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DEVELOPMENT STRATEGIES IN A LAGGING REGION: THE CASE OF CENTRALIZED POLARIZATION IN KOREA.

University of Hawaii Ph.D. 1981

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DEVELOPMENT STRATEGIES IN A LAGGING REGION:

THE CASE OF CENTRALIZED POLARIZATION IN KOREA

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE
UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT
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DOCTOR OF PHILOSOPHY

IN GEOGRAPHY

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by

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ABSTRACT

This study examines differences in the levels of regional development among the six regions (Capital, Kangwon, Ch'ungch'ong, Cholla, Kyongsang and Cheju) of the Republic of Korea from 1941 to 1976 and the possible factors which have created and perpetuated their differences, especially between the more developed Kyongsang region and the less developed Cholla region. It also investigates the ways in which the struggle for development in these two regions is affected by explicit economic and implicit political policies. Finally, the study recommends that development strategies aimed at reducing regional disparities be based on identifying and reversing these policies.

The variables employed in determining the level of regional development among six regions include demographic characteristics, productivity in primary and secondary sectors, the magnitude of infrastructural facilities, health facilities and educational attainment, and other financial conditions such as local taxes and bank deposits. Furthermore, the overall extent of regional disparities in the Republic of Korea is analyzed by Williamson's population-weighted coefficient of variation, using GRP per capita. Its overall magnitude of disparities converged during 1961-66, but subsequently diverged during 1966-76. Regional disparities between the Cholla region and the Kyongsang region have accelerated in terms of both the regions as a whole and within localities of the two regions, particularly since the early 1970s.

In the 1970s private investment variable was by far an important determinant in the level of regional development of the Kyongsang region and, to a lesser extent, of the Cholla region. During the 1960s, however, education played an important role in the Cholla region, but this was not significant in the Kyongsang region. While infrastructure was a crucial factor in explaining developmental changes in the Cholla region between 1971 and 1975, private investment was more important in the Kyongsang region during the same period. The regional dummy variables had little effect on the static models of regional development, but these had a somewhat significant effect on the dynamic models. Disparities in development between the two regions are thus attributable to both locational and structural conditions.

The Kyongsang region has rapidly developed as an industrial region, especially for manufacturing of export goods, in the Republic of Korea, along with the support of explicit economic and implicit political policies. In contrast, it appears that the Cholla region has not only received relatively little benefit of development but has also been comparatively neglected in recent industrial development. The implication is that explicit and implicit policies aimed at efficiency-oriented economic development through regional polarization cannot be successful without negative side effects. The efficiency goal, therefore, may not be compatible with the equity goal. It appears from the experience of the Republic of Korea that polarization policies perpetuate regional disparities arising in the early stage of economic development.

In order to relieve prevailing social unrest and thereby realize

social and spatial justice, the most effective means of overcoming regional disparities appears to be through paving the way for an equity policy. Continuous attention and almost single-minded commitment of political leaders are required to transform an efficiency-orientation into equity-oriented programs. Strong political commitment, changes in policy priorities, and more political participation appear to be the basic preconditions for more equitable regional development in centralized countries in the Third World, including the Republic of Korea.

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CHAPTER I

INTRODUCTION

The Problem of Regional Disparity

Throughout the history of mankind equality has always been raised as an important consideration, if not an ideal. Equality is not purely an economic concept. The issue of economic equality, as it appears in history, is often compounded by issues of political, social, and even spatial equality.[1] Spatial equality in broad terms refers not only to spatial equality of living conditions but also to equality in terms of opportunities for individuals and groups.[2] If we do not wish to discriminate against people on the basis of race, religion, or social status, we should not discriminate against people on the basis of location.[3]

The persistence of regional disparities has been an intractable problem not only for economists, but also for planners and policy makers.

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[1] Paukert, Felix. (1973). "Income Distribution at Different Levels of Development: A Survey of Evidence," International Labor Review. vol. 108, no. 2-3 (August-September), p. 97.

[2] Stöhr, Walter and Franz Tödtling (1977). "Spatial Equity: Some Anti-theses to Current Regional Development Doctrine," Papers of the Regional Science Association. vol. 38, pp. 34-35.

[3] Coates, B.E. et al. (1977). Geography and Inequality. Oxford: Oxford University Press, p. 5.

Widening regional variations in economic and social conditions are a common national development problem, because these smack of territorial injustice. While some countries have achieved in a relatively short time enormous aggregate improvements in economic and social performance and gains in standards of living, poor regions within these countries have often failed to keep pace. Disparities in economic and social conditions among regions and areas within a country, contrary to Williamson,[4] do not necessarily depend upon its overall stage of economic development.

Even though scholars do not agree about the causes of sub-national disparities, most would agree that these are structural as well as political. The factors involved are complex, operating together as mutually reinforcing economic, social, political and spatial variables. Whatever the basic causes of disparity, it is clearly a spatial and social problem. Indeed, the problem of 'lags' among regions is universal, not peculiar to any economic system. In investigating disparity it is thus necessary to establish the extent to which spatial disparities are rooted in structural, as opposed to political, factors.[5] Therefore, a few basic questions should be raised about regional disparities: (1) why do regional disparities occur within a country? (2) what factors account for regional differences in development? (3) what kinds of development strategies are needed to alleviate regional disparity? These are the

---

[4]Williamson, Jeffrey G. (1965). "Regional Inequality and the Process of National Development: A Description of the Patterns," Economic Development and Cultural Change. vol. 13, no. 4, Part 2, pp. 3-45.

[5]Coates et al., p. 5.

main research concerns of this study.

Despite increasing attention to the problems of lagging regions in many countries, most geographers have ignored the role of politics in perpetuating such problems. Many geographers continue to believe that sub-national poverty and deprivation are the price that must be paid for national efficiency: few recognize the possibility that polarized spatial systems tend to reduce overall levels of well-being,[6] and are thus a cause as well as an effect of socio-economic conditions.

Smith[7] explains how the question of equity or fairness should be viewed in the discipline of geography:

> "One of the most interesting innovations in geographical thought since the 'quantitative revolution' has been the idea of judging spatial distributions from the perspective of social justice. ... but the idea of geographical discrimination is less familiar. Yet if people living in some areas have a markedly inferior life quality to those in other areas, this may conflict with equity principles just as much as other forms of differentiation. ... 'spatial injustice' is becoming one of the major themes of the new socially activist geography."

Is the so-called trade-off between equity and efficiency[8] necessary, or is it simply a hoax?

The Case of the Republic of Korea

The economic growth of Korea dating back to the Japanese colonial

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[6] Ibid., pp. 5-6.

[7] Smith, D.M. (1974). "Who Gets What Where, and How: A Welfare Focus for Human Geography," Geography. vol. 59, no. 265, p. 295.

[8] Alonso, William. (1975). "Urban and Regional Imbalances in Economic Development," in John Friedmann and William Alonso (eds.), Regional Policy: Readings in Theory and Applications. Cambridge: MIT Press. pp. 622-635.

period of 1910-1945 was achieved through regional specialization. Regional specialization was primarily based upon initial locational advantages of the various industries. It is well known that heavy industry had been developed in the northern part of Korea and that light industry and agriculture had grown in the southern part, mainly because of rich mineral deposits and hydroelectric power in the north and fertile plains in the south.[9] The division of Korea into northern and southern halves after World War II destroyed this interdependency. It gave the Republic of Korea less than half the land, more than three-fifths of the population,[10] most of the agriculture, and little of the industry. In keeping with the motives of Japanese colonial development, regional specialization led to the widening of regional disparities among different regions within Korea.

The Korean War, which lasted from 1950 to 1953, further divided the country and worsened living conditions. Sixty percent of the cultivated land was overrun, and most of the limited industrial capacity was destroyed. Civilian war casualties were estimated at almost one million in the Republic of Korea. Casualities among the United Nations forces totaled 420,000, of which almost three-quarters were Korean.[11]

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[9] Suh, Sang Chul. (1978). Growth and Structural Changes in the Korean Economy: 1910-1940. Cambridge: Harvard University Press, pp. 131-142.

[10] The total area of North Korea and the Republic of Korea is about 220,951 km^2, of which 44.5% (98,431 km^2) belongs to the Republic of Korea. According to the population census first taken by the Republic of Korea in 1949, the population of the Republic of Korea was 20,167,000, while North Korea had the population of 9,740,000 as estimated by the Ministry of National Defense, the Republic of Korea.

[11] Kuznets, Paul W. (1977). Economic Growth and Structure in the Republic of Korea. New Haven: Yale University Press, p. 37.

The overall extent of wartime damage was estimated at some $3 billion (approximately the size of gross national product in 1965).[12] In the immediate postwar period an estimated 10 million Koreans were without homes, adequate food, and medical care; approximately 5 million were on relief. The Neutral Nations Inspection Committee reported: "The country is dead. ... there is no activity. ... the cities are completely destroyed."[13] Per capita income in 1953 was about $196 (1976 prices), and manufacturing was only 9 percent of GNP. Over the next 10 years, from 1953 to 1962, Korean government policy aimed at reconstruction and defense with financial assistance flowing in from abroad, mainly from the United States. Korea's GNP rose by 4.6 percent per annum from 1954 to 1958.[14] The industrial growth which occurred during the postwar period further increased the nation's stocks of both physical and human capital.

Since the beginning of the first five-year economic development plan in 1962, Korea has experienced high rates of growth in output and rising ratios of investment, saving, and exports and imports to GNP. During the period 1963-76 real GNP more than trebled, growing at 9.6 percent per annum at 1970 constant prices; per capita GNP reached $700 in 1976, well over double the level of a decade earlier. In addition, exports rose in value from $87 million in 1963 to $7,715 million in 1976, growing by 37.8 percent annually at current prices, and making up 31 percent of

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[12] Lim, Youngil. (1968). "Foreign Influence on the Economic Change in Korea: A Survey," The Journal of Asian Studies. vol. 28, no. 1, p. 83.

[13] Hasan, Parvez. (1976). Korea: Problems and Issues in a Rapidly Growing Economy. Baltimore: The Johns Hopkins University Press, p. 27.

[14] Bergsman, Joel. (1980). "Growth: A Tale of Two Nations; Korea and Argentina," Report: News and Views from the World Bank. May-June, p. 2.

GNP in 1976.[15] Manufactured exports rose by 51 percent annually at current prices; the increase in exports accounted for 25 percent of the increase in manufacturing output during the period 1960-66, and for 46 percent during the period 1966-73.[16] This rapid growth has been the result of export expansion and the government's strong commitment to aggregate economic growth. The Korean economy has pushed ahead at such rapid rates that most people have been able to perceive the improvements and to share in at least some of the benefits.

The central government policies that maximize national development in the interest of efficiency may be one major reason for increasing regional disparities within a country. Tendencies toward polarization may also be exacerbated by the concentration of public investment in a few favored regions or urban centers. The rapid growth of manufacturing output in Korea in the last two decades, for example, is characterized by the enormous expansion of industrial parks within some growth centers, presumably to achieve efficiency objectives, as shown in Figure 1.[17] Export-oriented, labor-intensive industries have been rapidly developed with the aid of American and Japanese capital and technology. The attraction of private enterprise under highly centralized government planning to such growth centers is said to have been an important driving force in economic development. At no time during the economic development

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[15] Economic Planning Board. (1977). Korea Statistical Yearbook. Seoul: EPB, p. 229, p. 441, and pp. 448-449.

[16] Bergsman, op. cit., p. 3.

[17] The spatial distribution of industrial parks seems to be fairly evenly distributed, but there are great regional variations in the type of industries, the scale of industries, the size of employment, and thereby the amount of manufactured output and exports.

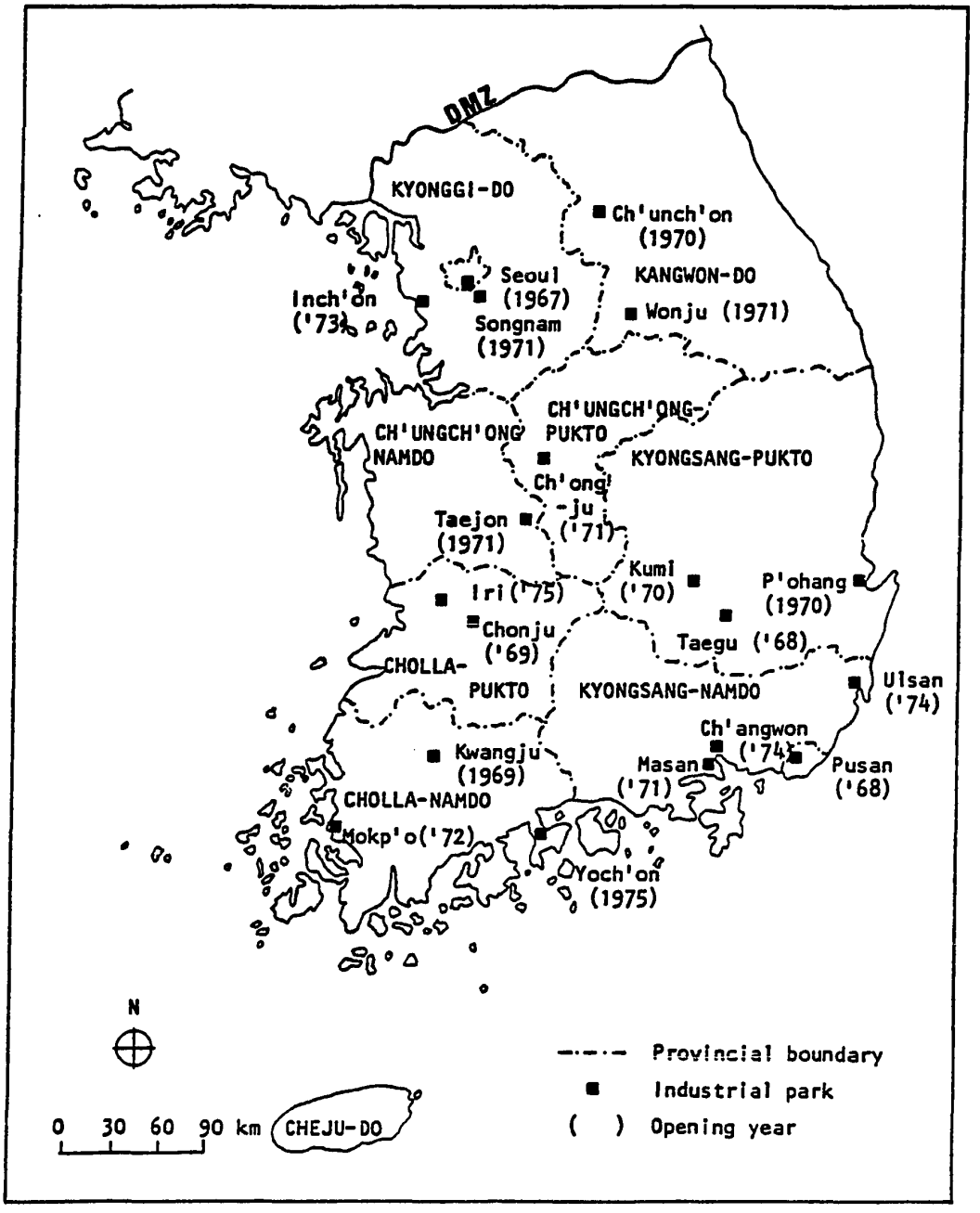

FIGURE 1. -- SPATIAL DISTRIBUTION OF INDUSTRIAL PARKS IN KOREA

plan period was the redistribution of income or wealth a major concern. Instead the government has attempted to maximize aggregate manufacturing output and exports. Are Korea's regional disparities in economic development an outgrowth of explicit aggregate policies aimed at national efficiency or are these an expression of implicit sub-national favoritism? Can less centralized countries in the Third World afford the luxury of politically as well as economically polarized development?

