income shares of:	Constant	Share of agriculture in GDP	[Share of agriculture in GDP]^2	Socialist Dummy	R square adjusted
(1) Top 20 percent	39.54	1.155	-0.018	-20.110	0.49
F=19.8	(13.73)	(5.01)	(4.63)	(6.33)	
(2) Middle 40 percent	41.89	-0.671	0.010	8.453	0.34
F=10.9	(21.55)	(4.31)	(3.77)	(3.94)	
(3) Lowest 60 percent	36.58	-0.867	0.014	17.24	0.55
F=24.5	(17.38)	(5.15)	(4.91)	(7.42)	
(4) Lowest 40 percent	18.56	-0.484	0.008	11.660	0.56
F=26.3	(14.25)	(4.64)	(4.61)	(8.11)	
(5) Lowest 20 percent	6.02	-0.159	0.003	5.370	0.54
F=24.2	(10.11)	(3.35)	(3.68)	(8.18)	

[a] t-Statistics in parentheses.

Source: Ahluwalia 1976, 319.

Table 3. Intersectoral shifts and inequality (Share of urban population in total).[a]

Income shares of:	Constant	Share of urban population	[Share of urban population]^2	Socialist Dummy	R square adjusted
(1) Top					
20 percent	52.08	0.28	-0.005	-18.140	0.43
F=15.8	(15.25)	(1.62)	(2.53)	(5.39)	
(2) Middle					
40 percent	31.860	-0.050	0.002	7.066	0.28
F=8.5	(14.00)	(0.43)	(1.36)	(3.15)	
(3) Lowest					
60 percent	29.49	-0.310	0.004	15.99	0.50
F=20.4	(11.99)	(2.46)	(3.28)	(6.54)	
(4) Lowest	16.060	-0.232	0.003	11.070	0.54
40 percent	(10.71)	(3.04)	(3.69)	(7.50)	
F=24.1					
(5) Lowest					
20 percent	6.10	0.107	0.001	5.221	0.53
F=23.00	(9.00)	(3.12)	(3.39)	(7.82)	

[a] t-Statistics in parentheses.

Source: Ahluwalia 1976, 319.

Appendix B

Table 1. Government military expenditure and income distribution

Constant	Y	1/Y	Gmilit
0.42721	-0.000028723	-102.79	0.0016982
(10.82)	(-5.201)	(-6.896)	(1.701)

Notes: R-square: 0.6378; R-square adjusted: 0.6003; Durbin-Watson Statistic: 0.51824; Durbin-Watson P-Value: 0.000; F-value: 17.021.

t-statistics in parentheses

Gmilit=share of government military expenditure in total government expenditure

Table 2. Government military expenditure and income distribution (estimate corrected for autocorrelation)

Constant	Y	1/Y	Gmilit
0.42721	-0.000026254	-81.841	0.00046239
(9.196)	(-2.933)	(-3.128)	(0.5118)

t-statistics in parentheses