Purposes of the Study

A number of studies dealing with regional disparity focus on a description of spatial variations in socio-economic phenomena, even though the concept of development differs considerably from one author to another and from culture to culture. If 'development' is inevitably a normative concept, almost a synonym for improvement, as Seers[18] points out, socio-economic disparity can be seen as the unequal access of individuals and groups in a territory to material and non-material necessities, and thereby causing unequal development among territories. The study of regional disparity thus involves both a description of the spatial imprint of socio-economic variations and an analysis of the nature and evolution of the processes which cause and perpetuate those disparities in relation to any particular geographic space.[19]

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[18]Seers, Dudley. (1972). "What are We Trying to Measure?" The Journal of Development Studies. vol. 8, no. 3 (April), p. 22.

[19]Hinderink, J. and J.J. Sterkenburg (1978). "Spatial Inequality in Underdeveloped Countries and the Role of Government Policy," Tijdschrift voor Economische en Sociale Geografie. vol. 69, no. 1-2, p. 6.

Many social scientists have attempted to formulate development programs to stimulate the economy of the lagging regions,[20] but their analytical interests have been primarily devoted to explaining the extent of regional disparities and the distribution of economic and social phenomena rather than their causes. They have paid little attention to formulating comprehensive development strategies for lagging regions addressed at the reasons for regional disparities.

In view of the need for greater insight into the reasons for spatial disparities in economic development in rapidly growing Third World nations, this study focuses on the following objectives:

1) To examine differences in regional development in the southern part of Korea, particularly between a fast-growing Kyongsang and a slow-growing Cholla region over time (1941-76), and the possible factors which have created and perpetuated differences.[21]
2) To identify the ways in which the struggle for development in these two regions is affected by explicit economic and implicit political policies.
3) To recommend development strategies for diminishing regional disparities

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[20]For example, see Irma Adelman and Sherman Robinson (1978). Income Distribution Policy in Developing Countries: A Case Study of Korea. Stanford: Stanford University Press; A.F. Burghardt (1972). "Income Density in the United States," Annals of the Association of American Geographers. vol. 62, no. 3 (September), pp. 455-460; Minoru Tachi (1964). "Regional Income Disparity and Internal Migration of Population in Japan," Economic Development and Cultural Change. vol. 12, no. 2 (January), pp. 186-204; and Williamson, op. cit., pp. 3-45.

[21]The Kyongsang region consists of the Special City of Pusan and North and South Kyongsang Provinces, while the Cholla region includes North and South Cholla Provinces. These are also sometimes called the Yongnam region and the Honam region respectively.

in the slow-growing Cholla region, based on the identification of ways in which the major development efforts are affected by explicit and implicit biases in national policies.

The Kyongsang region has developed rapidly since the early 1960s, especially in the manufacturing sector; partly because of government protection and support in various forms, including in some instances substantial subsidies, and partly because of the economies of scale and agglomeration resulting from the accumulated social overhead capital. The exports of manufactured goods produced by various industrial parks in the region amounted more than 2,104 million dollars (approximately 20.9 percent of the nation's total exports) in 1977.[22] The Kyongsang region today is a major element in the economy of Korea.

On the other hand, the Cholla region is a remote, poor area whose people have traditionally engaged in agricultural activities. The region has played a key role as the nation's rice basket because of an intensively cultivated Honam Plain in the west (Figure 14). Industrial development in the region has been generally neglected. Industrial parks in the region contributed only about 1.4 percent to the nation's total exports in 1977. Since the mid-1960s the region has been the poorest in the country in terms of gross regional product (GRP) per capita. The Cholla region has been bypassed by the main axis of development (Seoul-Pusan).

The underlying competitive attitude between the two regions, which reinforces their regional identities, may be rooted in historical events.

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[22]Computed on the basis of a series of reports on industrial parks in Korea from Dong-A Ilbo (Dong-A Daily Newspaper), March 29-April 11, 1978.

The unification of the later Paekche Kingdom (site of the Cholla region) by Silla (site of the Kyongsang region) in the 7th century has not been forgotten, as pointed out by Bartz.[23] The people of Cholla have complained of unfair treatment by the central government since the early 1960s. Most of all, they resent the fact that their region has been deprived of the kind of industrialization that has benefited other regions of the country.[24] In comparing the two regions, implicit sub-national favoritism may account for differential outcomes in the last two decades.

Regional Disparities in Korea: Previous Research

Considerable attention has already been focused on the impact of rapid economic growth in Korea on spatial disparities, using various indicators of development and employing different spatial units, such as provinces and rural-urban areas. Renaud[25] examined economic differences among provinces using data on output per worker and activity rates (the ratio of employed population to total population) for 1960 and 1968, and gross income per capita in 1968. He observed an increase of the activity rates in the two major urban centers of Seoul and Pusan and the Kyongsang region as a whole, and a decline in the Cholla region. In

---

[23] Bartz, Patricia M. (1972). South Korea. Oxford: Oxford University Press, p. 181.

[24] "Season of Spleen: Outright Insurrection Raises Alarm about an Invaluable Pacific Ally," Time. June 2, 1980, pp. 36-37.

[25] Renaud, Bertrand M. (1973). "Conflicts between National Growth and Regional Income Inequality in a Rapidly Growing Economy: The Case of Korea," Economic Development and Cultural Change. vol. 21, no. 3 (April), pp. 429-445.

addition, his analysis, based on a formal model, examined the relationships between the structure of production and the national growth rate. He showed that the Korean economy experienced more polarization of economic activity to the more dynamic regions, particularly in 1968. In other words, rapid growth was being achieved at the expense of more equitable regional development.

In another attempt three years later, Renaud[26] again investigated nationwide patterns of income distribution from 1959 to 1970, using tax data, income surveys, national accounts data, consumer expenditure surveys, and wage surveys. His extensive analysis of the information available indicated that income disparity in Korea was comparable to that in developed countries, and that no serious deterioration of aggregate income distribution on a nationwide basis took place during this period. Indeed, he found that urban-rural disparities, which had been rising in the early 1960s, appeared to be diminishing by the end of the decade.

Mera[27] contends, however, that inter-provincial income disparities of Korea, measured by gross regional product (GRP) per capita, increased from 1964 to 1967, decreased from 1968 to 1971, and remained almost unchanged until 1974. He argued that the convergence of regional disparities which started to appear in 1968 was mainly attributable to the improvement

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[26]Renaud, Bertrand M. (1976). Economic Growth and Income Inequality in Korea. Washington, D.C.: The World Bank, World Bank Staff Working Paper No. 240.

[27]Mera, Koichi. (1978). "Population Concentration and Regional Income Disparities: A Comparative Analysis of Japan and Korea," in Niles M. Hansen (ed.), Human Settlement Systems: International Perspectives on Structure, Change and Public Policy. Cambridge: Ballinger. pp. 163-175.

of the terms of trade for farmers through pricing policies of the central government. Furthermore, the maintenance of high growth of the economy was, he concluded, an effective way to reduce regional income disparities, and the Korean experience was particularly successful in terms of maintaining differences in income distribution among provinces at a fairly early stage of development.

Another study was undertaken by Rao.[28] He reviewed Korea's experience in the last 10 to 15 years (more specifically, during the period 1963-75), which was regarded by Renaud and Mera as being successful in combining rapid growth with improved rural-urban equity. According to Rao's findings, the increase in employment opportunities and the shift in composition toward manufacturing away from argiculture and services were the most important contributors to the growth of incomes of the poor. He further suggested that while the manipulation of grain prices to remedy rural-urban disparities was effective in maintaining equity, government expenditures, other than those for grain subsidies, were not specifically directed to alleviate poverty. He concluded that the relatively wide distribution of the benefits of growth in the Republic of Korea was rather mainly the result of the aggregate growth strategy itself, since there was no significant increase in income inequality, at least until 1970.

However, the trend of income distribution in Korea is not necessarily optimistic. Choo's estimation[29] yielded rather different results. In

---

[28]Rao, D.C. (1978). "Economic Growth and Equity in the Republic of Korea," World Development. vol. 6, no. 3, pp. 383-396.

[29]Choo, Hakchung. (1978). Economic Growth and Income Distribution in Korea. Seoul: Korea Development Institute, Working Paper 7810, pp. 22-45.

examining the distribution of income over the period 1965-76, he noted a slight tendency in the non-agricultural sector toward improvement during the period 1965-70 and subsequently rapid deterioration of income distribution from 1970 to 1976. Income distribution in the agricultural sector, however, continuously deteriorated during the period 1965-76.

The final study regarding regional disparities in Korea is that of Kim.[30] He confirmed Choo's findings that inter-provincial disparities were aggravated after 1960. By calculating the range, standard deviation, and the coefficient of variation of value added per capita of two special cities and nine provinces from 1960 to 1970, he observed that South Cholla Province remained the poorest in the country after 1966. Their major findings about regional disparities of Korea are summarized in Table 1.

A variety of conflicting views exists, based on different spatial units, data bases and time period employed in the analysis. First, variations may be inter-regional (provincial); intra-regional; rural-urban; inter-urban; or intra-rural. In other words, mutually exclusive arguments may result from the selection of different geographic scales. Second, attempts have been made to examine regional disparities of Korea using different indicators. Most measures have been narrowly-oriented in the sense that they addressed levels of material well-being like value added per capita, GRP per capita, household income, output per worker and share of national output, rather than more holistic indicators

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[30]Kim, An-Jae. (1974). "Chiyokkan kyongchejok kyokch'a ye kwanhan ch'ukdo yonku (A Study on Measurement of Inter-regional Economic Disparity)," Hwankyong Nonch'ong (Journal of Environmental Studies). vol. 1, no. 1, pp. 27-64.

TABLE 1

SUMMARY OF PREVIOUS RESEARCH ON REGIONAL DISPARITIES IN THE REPUBLIC OF KOREA

Author	Regional disparity		
	1960-65	1965-70	1970-76
Renaud (1976)	−	+	
Mera (1978)	−	+	=
Rao (1978)		+	+
Choo (1978)		+	−
Kim (1974)	−	−	

Note: a) + represents the convergence of regional disparities.
b) − represents the divergence of regional disparities.
c) = represents the unchanged trend of regional disparities.

of regional development and non-material well-being. Third, the convergence or divergence of regional disparities has been investigated in a relatively short span of time, mainly during the last 10-15 years. It may be necessary to examine the trend in regional disparities over a longer span of time. Finally, most of the studies on Korean development have dealt with aggregate patterns of static change.

This study, therefore, attempts to resolve these issues raised above. First, multiple levels of analysis are employed to examine different aspects of regional development in different geographic scales: regional and urban variations in development. Second, attempts are made to examine regional disparities using holistic indicators of regional development: economic well-being (GRP, local taxes, bank deposits, agriculture and manufacturing) and non-economic well-being (education, infrastructure and health) indicators. Third, the trend in regional

disparities is investigated over a longer span of time: the last 35 years (1941-1976). Finally, the determinants of regional development are analyzed by a multiple regression model, and the relationships between regional policies and causal factors of development are also examined. Planners in rapidly developing countries, like Korea, may need to know to what extent the explicit or implicit public policies of the central government affect the spatial distribution of causal factors of development.

CHAPTER II

SPATIAL DISTRIBUTION OF REGIONAL DEVELOPMENT

Analytical Framework

Many social scientists[1] argue that the ideal measure of regional development would be real income per capita by homogeneous geographic units, even though this ideal statistic is rarely available in Korea as well as in other developed and developing countries. However, McGranahan et al. and Sewell[2] point out major limitations of per capita income as a measure of development. They argue that it does not reflect the distribution of income and, therefore, aggregate money measures do not indicate anything about the levels of well-being of individuals. Furthermore, Seers[3] contends that the first task in the analysis of

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[1]For example, see Bertrand M. Renaud (1973). "Conflicts between National Growth and Regional Income Equality in a Rapidly Growing Economy: The Case Study of Korea," Economic Development and Cultural Change. vol. 21, no. 3 (April), pp. 429-445; David K. Whynes (1974). "The Measurement of Comparative Development: A Survey and Critique," The Journal of Modern African Studies. vol. 12, no. 1, pp. 89-107; and Jeffrey G. Williamson (1965). "Regional Inequality and the Process of National Development: A Description of Patterns," Economic Development and Cultural Change. vol. 13, no. 4, Part 2, pp. 3-45.

[2]McGranahan, D.V. et al. (1972). Contents and Measurement of Socio-economic Development. New York: Praeger, pp. 7-9; Sewell, John W. (1976). "A Physical Quality of Life Index," International Development Review. vol. 18, no. 4, pp. 34-37.

[3]Seers, Dudley. (1973). "The Meaning of Development," in Charles K. Wilber (ed.), The Political Economy of Development and Underdevelopment. New York: Random House. pp. 6-14.

development is to find a measure of development to replace national income as a measure of development potential because development does not simply mean the growth of income. The measure of regional development chosen should depend upon the meaning of development that one has in mind.

If development is a normative concept, and involves values, goals, and standards, whose values and goals are to be taken into account in measuring development? Planners' values or people's values? Market values or decision-makers' values? Baster[4] argues that most national 'welfare functions' are a mixture of different elements because national development objectives often reflect the society's value judgments and may be incorporated into a social welfare function. This implies that there is at least an agreed upon 'welfare function' that represents a commonly accepted set of development values within a country. A generally adopted criterion of development is supposed to be normative and objective reality rather than subjective, and reflects attitudes and perceptions, such as happiness or satisfaction. An alternative measurement of development to per capita income has emerged based on this notion. A variety of economic and social phenomena has been suggested as measures of development, particularly within an analytical and planning context.

In the recognition of such a complex multivariate nature of the concept of development, a wide range of different socio-economic conditions was selected to analyze the spatial distribution of regional development

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[4]Baster, Nancy. (1972) "Development Indicators: An Introduction," in Nancy Baster (ed.), Measuring Development: The Role and Adequacy of Development Indicators. London: Frank Cass. pp. 1-20.

in Korea. These are chosen so as to represent both causal factors and end results of development because development is, after all, a process of change. The variables used in this study include not only demographic characteristics, but also socio-economic concerns such as productivity in primary and secondary sectors, improvement in infrastructural facilities, health, education, and financial conditions including local taxes and bank deposits.

Overall levels of regional disparities were examined using Williamson's population-weighted coefficient of variation. The time period involved in the analysis is generally from 1941 to 1976, but this varies, depending upon data availability. The year of 1941 was chosen in order to discern whether regional disparities in Korea were attributable to Japanese colonial interests. In any event, as Zimmon[5] noted, these various aspects of development should not be viewed as necessary and sufficient conditions for a region to be developed. Instead, the selected variables can be interpreted as indicators of a region's relative level of development, i.e., the extent to which it is more or less developed compared to other regions.

According to Atkinson,[6] the conventional measures of disparity often have their own shortcomings. For example, the use of the variance implies increasing inequality-aversion; the coefficient of variation attaches equal weight to transfers at different income levels; and the

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[5]Zimmon, Henry A. (1979). "Regional Inequalities in Poland: 1960-1975," Economic Geography. vol. 55, no. 3 (July), pp. 242-252.

[6]Atkinson, Anthony B. (1970). "On the Measurement of Inequality," Journal of Economic Theory. vol. 2, no. 3 (September), pp. 256-257.

standard deviation weights transfers at the lower end more heavily. In order to avoid such shortcomings, different methods have been employed to measure disparity. Smith[7] argues that the most common method is the transformation of data on individual variables into standard scores, for example, conversion into rankings and the standardization of the ranges such as Z-scores and index values. In this study, index values were used to compare different levels of regional development over time, partly because of the simplicity involved in interpretation and partly because of the convenience for illustrations. In addition, all data were recalculated on per capita basis, and index values of the Cholla region were fixed as 100.

Multiple Levels of Analysis

For purposes of analyzing the level of regional development and comparing disparities between regions, both regional and urban variations were examined. The first type, consisting of two special cities[8] and nine provinces, indicated changes in spatial development in Korea over time. Differences between two regions (the Cholla region and the Kyong-sang region) were main concerns in this study. Data were also collected for cities and towns in these two regions, since cities and towns play

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[7]Smith, David M. (1973). The Geography of Social Well-Being in the United States: An Introduction to Territorial Social Indicators. New York: McGraw-Hill, p. 85.

[8]Although the administrative status of Seoul and Pusan is different from that of provinces, these are generally considered as provinces in terms of administrative classification and government statistical compilation units.

a vital role in the development of a region. The second type of analysis will be focused only on variations among cities and towns in the two regions. The Kyongsang region contains 11 cities and 25 Eups (equivalent to towns); the Special City of Pusan located in the southeastern coast will also be included in this region. The Cholla region consists of 7 cities and 23 Eups. Therefore, in the second type of analysis 37 and 30 localities, respectively, in the two regions were compared.

There are at least two advantages which make the province an appropriate unit of analysis. First, provincial boundaries have varied only slightly over the years, and in the main have remained the same. The provinces are traditionally well known as the local administrative districts. People have become accustomed to identifying themselves and their interests with their provinces. Furthermore, most basic data for the Korea Statistical Yearbook, the Population and Housing Census, and the Mining and Manufacturing Census were collected and compiled by province even during the Japanese colonial period.

The principal disadvantage in focusing on the province is, however, that eleven provinces do not constitute enough observations to evaluate statistically. Nevertheless, the province is used as the basic spatial unit of analysis in the first stage. These provinces are, however, aggregated into larger regions for the sake of convenience and comparison of regional variations in development. Each region classified in this study has its own regional identity, sometimes associated with nicknames,[9]

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[9]For example, the Kangwon region is sometimes called kamcha bau (rugged mountainous area cultivating mainly potatoes). Similarly, the Ch'ungch'ong region is yangban (noble man); the Cholla region is hawai (implicit meaning of untruthful); and the Kyongsang region is mundung-i (lepers).

and distinctive dialects, even though there are no strong regional, cultural or behavioral differences, no deeply entrenched differences in class or caste structure between regions. Thus, Korea is divided into six regions. Namely, Seoul and Kyonggi Province are regarded as the Capital region; North and South Ch'ungch'ong Provinces as the Ch'ungch'ong region; Kangwon Province as the Kangwon region; Cheju Province (island) as the Cheju region; and the two Cholla and Kyongsang regions.

There are controversies over the role of cities in development. Most advocates of the growth center theory, like Darwent, Hansen, and Kuklinski,[10] place heavy emphasis on the role of cities. The intuitive appeal of a growth center is that it is where regional development is initiated and transmitted to an area around it. On the other hand, Friedmann and Douglass[11] suggest the agropolitan district as a more appropriate unit of spatial variation, based on the assessment of the growth center experience of Asian countries. However, Kim[12] points out that manufacturing products in the hinterland of Ulsan, one of the major industrial parks in the Kyongsang region, has continuously increased

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[10]Darwent, David F. (1969). "Growth Poles and Growth Centers in Regional Planning: A Review," Environment and Planning. vol. 1, no. 1, pp. 5-31; Hansen, Niles M. (1971). Intermediate-Size Cities as Growth Centers. New York: Praeger; Kuklinski, Antoni R. (ed.), (1972). Growth Poles and Growth Centres in Regional Planning. The Hague: Mouton.

[11]Friedmann, John and Mike Douglass (1976). "Agropolitan Development: Towards a New Strategy for Regional Planning in Asia," in Growth Pole Strategy and Regional Development Planning in Asia. U.N. Centre for Regional Development, Nagoya, pp. 333-387.

[12]Kim, An-Jae. (1976). "Industrialization and Growth Pole Development in Korea: A Case Study of Ulsan Industrial Complex in the Context of Regional Development in Southern Coastal Areas," Korea Planners Association Journal. vol. 11, no. 26 (September), pp. 50-88.

since 1966. In this regard, the role of cities is not necessarily negative in Korea. Moreover, since 1964 various socio-economic characteristics of cities have been regularly compiled in a consistent way by the Ministry of Home Affairs. This adds another advantage to selecting cities and towns for the second type of analysis. Some data at the Kun (equivalent to county) level are of course available over time, but these cannot be consistently examined because the items selected and even the format used in the compilation differ from place to place and from time to time.

Levels of Regional Development among Regions

Demographic Characteristics

As Table 2 indicates, the annual average population growth rate of the Kyongsang region between 1955 and 1975 was double that of the Cholla region. Indeed the Cholla region experienced the lowest increase in population in Korea during this period. Furthermore, the population growth rate of all cities in the Kyongsang region was 4.9 percent, while that for the Cholla region was 3.9 percent in the same period. However, between 1955 and 1960 population growth was greater in the Cholla region than in the Kyongsang region in both urban and rural areas (Table 3). Regional disparities in terms of population growth obviously widened by the early 1960s.

On the other hand, the number of net migrants in the Kyongsang region had continuously increased since 1961, while that for the Cholla region had steadily decreased (Table 4). Between 1970 and 1975, the

TABLE 2

AVERAGE ANNUAL GROWTH RATE OF POPULATION (%)

Region	1955-60	1960-66	1966-70	1970-75	1955-75
Nation	3.0	2.6	1.9	2.0	2.4
Capital	5.7	4.9	6.5	4.2	5.2
Kangwon	1.8	1.9	0.4	-0.04	1.1
Ch'ungch'ong	2.7	2.3	-0.7	0.6	1.4
Cholla	2.5	1.7	-0.5	0.02	1.0
Kyongsang	2.4	2.1	1.3	2.1	2.0
Cheju	-0.5	3.1	2.0	2.4	1.8

Source: Han'guk t'ongkye yonpo (Korea Statistical Yearbook). Seoul: Economic Planning Board, 1977, p. 36.

TABLE 3

POPULATION GROWTH RATES BY URBAN AND RURAL AREAS (%)

Area	Period	Nation	Cholla	Kyongsang
Urban	1955-60	5.8	4.6	3.6
	1960-66	5.8	3.3	4.1
	1966-70	7.2	4.0	6.1
	1970-75	5.4	3.8	5.6
Rural	1955-60	2.1	2.1	1.9
	1960-66	1.3	1.4	1.1
	1966-70	-1.2	-1.6	-1.6
	1970-75	-0.7	-1.1	-0.7

Source: As in Table 2.

Cholla region also recorded the lowest net migration rate of any region, which was even less than that of the Kangwon region. In the same period,

TABLE 4

NUMBER OF NET MIGRANTS
(IN PERSONS PER 1,000 PEOPLE)

Region	1961-66	1965-70	1970-75
Capital	125.9	109.0	76.2
Kangwon	-34.8	-43.5	-58.9
Ch'ungch'ong	-57.5	-72.9	-53.0
Cholla	-47.8	-57.3	-59.6
Kyongsang	-41.6	-19.1	-2.8
Cheju	20.0	7.8	-34.0

Source: 1961-66; Shin, Tong-joon. (1970). Inku idong (Population Movement). Seoul: Korea Research Institute of Statistics, pp. 69-72.
1965-75; Ch'ong inku mit chutaek chosa poko (Population and Housing Census). Seoul: EPB, 1970, ,975.

the number of in-migrants to the Kyongsang region per 1,000 people was more than double that of the Cholla region; the number of out-migrants remained almost same in both regions.[13] In 1976 the in-migration rates in the Kyongsang region and the Cholla region were 55.9 and 29.4 respectively, whereas the inter-regional out-migration rates were 61.4 and 53.9 respectively.[14] The net migration rates were thus -5.5 in the Kyongsang region but -24.5 in the Cholla region. More prosperous areas like the Kyongsang region tend to attract more in-migrants and, at the same time,

[13] Between 1970 and 1975, the number of inter- and intra-regional in-migrants in the Kyongsang region and the Cholla region was 132.5 and 65.2 persons per 1,000 people respectively, while the number of out-migrants was 134.8 and 135.3 respectively.

[14] Inku idong t'ongkye yonpo (Yearbook of Migration Statistics). Seoul: Economic Planning Board, 1976, p. 12.

to have an unusually high out-migration rates.[15] The heavy influx of manpower into the Kyongsang region may be the result of the increased employment opportunities, especially in industrial parks.

Agricultural Development

As mentioned previously, the Cholla region is usually perceived as a remote, poverty-stricken area. Almost three-fifths of the total households are engaged in primary activities. In terms of rice productivity, since 1961 the region has led the country in per both unit cultivation area (Figure 2) and farm population. Rice productivity of the Kyongsang region has steadily declined, even though the productivity of fruits and vegetables has not. The overall trend in agricultural productivity per unit cultivation area, including rice, barley, vegetables and fruits, indicates that the difference between the two regions has accelerated since the Korean War (Figure 3), and the gap in terms of farm population has become much wider as shown in Table 5. In 1976 the overall agricultural productivity of the Cholla region was the second lowest in the country, being ahead of only the Kangwon region, where mining and tourism have been major activities.

The relatively low agricultural productivity of the Cholla region is also well reflected by its level of agricultural infrastructure. Farm mechanization, agricultural power capacity and irrigation systems in the Cholla region, for example, lagged behind those of the Kyongsang region

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[15] Miller, Edward. (1973). "Is Out-migration Affected by Economic Conditions?" Southern Economic Journal. vol. 39, no. 3 (January), p. 398.

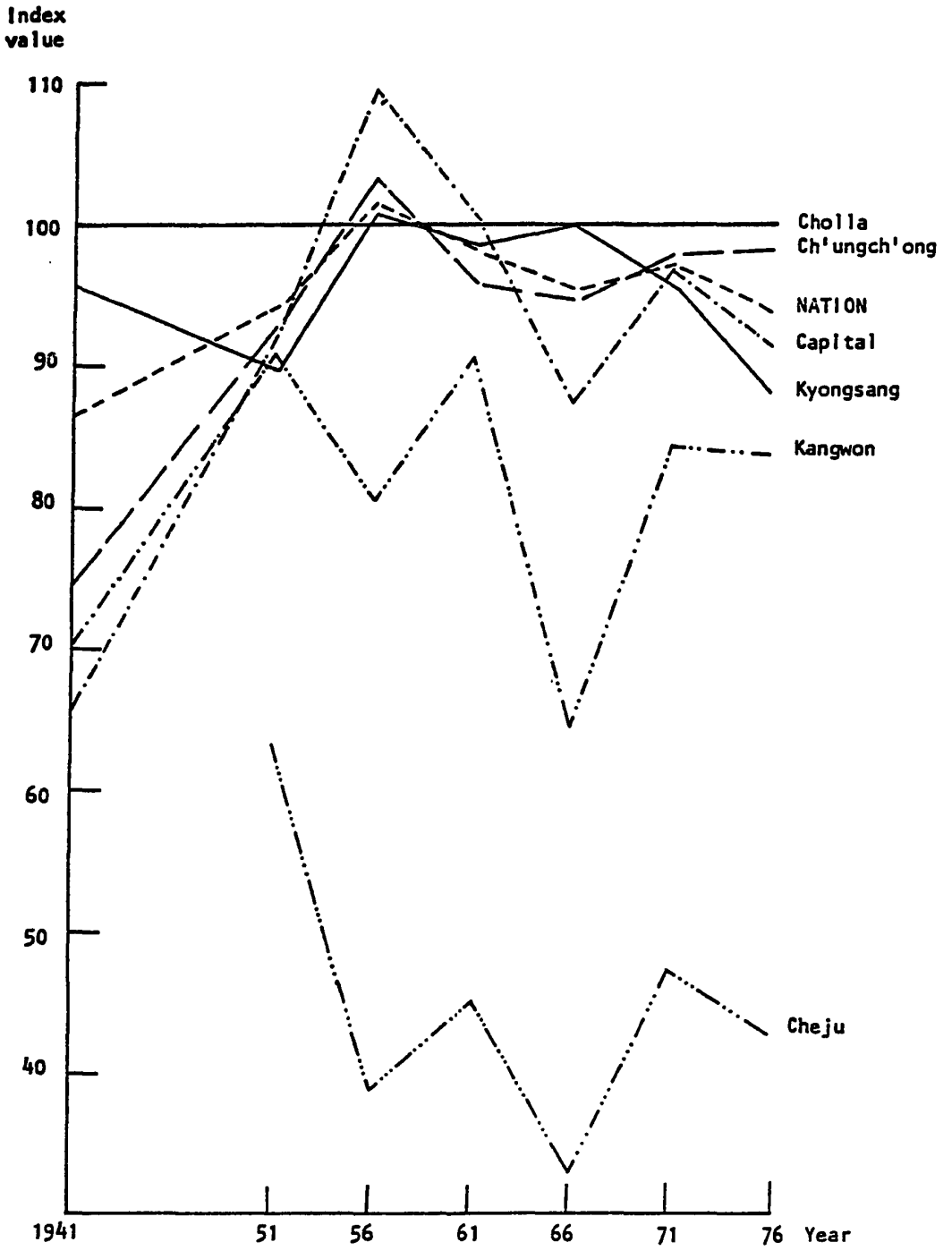

FIGURE 2. -- RICE PRODUCTIVITY PER UNIT CULTIVATION AREA

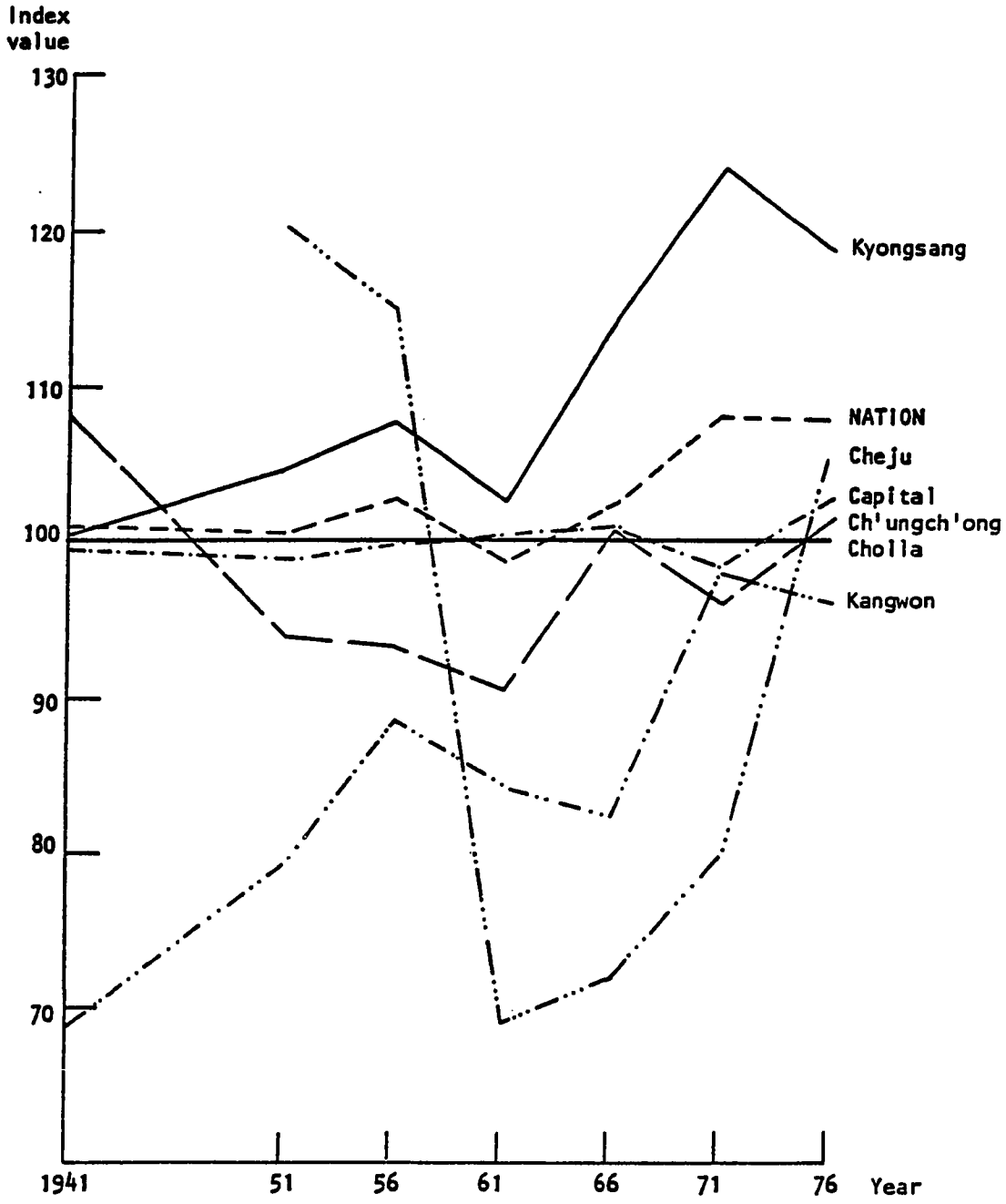

FIGURE 3. -- OVERALL AGRICULTURAL PRODUCTIVITY PER UNIT AREA

TABLE 5

INDEX VALUES OF OVERALL AGRICULTURAL PRODUCTIVITY
(PER FARM POPULATION)

Region	1941	1951	1956	1961	1966	1971	1976
Nation	127.4	110.4	108.6	109.3	113.6	119.3	115.3
Capital	144.5	115.4	139.6	137.4	134.4	153.7	126.0
Kangwon	73.3	148.6	81.2	64.0	76.8	72.2	74.2
Ch'ungch'ong	124.7	77.8	98.5	89.3	104.1	96.2	104.0
Cholla	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Kyongsang	168.7	122.6	117.2	129.5	132.6	152.1	137.8
Cheju	-*	169.2	84.6	75.3	77.2	84.2	174.7

*The Cheju region was included in the Cholla region during the Japanese colonial period.

Note: Overall agricultural productivity was calculated by the average index values of rice, barley, vegetables and fruits.

Source: Han'guk t'ongkye yonpo (Korea Statistical Yearbook). Seoul: EPB, 1942, 1952, 1957, 1962, 1967, 1972, and 1977.

as well as the country as a whole in 1976 (Table 6). Even the irrigation system for paddy fields in the Cholla region is less developed than in the Kyongsang region, and slightly ahead of the country as a whole, despite the fact that the Cholla region has played an important role as the rice basket of Korea. As mentioned earlier, the Cholla region includes the intensively cultivated Honam Plain, the largest plain in Korea, primarily devoted to subsistence crops such as rice and barley. In addition, soil conditions for the adaptation of high yielding varieties, climatic conditions, and the availability of agricultural extension services, may also contribute to increases in the productivity of main grains. On the contrary, the Kyongsang region concentrates more on the

TABLE 6

AGRICULTURAL INFRASTRUCTURE DEVELOPMENT

Item	Nation	Cholla	Kyongsang
% of farm households	34.6	58.9	35.4
Power tiller (per 1,000 farm households)	52.3	44.9	60.0
% of irrigation for paddy	72.5	77.9	78.3
Agricultural power capacity (HP/farm household)	0.31	0.23	0.39

Source: Han'guk t'ongkye yonpo (Korea Statistical Yearbook). Seoul: EPB, 1977.

cultivation of vegetables and fruits (usually called suburban farming) than on subsistence crops. As a result, the incomes of farmers in the Kyongsang region are expected to be higher than in the Cholla region, partly because of the high rate of return and intensive cultivation using green-house throughout the year and partly because of their proximity to larger urban centers (e.g., agglomeration effect).

Manufacturing Development

As previously noted, the structural changes in the Korean economy have been highlighted by the sharp rise in the ratio of manufacturing output, exports, and fixed investment to GNP. The growth of manufacturing since the mid-1960s has been mainly induced by the rapid expansion of various local and private industrial parks. Korea's first export-industrial complex was constructed in Seoul in 1967. Other important large-scale

industrial parks have been continuously developed in the country, particularly on the southeastern coast of the Kyongsang region. While the number of workers employed at these industrial parks reached 262,250 in the Kyongsang region in 1977, only 6,000 were employed at such parks in the Cholla region.[16]

Manufacturing in terms of value added per capita in the Kyongsang region was far ahead of the Cholla region, even in 1941, but the gap has widened during the past four decades, as illustrated in Figure 4. The gap, however, seems to have narrowed by 1976, probably because of the construction of new petro-chemical industrial complex in the southern Cholla region in 1974. Nevertheless, substantial disparity still exists among regions in the spatial distribution of manufacturing development. In 1976 50.3 people per 1,000 were employed in the manufacturing sector in the Kyongsang region compared to only 13.7 in the Cholla region. The Kyongsang region was also ahead of the nation's level (40.9). Along with the heavy concentration in the manufacturing sector in the Kyongsang region, in 1976 wholesale and retail trade were also greater in the Kyongsang region than in the Cholla region.[17]

In relation to manufacturing development, private investment in tangible fixed assets must be one of important determining factors. Table 7 shows that the gap between the two regions has widened since 1966. The amount invested in the Kyongsang region surpassed even that in

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[16] Dong-A Ilbo (Dong-A Daily Newspaper). "Kongup tanji ui hyonhwang (Current Conditions of Industrial Parks)," 29 March 1978 to 11 April 1978.

[17] The annual sales in the country was 180.7 thousand won (US$1 was approximately 480 won in 1976) per person; the Kyongsang region was 153.6 thousand won; and the Cholla region was 95.0 thousand won.

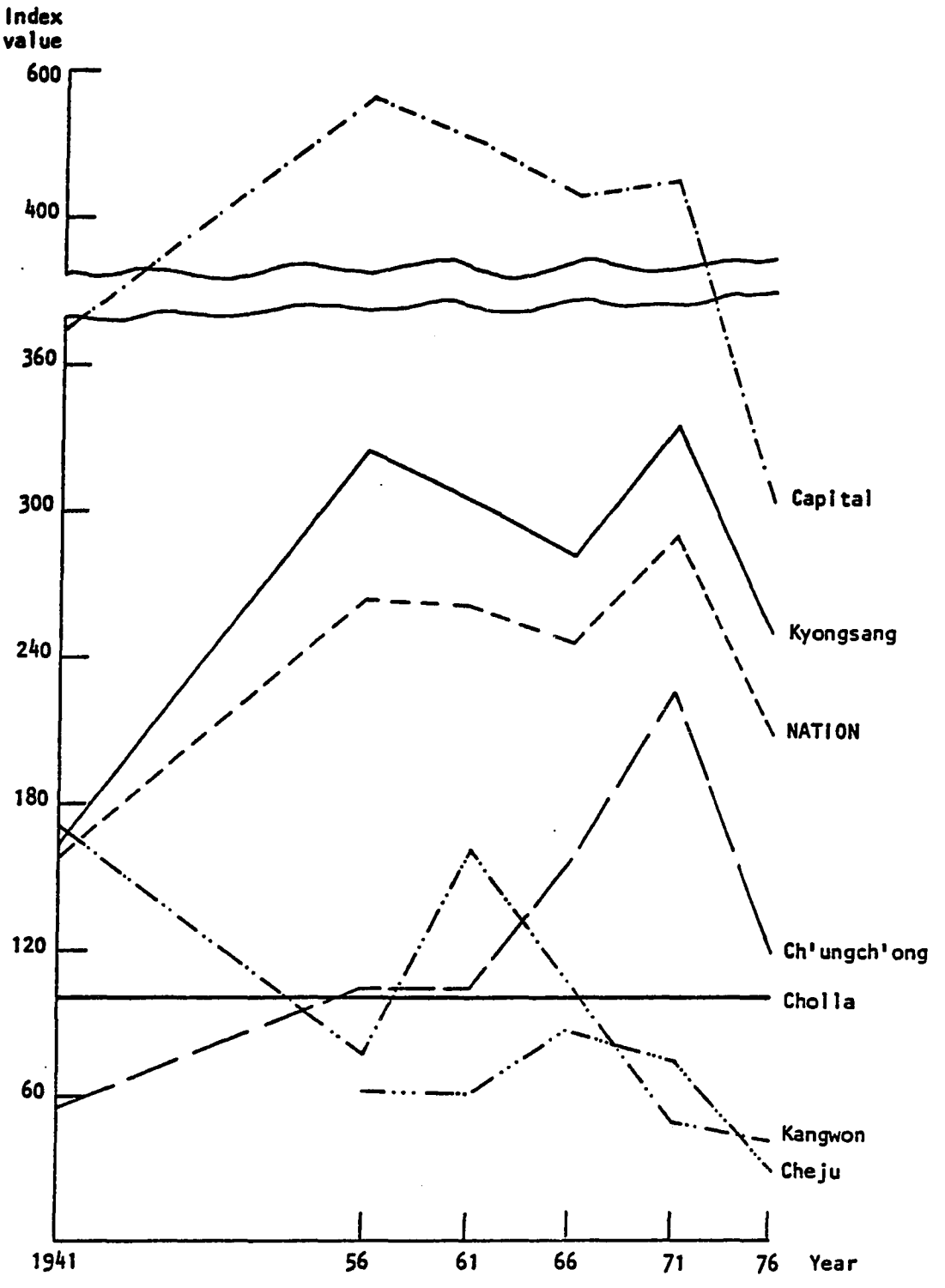

FIGURE 4. -- VALUE ADDED PER CAPITA IN MANUFACTURING

TABLE 7

INDEX VALUES OF INVESTMENT IN TANGIBLE FIXED ASSETS PER CAPITA IN MANUFACTURING

Region	1966	1971	1976
Nation	307.7 (0.80)	358.8 (5.74)	486.0 (32.22)
Capital	646.2 (1.68)	655.0 (10.48)	611.6 (40.55)
Kangwon	153.8 (0.40)	78.7 (1.26)	123.8 (8.21)
Ch'ungch'ong	134.6 (0.35)	84.4 (1.35)	332.0 (22.01)
Cholla	100.0 (0.26)	100.0 (1.60)	100.0 (6.63)
Kyongsang	330.8 (0.86)	447.5 (7.16)	738.2 (48.94)
Cheju	57.7 (0.15)	64.4 (1.03)	11.2 (0.74)

Note: The figures in parentheses indicate the actual amount of investment in 1,000 won.

Source: Han'guk kyongche t'ongkye yonpo (Economic Statistics Yearbook of Korea). Seoul: The Bank of Korea, 1967, 1972, and 1977.

the Capital region in 1976, mainly because of government financial supplements to private investment in, and foreign loans, for heavy industries, namely ship-building, heavy machinery, steel, non-ferrous metals, petro-chemicals, and electronics, mostly developed in the region. Except for the Cheju region in which tangerine cultivation and tourism are dominant, the Cholla region in both 1966 and 1976 attracted the least private investment in terms of tangible fixed assets in manufacturing.

Infrastructure Development

According to Hasan,[18] the increase in real fixed investment

[18] Hasan, Parvez. (1976). Korea: Problems and Issues in a Rapidly Growing Economy. Baltimore: The Johns Hopkins University Press, pp. 39-40.

in Korea increased at twice the rate of GNP between 1962 and 1972. A large portion of this in the second half of the 1960s was directed toward a massive public investment program in infrastructure. Widespread improvements in transport, communications, and water supply were designed essentially to expand the manufacturing sector. In 1941 the increase in road paving of national, provincial and local roads was the highest ever recorded in the Cholla region;[19] it was even greater than that for the Capital region and the country as a whole (Figure 5). However, the disparity among regions increased after 1954 but decreased in 1976. Road paving in the Cholla region has been lowest since 1966. It is not surprising that the number of motor vehicles per 1,000 people has been the lowest in the Cholla region throughout the period, even though the gap between the two regions has steadily declined, as shown in Table 8.

TABLE 8

INDEX VALUES OF MOTOR VEHICLES

Region	1951	1956	1961	1966	1971	1976
Nation	214.5	277.3	265.9	260.6	268.4	222.5
Capital	242.3	697.7	586.4	560.6	529.2	370.6
Kangwon	180.8	290.9	293.2	221.2	166.7	133.8
Ch'ungch'ong	130.8	145.5	143.2	115.2	119.3	122.5
Cholla	100.0	100.0	100.0	100.0	100.0	100.0
Kyongsang	334.6	254.5	238.6	227.3	226.9	203.1
Cheju	226.9	170.5	222.7	227.3	238.0	199.3

Source: Han'guk t'ongkye yonpo (Korea Statistical Yearbook). op. cit.

[19]The rate for 1941 was measured in paved road length per total length by the Government-General of Korea.

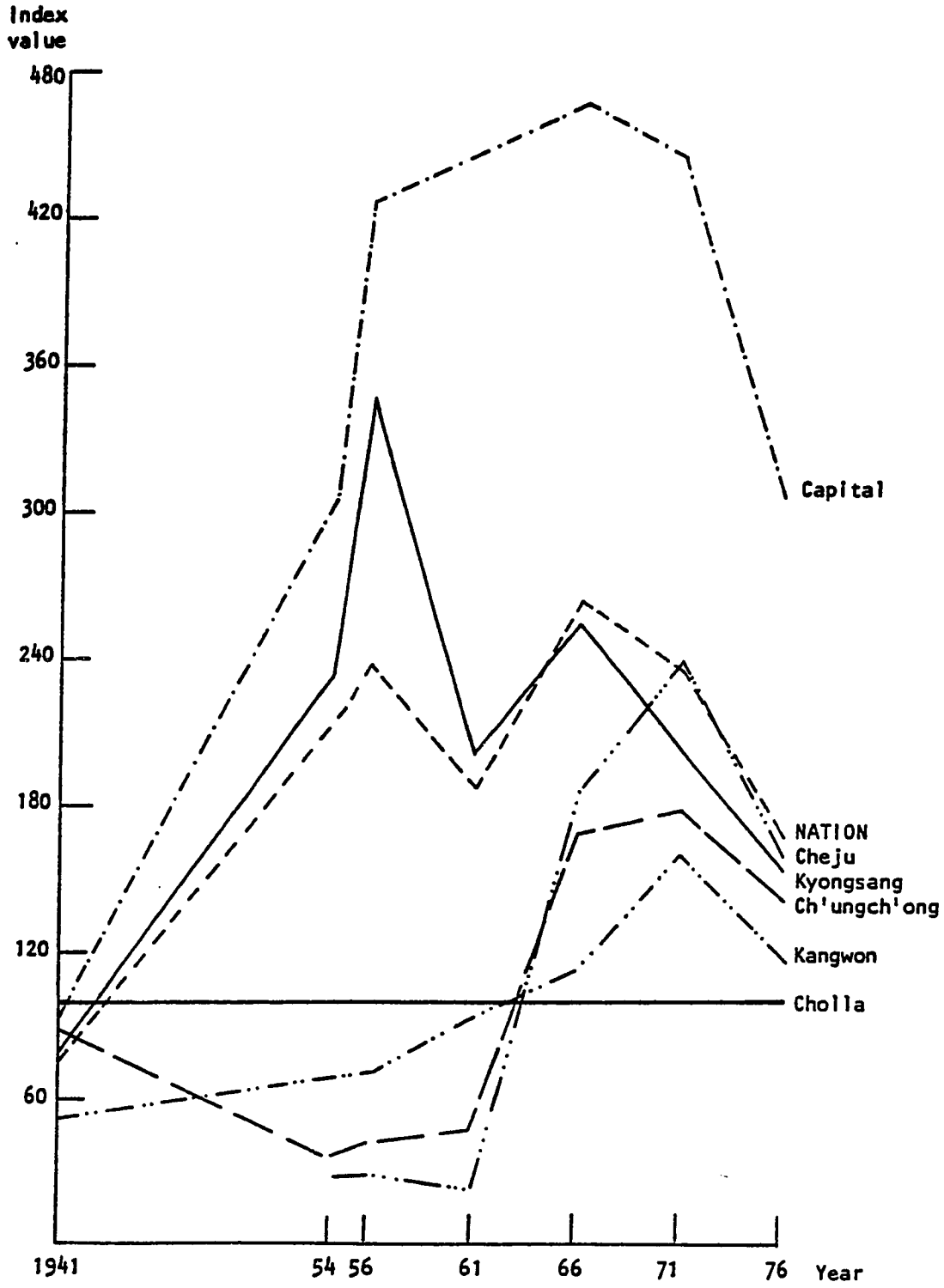

FIGURE 5. -- ROAD PAVEMENT RATE

Although public investment in the improvement of the road network has been heavy, other infrastructural needs have also been met. The number of postal stations has more than doubled from 1961 to 1971.[20] Telephone and telegraph grew even more rapidly. Nevertheless, since 1961 the Cholla region again had the lowest number of telephone subscribers per 1,000 people. The difference between the Cholla region and the Kyongsang region widened until 1966, and slightly declined thereafter (Figure 6). The ability of residents to subscribe to telephone service clearly depends upon their income levels, but the construction of facilities to meet increasing demand is of course in the hands of the central government, as is the case with other infrastructure development. The people of Cholla feel that they have not been fairly treated in this respect.

Table 9 shows the extent of piped water supply among regions between 1941 and 1976. The trend varies immensely from region to region over time, mainly because different methods were used to collect and code the data. In some years data were collected on the basis of the number of people served; in others these were based on the number of households served, and in others on the area provided with public water supply. Consistent practices in compiling data among regions were followed in the same year, however, so that regions could be compared in a given year. As far as public water supply is concerned, the Cholla region is better off than other regions in Korea, partly because of the generally low-level terrain compared to that of the mountainous Kangwon and Ch'ungch'ong

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[20] Hasan, op. cit., p. 32.

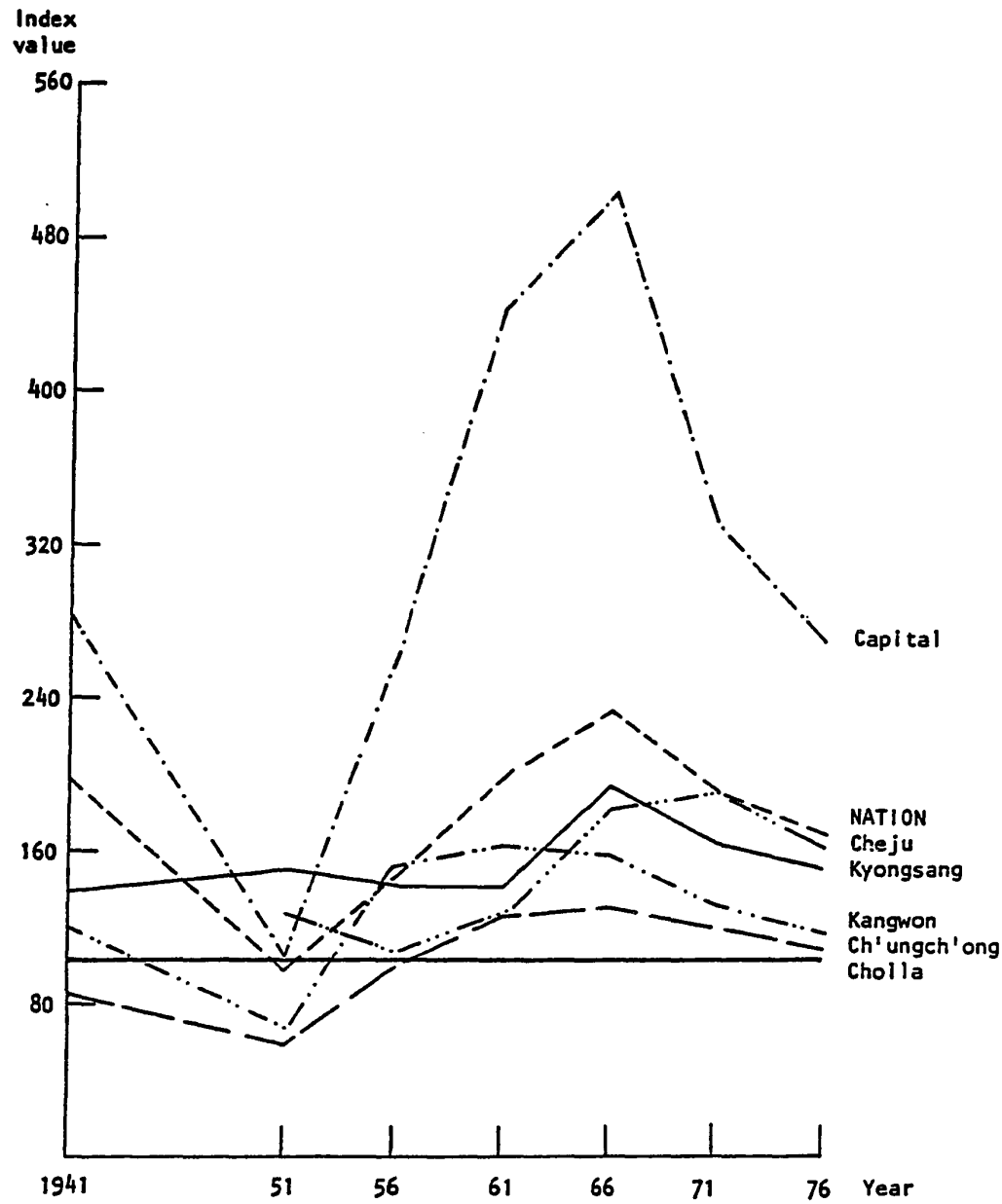

FIGURE 6. -- NUMBER OF TELEPHONE SUBSCRIPTIONS

TABLE 9

INDEX VALUES OF PUBLIC WATER SUPPLY

Region	1941	1956	1961	1966	1971	1976
Nation	222.6	156.9	252.7	227.4	159.8	111.3
Capital	691.4	416.5	619.6	356.9	186.9	121.3
Kangwon	51.3	24.0	37.5	100.7	87.4	74.7
Ch'ungch'ong	55.9	56.0	61.9	70.2	127.9	90.7
Cholla	100.0	100.0	100.0	100.0	100.0	100.0
Kyongsang	200.7	134.5	256.0	300.5	151.9	112.0
Cheju	-*	45.0	18.0	273.6	197.9	125.7

*The Cheju region was included in the Cholla region in 1941.
Source: As in Table 8.

regions and partly because of the relatively abundant water resources. Although the gap between the Cholla region and the Kyongsang region is still conspicuous, it seems to have converged in the early 1970s.

The development of health care services also reflects the complexity of economic, social and political variations in the country. The delivery of health care is noticeably worse in the Cholla region. As shown in Figure 7, the disparity between the Cholla region and the Kyongsang region has steadily declined since 1961, even though the Cholla region still has fewer health facilities than any other region.

Since housing demand almost always exceeds supply in a rapidly growing economy, the housing shortage in Korea (30 percent in 1975[21]) is no exception. Although many public and private enterprises are

[21] Ch'ong inku mit chutaek chosa poko (Population and Housing Census). Seoul: Economic Planning Board, 1975, pp. 126-140.

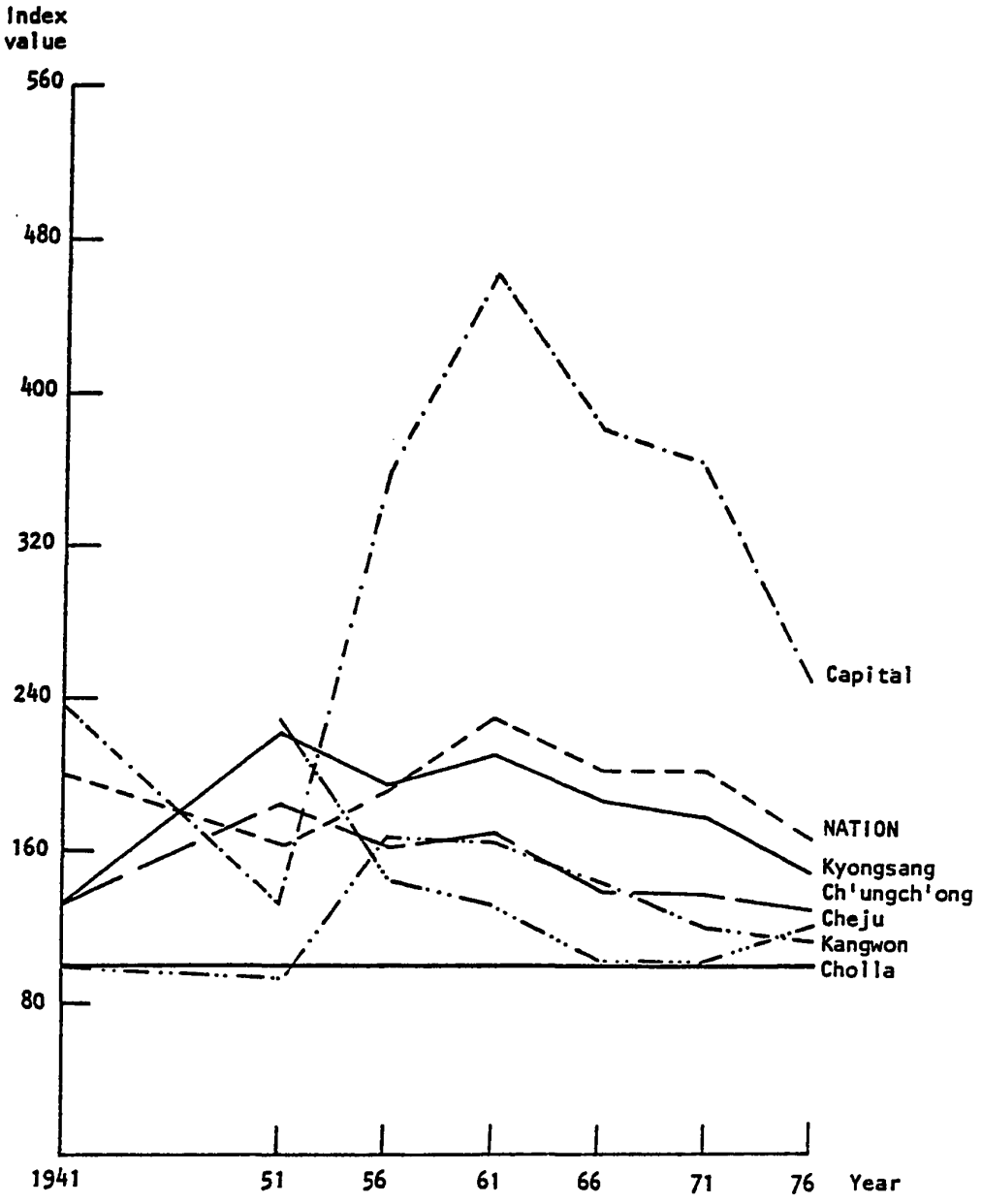

FIGURE 7. -- NUMBER OF MEDICAL FACILITIES

making an effort to relieve the shortage, housing shortages seem to be still high. About 27 houses per 1,000 households were built in the country as a whole in 1976. While 22 per 1,000 households were constructed in the Kyongsang region, only 15 houses were built per 1,000 households in the Cholla region.[22] Spatial variations in infrastructure development, such as road paving, telephones, and public water supply, which were largely financed by the central government investment, indicate that the disparity between the two regions in the country grew until 1966, but has since declined (Figure 8). During the first five-year economic development plan period (1962-66), infrastructure development was largely concentrated in the Kyongsang region to pursue efficiency-oriented development policy. However, the central government seems to be attempting to reduce discrepancies in the distribution of spending in infrastructure development in the first half of the 1970s. Despite such practices, the Cholla region continues to lag far behind the Kyongsang region in all aspects of infrastructure development, as it has since 1941.

Educational Development

Korean society has traditionally placed a high value on education. Education was vigorously promoted by the United States advisers after World War II, and it continued to spread thereafter. The literacy rate rose to over 80 percent in 1965 from 22 percent in 1945, and today

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[22] Han'guk t'ongkye yonpo (Korea Statistical Yearbook). Seoul: Economic Planning Board, 1977, p. 212.

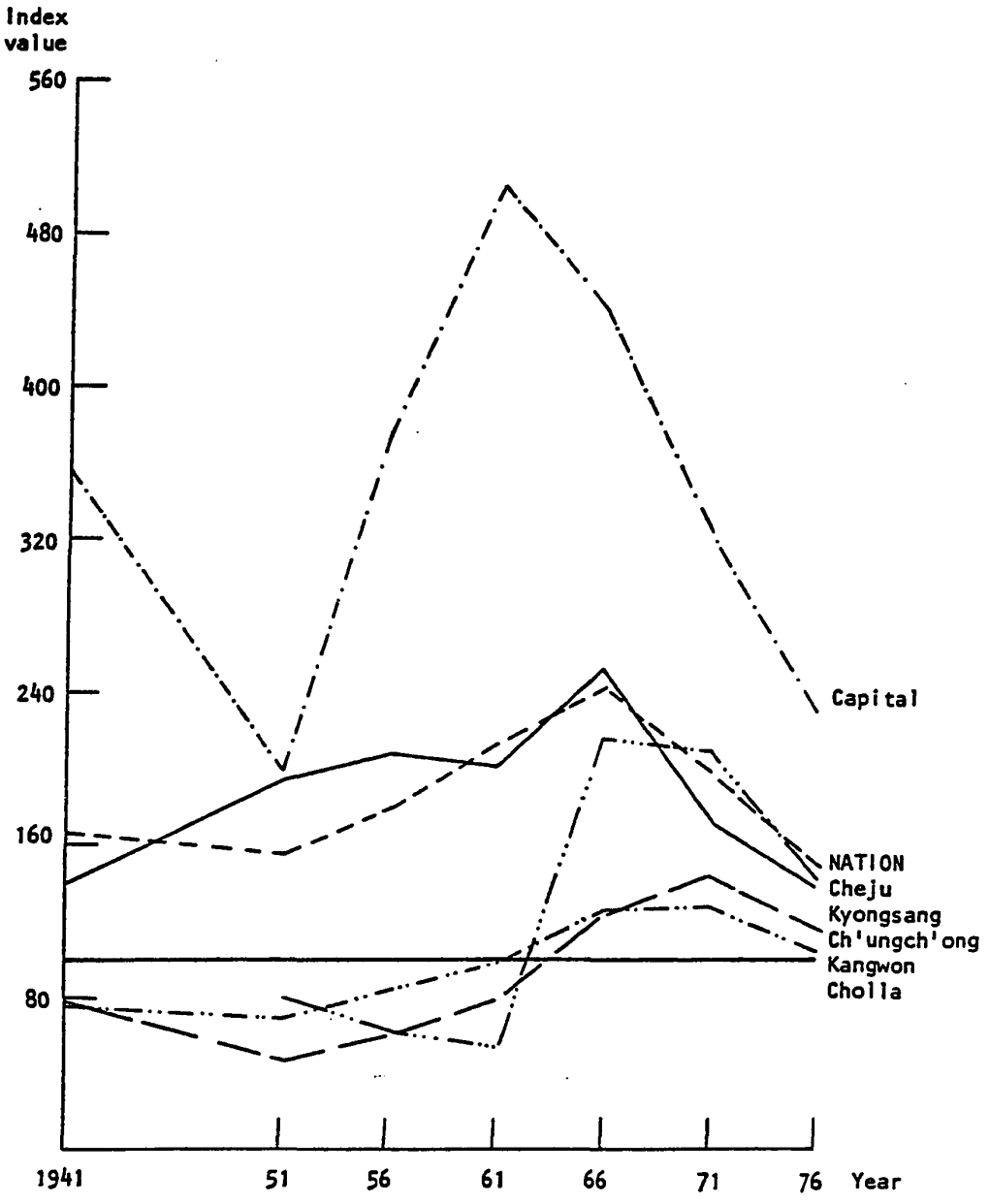

FIGURE 8. -- OVERALL INFRASTRUCTURE DEVELOPMENT

virtually all Koreans below 50 years of age are literate.[23] The rapid industrial growth which occurred in the 1960s was achieved because the population was relatively well educated and achievement-oriented. Per capita government investment on education, mainly through the central government's educational special account, is approximately $11 a year, higher than that of other countries at a similar stage of development.[24]

Variations in school enrollments and stocks of educated manpower may thus be another reason for different levels of regional development. As shown in Figure 9, in 1941 most of those enrolled in high school were concentrated in Seoul and its surrounding area. The other regions had similar enrollment ratios, except for the Kangwon region whose rate was even less than that of the Cholla region. Differences in enrollment between the Cholla and Kyongsang regions, however, increased until 1956, when began to decrease steadily. By 1976 the spatial distribution of high school enrollments had converged more than that of manufacturing, infrastructure and agricultural development.

In contrast, the distribution of highly educated manpower and human capital stocks reveals a quite different pattern. Although these data are available only from the Population and Housing Census after 1960, the trend toward regional disparity did not decline in the late 1960s and early 1970s. Divergence in the ratio of highly educated people[25]

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[23] Hasan, op. cit., p. 33

[24] Ibid., p. 34.

[25] Highly educated people include graduates of high school, and both graduates and drop-outs of junior college and above. In other words, they attained formal education of 12 years and over. The ratio is based on the number of highly educated to population over 6 years of age.

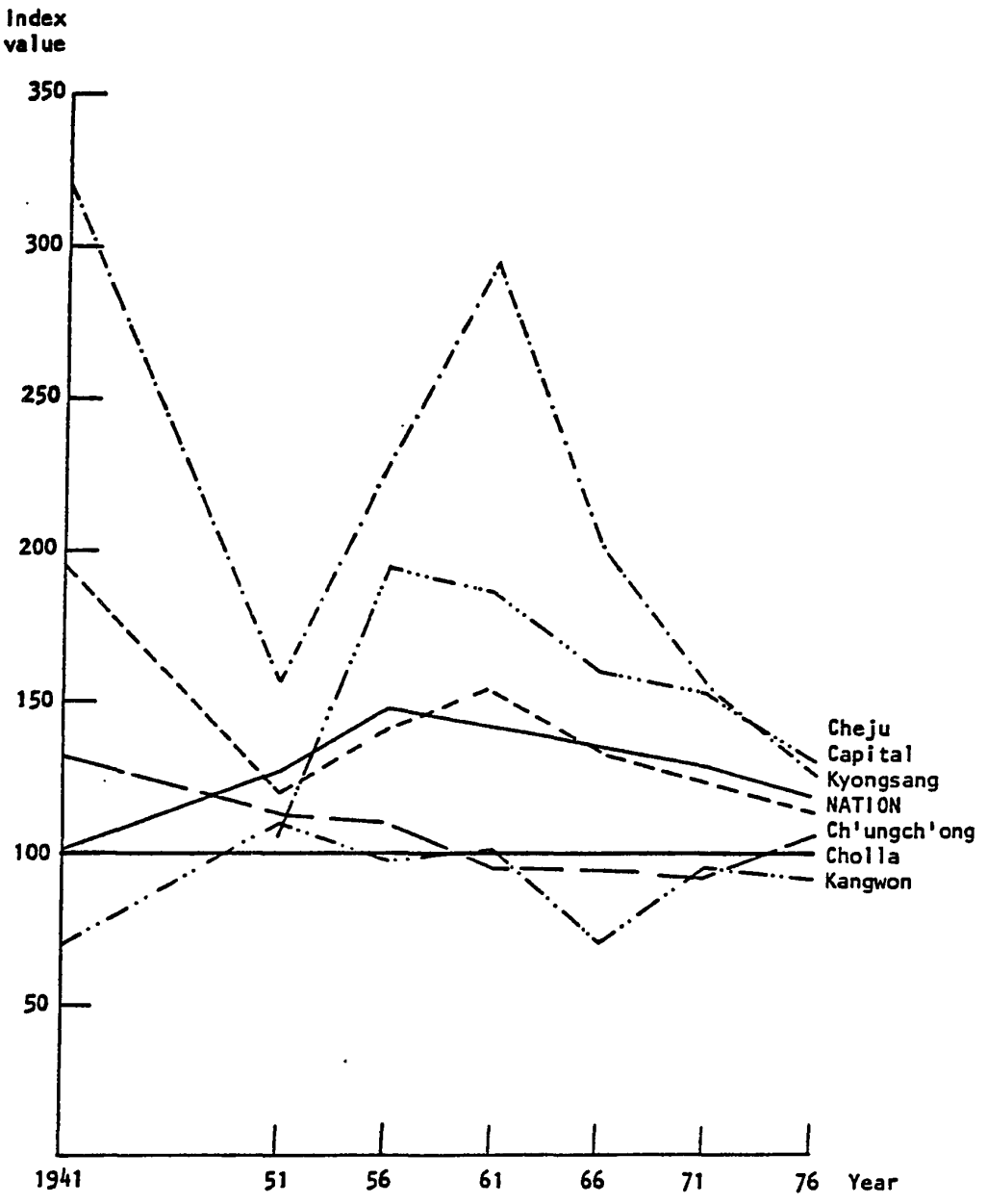

FIGURE 9. -- NUMBER OF HIGH SCHOOL ENROLLMENTS

and the percentage of professional and managerial workers between the Cholla region and the Kyongsang region probably reflects differences in labor mobility (Tables 10 and 11). The Kyongsang region appears to have received high quality manpower in terms of educational attainment as compared to the Cholla region.

According to Jeong,[26] between 1960 and 1971 the annual growth rate in the stock of human capital was 7.9 percent, which was slightly higher than the rate of growth for physical capital (6.8 percent). He argued that Korea has accumulated a huge amount of human capital. His calculations, based on various assumptions, of the total costs of education consisted of direct educational expenditures and opportunity costs, which are foregone earnings of students while attending school. Direct educational expenditures are, in turn, composed of in-school expenditures such as tuition, registration fees, training expenses, and government subsidies, and out-of-school expenditures such as expenses for books, stationery, transportation, and room and board. Opportunity costs were calculated on the basis of differentials in earnings by different educational levels. Based on his analytical methods and using the Population and Housing Census data, the spatial distribution of human capital stocks was estimated[27] and is shown in Table 12.

For the period 1960-75, per capita stocks of the Capital region were

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[26]Jeong, Chang Young. (1977). "Rates of Return on Investment in Education," in Chuk Kyo Kim (ed.), Industrial and Social Development Issues. Seoul: Korea Development Institute. pp. 257-302.

[27]Total educational costs per student with different years of schooling were assumed same in 1966, 1970, and 1975. Jeong also assumed that the total costs per student were same in 1966 and 1971.

TABLE 10

INDEX VALUES OF HIGHLY EDUCATED PEOPLE

Region	1960	1966	1970	1975
Nation	154.5	158.9	163.6	168.6
Capital	280.1	283.4	273.7	268.1
Kangwon	121.4	122.7	116.1	111.8
Ch'ungch'ong	100.3	99.1	96.4	96.3
Cholla	100.0	100.0	100.0	100.0
Kyongsang	146.9	139.8	141.9	148.4
Cheju	133.4	157.8	149.1	146.8

Source: Ch'ong inku mit chutaek chosa poko (Population and Housing Census). Seoul: Economic Planning Board, 1960, 1966, 1970 and 1975.

TABLE 11

INDEX VALUES OF PROFESSIONAL AND MANAGERIAL WORKERS

Region	1960	1966	1970	1975
Nation	156.9	151.4	143.1	146.4
Capital	275.0	260.1	233.3	229.3
Kangwon	160.0	132.9	104.2	110.4
Ch'ungch'ong	140.5	125.5	101.4	94.3
Cholla	100.0	100.0	100.0	100.0
Kyongsang	152.2	136.2	124.3	131.4
Cheju	102.2	106.6	120.1	115.7

Source: As in Table 10.

TABLE 12

INDEX VALUES OF HUMAN CAPITAL STOCKS

Region	1960	1966	1970	1975
Nation	140.6	143.4	147.5	143.1
Capital	235.9	242.3	231.7	204.9
Kangwon	115.5	109.5	108.1	104.0
Ch'ungch'ong	102.8	98.8	98.4	100.6
Cholla	100.0	100.0	100.0	100.0
Kyongsang	132.6	128.9	131.8	131.3
Cheju	132.1	129.9	124.9	119.3

Source: As in Table 10.

always at least twice that of the Cholla region, which had the lowest level in 1975. Differences between the Cholla region and the Kyongsang region have been to some extent steady throughout the period. Variations in overall level of educational development, including stocks of human capital, the ratios of highly educated manpower and professional and managerial workers, are shown in Table 13. Only the Ch'ungch'ong region has experienced the 'brain-drain' more than the Cholla region since 1970; the Kyongsang region has usually been favored by highly educated workers.

Overall Levels of Regional Development

Regional disparities can also be measured in monetary items, such as by bank deposits and local taxes. Bank deposits, representing savings, provide a measure of cumulative wealth, while local taxes measure the

TABLE 13

INDEX VALUES OF OVERALL EDUCATIONAL DEVELOPMENT

Region	1960	1966	1970	1975
Nation	150.7	151.2	151.4	152.7
Capital	263.7	261.9	246.2	234.1
Kangwon	132.3	121.7	109.5	108.7
Ch'ungch'ong	114.5	107.8	98.7	97.1
Cholla	100.0	100.0	100.0	100.0
Kyongsang	143.9	135.0	132.7	137.0
Cheju	122.6	131.4	131.4	127.3

Source: As in Table 10.

average level of aggregate income. Between 1941 and 1976 bank deposits per capita have been heavily concentrated in the Capital region, where these are often more than ten times that of the Cholla region (Figure 10). The gap between the Cholla region and the Kyongsang region reached the peak in 1951 and declined from 1961 to 1971, and rose again thereafter. The level of the Kyongsang region was more than double that of the Cholla region in 1976. Although differences in local taxes per capita between the two regions are less than those for bank deposits per capita, the gap grew from 1966 to 1971 and then declined from 1971 to 1976. The lowest level was in the Kangwon region, which was the only region below the Cholla region in 1976 (Figure 11). The average level of combined bank deposits and local taxes per capita, which can be regarded as the economic indicator, indicates that the gap between the two regions declined from 1961 to 1966, and rose from 1966 to 1976.

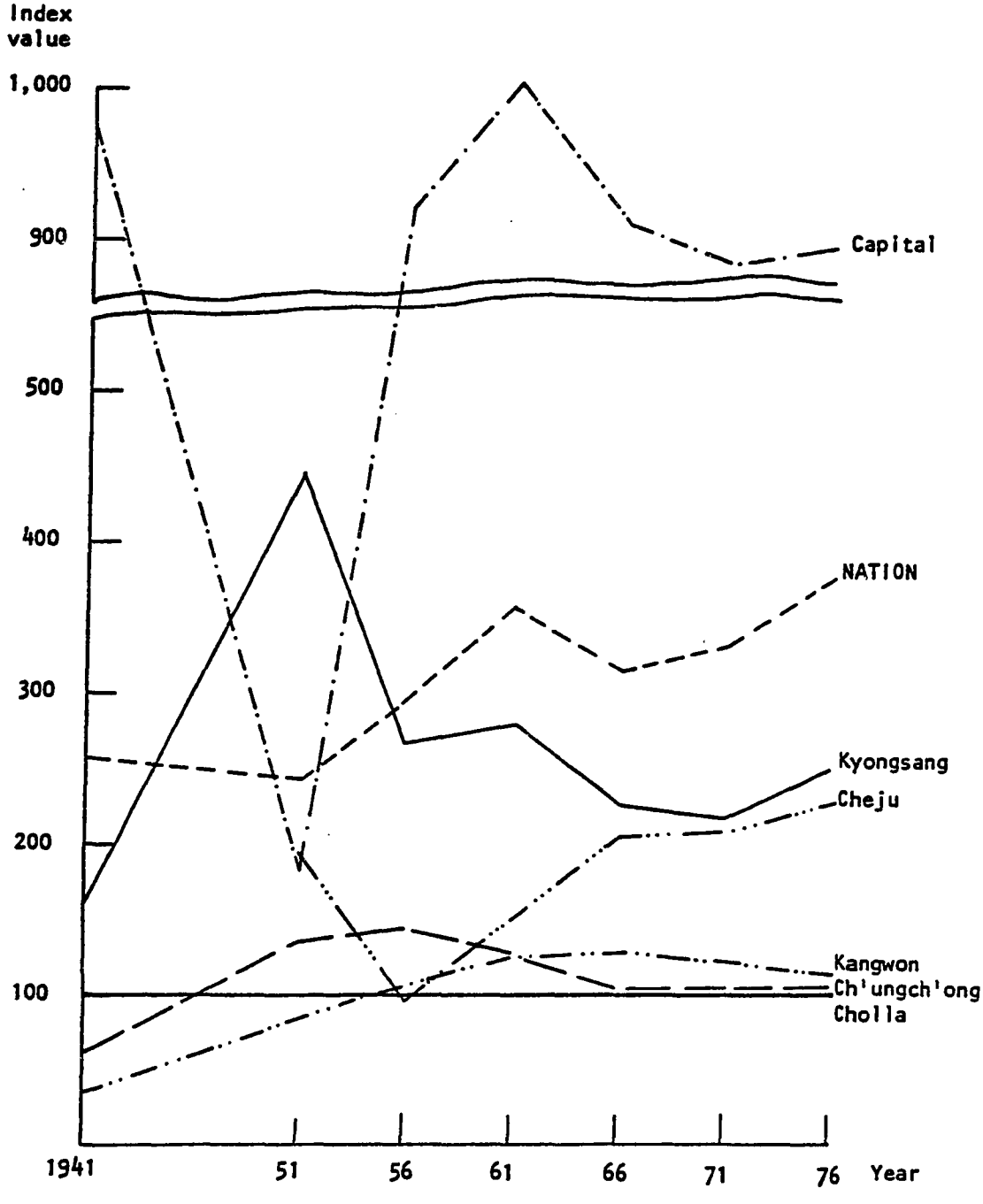

FIGURE 10. -- BANK DEPOSITS PER CAPITA

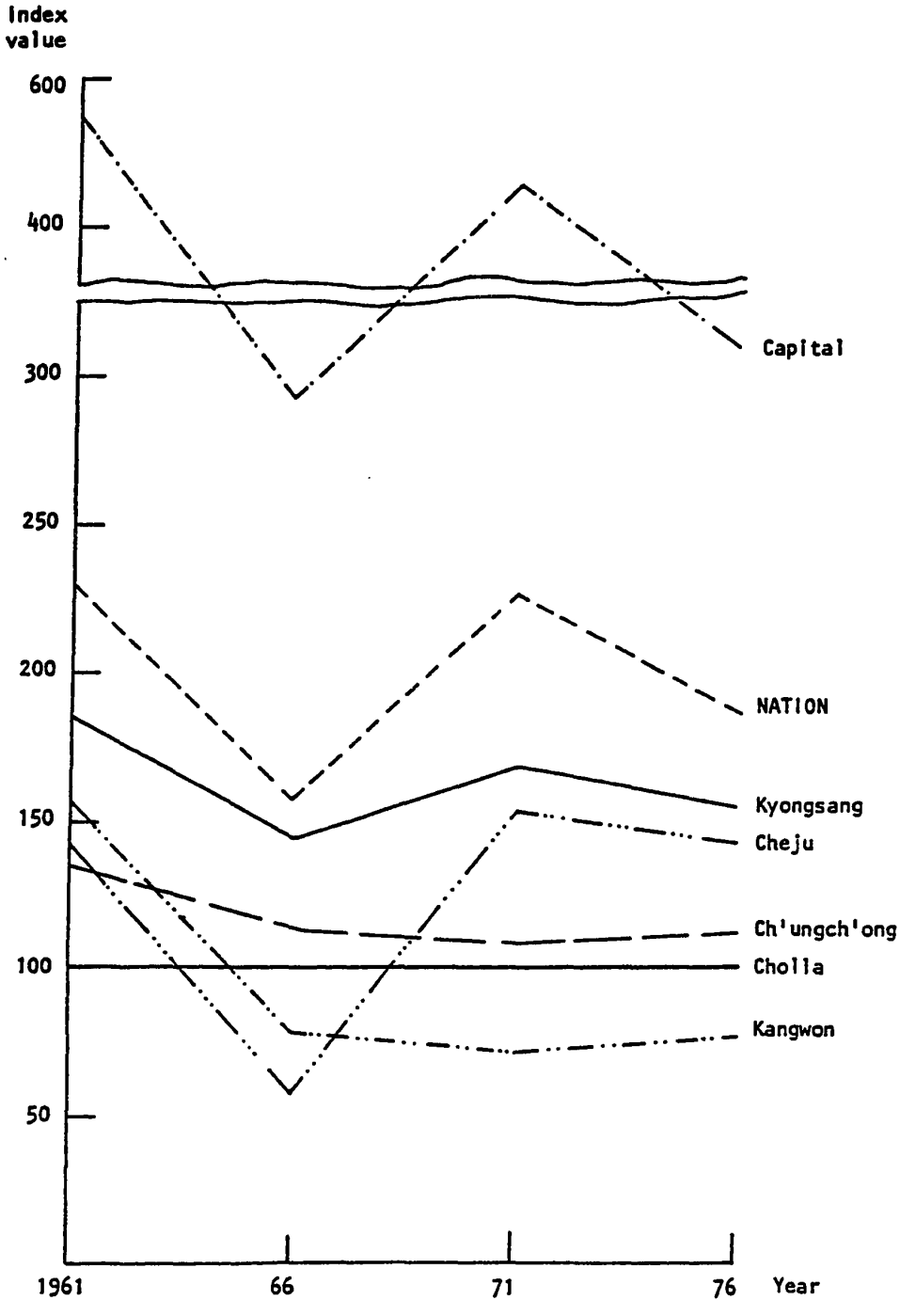

FIGURE 11. -- LOCAL TAXES PER CAPITA

In addition, the dimension of social well-being such as mortality and housing ownership[28] is added to the economic indicator in order to measure the spatial distribution of overall socio-economic development. Overall levels of socio-economic development were calculated based on the average index values of bank deposits per capita, local taxes per capita, mortality, and housing ownership. Figure 12 shows that the Kangwon region was most underdeveloped in 1976, which was slightly less than the Cholla region. The disparity between the Cholla region and the Kyongsang region noticeably converged during the period 1961-66, but diverged from 1966 to 1971 and subsequently remained almost unchanged.

Finally, regional disparities can also be examined by variations in gross regional product (GRP) which represents the value of primary, secondary, and tertiary activities performed in a region, even though much of the informal sector is not counted in GRP. GRP per capita is, however, often used as a common denominator to compare different components of the economic system, in the sense that such production activities are the final results of complex interdependent political, economic and social systems. It would be thus possible, using GRP per capita, to compare the value of per capita production of the economy in one region with that in another.

Figure 13 illustrates the regional variations in GRP per capita for the period 1961-76. In 1961 the lowest GRP per capita was recorded in the Ch'ungch'ong region, which was slightly less than that of the Cholla region. The Cholla region has, however, become the poorest in the

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[28]The selection of these variables will be discussed in Chapter III.

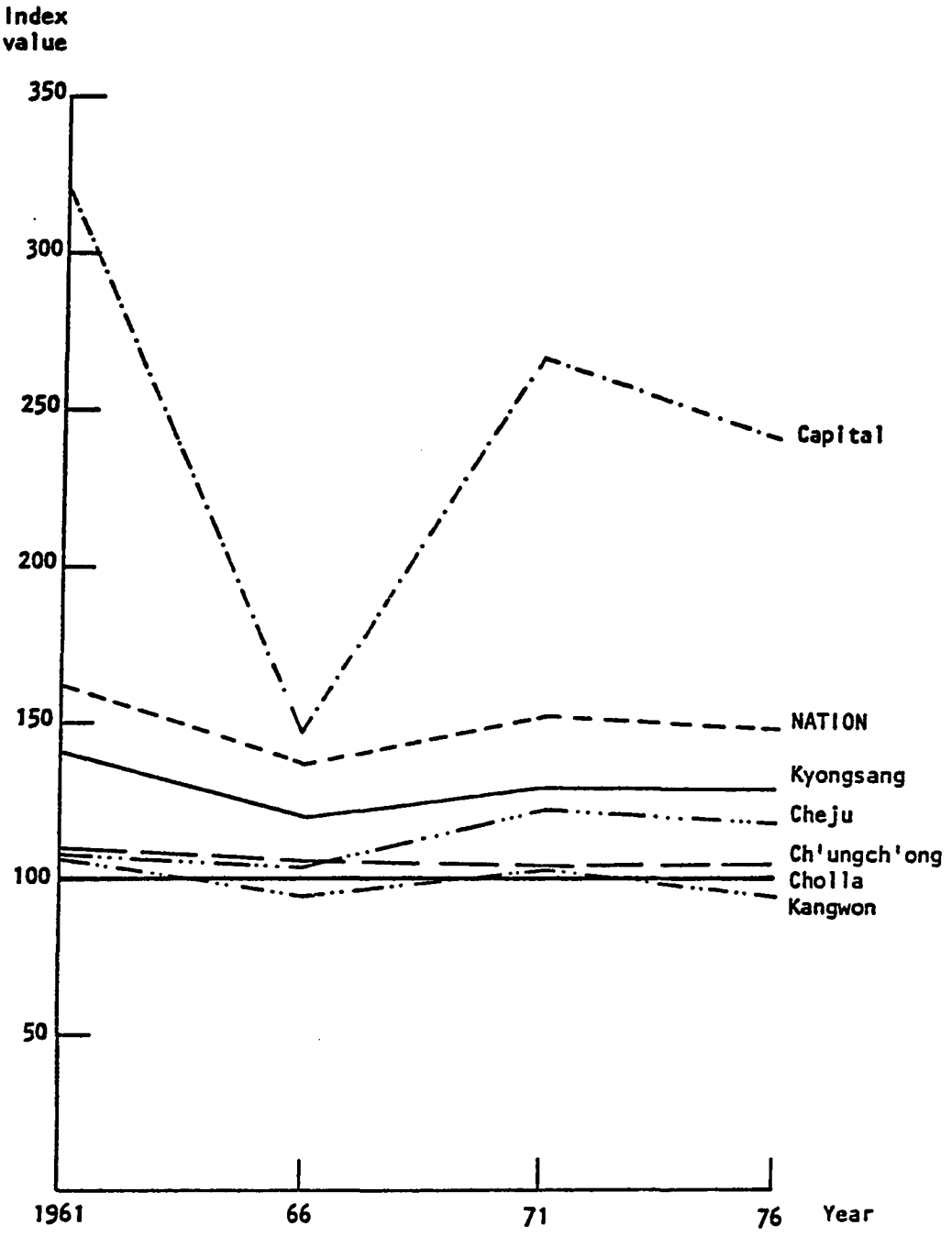

FIGURE 12. -- OVERALL SOCIO-ECONOMIC DEVELOPMENT

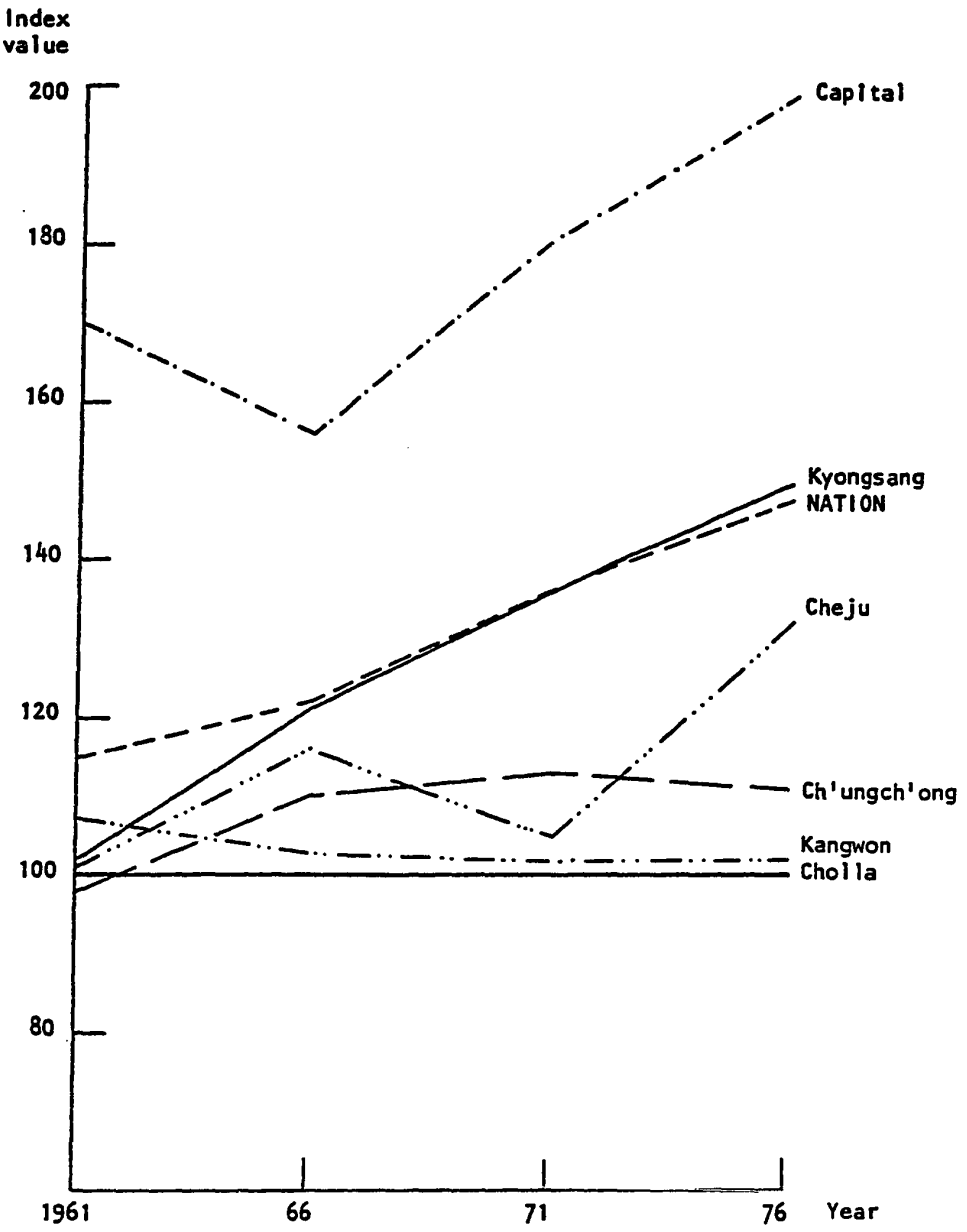

FIGURE 13. -- GROSS REGIONAL PRODUCT PER CAPITA

country since 1966. Furthermore, the gap between the Cholla region and the Kyongsang region has aggravated since 1966. Measures of regional development, such as GRP per capita and bank deposits per capita, revealed a pattern of divergence, particularly since the latter half of the 1960s. In other words, since the beginning of the second five-year economic development plan the aggregate level of economic development between the Cholla region and the Kyongsang region has accelerated, even though levels of manufacturing output in terms of value added per capita and infrastructure development for the two regions seemed to converge in the first half of the 1970s.

The Gini coefficient is often used to measure the distribution of income within a country over time. This coefficient is determined by the area between the Lorenz curve and the line of equality (45-degree line). Multiplying this 'area of inequality' by 2 gives the Gini's coefficient of inequality. It ranges between 0 and 1.[29] Thus the higher the value of the coefficient, the more unequal is income in the country. Using the Gini coefficient, Choo[30] estimated the overall size distribution of Korea from 1965 to 1976, based on city and farm household income and expenditure surveys. This coefficient declined from 0. 3439 in 1965 to 0.3322 in 1970 and then rose to 0.3808 in 1976. The result reveals a slight tendency toward improvement during the period 1965-70, but rapid

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[29]Alker, Hayward R. Jr. (1970). "Measuring Inequality," in Edward R. Tufte (ed.), The Quantitative Analysis of Social Problems. Massachusetts: Addison-Wesley. pp. 200-201.

[30]Choo, Hakchung. (1978). Economic Growth and Income Distribution in Korea. Seoul: Korea Development Institute, pp. 22-38.

deterioration of income distribution during the period 1970-76 in Korea.

In addition, the degree of regional disparities can also be measured by Williamson's population-weighted coefficient of variation.[31] Given the GRP and population of each province (including two special cities), the coefficient of variation was calculated over the period 1961-76. The coefficient initially decreased from 0.337 in 1961 to 0.271 in 1966 and then increased to 0.305 in 1971 and to 0.324 in 1976. To some extent, this result is different from Choo's findings, particularly during 1965-70. The dissimilarity may be resulted from different sources of data employed. In any event, since the second half of the 1960s the overall level of regional disparities in Korea has deteriorated, which has been very similar to that for the Cholla region and the Kyongsang region examined in various ways. If the inverted U-hypothesis is true between the level of economic development and the degree of regional disparity in a country, it suggests that Korea's level of economic development is still in the early stage.

Regional Disparity between Localities in the Two Regions

The province or region as a whole is not necessarily the most appropriate unit of analysis for a study of regional disparity. Other

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[31] The equation used in this study is as follows: $V_w = \sqrt{\left(\sum_i (Y_i - \bar{Y}) \cdot f_i / n\right)} / \bar{Y}$, where V_w = weighted coefficient of variation; f_i = population of the ith province; n = population of Korea; Y_i = GRP per capita of the ith province; and $\bar{Y}$ = the nation's GNP per capita. See Williamson, op. cit., p. 11.

geographic units may represent different aspects of regional variations in development. It is thus necessary to examine smaller spatial units for a deeper insight to the problem. As a distinct human settlement, the individual city seems to be a useful unit of observation. As described earlier, data were compiled from 37 cities (including towns) in the Kyongsang region and 30 cities in the Cholla region for 1964, 1967, 1971, and 1975, according to the availability. Two economic indicators (bank deposits per capita and local taxes per capita) and two social indicators (mortality and housing ownership) were selected as surrogate measures of development.[32] The average score of two economic variables was used as a single economic indicator in the analysis of regional disparity by a one-way analysis of variance technique. Similarly, the social indicator and the overall indicator (the simple arithmetic mean) were separately used in the analysis of variance.

Table 14 shows the analysis of variance results for localities versus localities of the Cholla region and the Kyongsang region. Among other indicators, the overall indicator has the largest F-value throughout the period but 1964, which indicates a significant difference between the two group (i.e., region) means. In 1964 there was no significant difference between the two regions at all, as indicated by very low F-value. The level of significance, however, increased in 1967 and subsequently decreased in 1971. This may indicate that regional disparity between the two regions converged during 1967-71. By contrast,

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[32]All data were transformed into Z-scores for one-way analysis of variance and multiple regression in Chapters IV and V. The procedure and the criteria for the selection of these variables will be discussed in Chapter III.

TABLE 14

ANALYSIS OF VARIANCE RESULTS FOR REGIONAL DISPARITY BETWEEN LOCALITIES

Year	Indicator	D.F.	F-value	E^2
1964	Economic	1, 62	0.48	0.007
	Social	1, 65	0.38	0.006
	Overall	1, 62	0.01	0.000
1967	Economic	1, 61	5.39*	0.08
	Social	1, 65	9.07*	0.12
	Overall	1, 61	9.62**	0.14
1971	Economic	1, 58	4.39*	0.07
	Social	1, 65	1.02	0.02
	Overall	1, 58	5.92*	0.09
1975	Economic	1, 65	7.31**	0.10
	Social	1, 65	4.15*	0.06
	Overall	1, 65	11.91***	0.16

Note: *significant at 0.05.
**significant at 0.01.
***significant at 0.001.

the observed difference between the two group means was highly significant in 1975. In other words, variations between the Cholla region and the Kyongsang region were much wider than differences in the level of development among cities within these two regions. The gap again grew between 1971 and 1975.

The statistical significance, however, does not say anything about how different they may be. The effect of the region variable on the economic, social, and overall indicators can be measured in a simple way,

that is, by the correlation ratio, sometimes denoted as eta squared.[33] This is the ratio of the sum of squares for the group to the total sum of squares.[34] It thus represents the extent to which the variation within treatments (indicators) is explained by the region (among treatments). The higher the correlation ratios, the stronger the regional effects. The magnitude of correlation ratios shown in Table 14 also correspond with that of the F-value of the overall indicators. The ratio was zero in 1964, when there was thus no strong regional difference at all. It increased by 0.14 in 1967 and decreased to 0.09 in 1971, but again increased to 0.16 in 1975, even though the relationship between the region and measures of development was fairly weak. The relatively low correlation ratios may be due to either the transformation of all variables into the standardized Z-scores or the relatively large number of observations.

In any event, the results investigated by the analysis of variance between the two regions are to a greater extent consistent with earlier findings examined by index values among regions in Korea. Multiple levels of analysis using different spatial units clearly verify that regional disparities between the Cholla region and the Kyongsang region have accelerated since the late 1960s or early 1970s, even though there are some fluctuations throughout the period.

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[33] Iversen, Gudmund R. and Helmut Norpoth (1976). Analysis of Variance. Beverly Hills: Sage, p. 32.

[34] The equation used in this study is as follows:
E^2 = 1 - (error sum of squares / total sum of squares).

The Kyongsang region is geographically closest to Japan, and has been most influenced in ways both good and bad from the Korean point of view by contact with that country. During the Japanese colonial period, the Kyongsang region was the area most affected by the Japanese. Cultivation of rice, cotton, soybeans and other crops was expanded, railways, factories, and ports were constructed, and the Japanese came to reside in relatively large numbers.[35]

However, the Cholla region was not ignored. Kunsan was developed by the Japanese as a major port for shipping rice from the Honam Plain and until 1945 had a large Japanese population. Mokp'o is also a port city established during Japanese times. Although regional disparities between the two regions were recognizable dating back to the colonial period, their magnitude was not so phenomenal.

In addition, the Korean War (1950-53) also had far-reaching effect on the Kyongsang region. Korea became the scene of bloody battles which devastated the whole country except for the southeastern area. Refugees from the whole country, even from the North, came in flocks to the region and consequently two large cities, Pusan and Taegu,[36] emerged in this period. The rapid increase of mobility along with the concentration of political, economic and educational activities added a new vitality to this region during the war.

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[35]Bartz, Patricia A. (1972). South Korea. Oxford: Oxford University Press, pp. 161-162.

[36]The Special City of Pusan is the second largest city with the population of 2.5 million, and Taegu City is the third largest with 1.3 million people, according to the Population and Housing Census of 1975.

With the establishment of the Third Republic by President Park in 1963, the issue of economic development grew in importance and an accelerated growth of output was emphasized as revealed in a series of economic development plans. To keep pace with the increased domestic and external demands of manufactured goods, the government stated its intention to develop some growth centers in the Kyongsang region, based on the accumulated social overhead capital and the addition of new transport networks such as the nation's first four-lane freeway from Seoul to Pusan in 1970.

On the other hand, agricultural productivity lags generally behind manufacturing because of rapid technological absorption and capital accumulation in manufacturing sector. Furthermore, industrial development in Kwangju, the largest city in the Cholla region, has been restricted by remoteness and by poor road and rail connections to Seoul and Pusan. The second largest city, Chonju, has also lagged behind other major cities of the country in terms of value added per capita in manufacturing sector.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

Integrated Approaches to Socio-economic Indicators

As briefly discussed in Chapter II, measures of development are usually subject to criticism by social scientists and planners, because they are seldom consistent with a society's goals and values. In the 1950s national accounting measures such as gross national product (GNP), average growth rate in GNP and per capita income were heavily emphasized as indicators of a society's economic performance. The achievement of growth targets, however, too often failed to improve living conditions for the majority of people. One response at the international level to this tendency was the social indicators movement and a drive towards macrosocial accounting.[1] At the national level increasing public awareness of the regional disparities heightened by growth led to strong pressure on governments and planners to relieve its adverse by-products.[2]

With the growth of concern for equity as well as economic growth, the need for reliable information about the spatial distribution of

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[1] Young, Frank W. (1972). "Macrosocial Accounting for Developing Countries," Sociologia Ruralis. vol. 12, no. 3/4, pp. 288-301.

[2] Cant, R.G. (1975). "Territorial Socio-economic Indicators in Development Plans in the Asian Region," International Social Science Journal. vol. 27, no. 1, p. 54.

economic and social welfare has arisen. Not only does the scope of such information differ from country to country and from region to region even within a country, there is also little consensus about the method of evaluating policy from a research perspective. According to the U.S. Department of Health, Education and Welfare,[3] a social indicator is defined as a statistic of direct normative interest which facilitates concise, comprehensive and balanced judgment about the condition of major aspects of a society. Therefore, social indicators are largely limited to phenomena that are observable and measurable. Despite the increasing recognition of the need for social indicators, economic indices of territorial welfare continue to prevail, since these are sometimes a pre-condition to the attainment of other goals. The indicator approaches can be thus extended so as to cover economic indicators as well as social ones.[4] Economic and social indicators employed in this study are surrogate measures of progress toward national goals which are considered important in developmental process.

According to Cant,[5] the main advantages of socio-economic indicators are their flexibility and the fact that they are capable of rapid and revision as new tasks are assigned and new information becomes available. Moreover, indicators may be used to describe development trends and

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[3]Cited from David M. Smith (1973). The Geography of Social Well-being in the United States: An Introduction to Territorial Social Indicators. New York: McGraw-Hill, p. 54.

[4]McGranahan, D.V. et al. (1972). Contents and Measurement of Socioeconomic Development. New York: Praeger, p. 10.

[5]Cant, op. cit., pp. 57-58.

analyze the inter-relationship between dependent and independent variables. These may also be used for prediction and for planning.[6]

Socio-economic indicators can be disaggregated, composite or representative.[7] Disaggregated indicators are usually selected to represent different components of a complex phenomenon. These components should be homogeneous, mutually exhaustive, and mutually exclusive. In the case of composite or aggregate indicators, a single indicator is derived by combining a number of components. Finally, a representative indicator is selected as the best measure of a particular phenomenon on the basis of certain criteria such as closeness of correlation with other indicators. In all cases the validation of the indicator depends upon the reliability, accuracy, and the consistency of its relationship to other development indicators. In this study, disaggregated and composite indices are used for both dependent and independent variables in identifying development factors in the Cholla region and the Kyongsang region over time.

As in the case of the examination of regional disparities in Chapter II, the obtrusive measures of development are excluded because of practical rather than theoretical considerations. In Korea, as in most other developing countries, attitudinal surveys have not yet been widely attempted. Newspaper agencies occasionally inquire of people's satisfaction or desires such as housing, education, environmental

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[6]Baster, Nancy. (1972). "Development Indicators: An Introduction," in Nancy Baster (ed.), Measuring Development: The Role and Adequacy of Development Indicators. London: Frank Cass. p. 5.

[7]Ibid., p. 4.

pollution and income disparities through public opinion polls.[8] Such surveys are, however, generally designed to detect nationwide patterns so that regional variations in local residents' attitudes cannot be reliably ascertained. Furthermore, attitudinal surveys reveal divisions of opinion which are difficult to construct into quantitative indicators, and a more practical difficulty lies in the small size of the task of surveying attitudes.[9] Nevertheless, objective socio-economic conditions and personal perceptions of well-being may be treated from different points of view.[10] In any event, there is probably a substantial correlation between general socio-economic conditions and the levels of well-being perceived by people, as pointed out by Schlegel.[11] Whether this argument is conclusive or not, the socio-economic indicators perspective is limited in Korea to unobtrusive measures.

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[8]For example, Joong-ang Daily Newspaper Agency conducted public opinion polls on a nationwide scale, the results of which were reported on September 24, 1979. According to this survey, Korean people perceived that price stability was the most serious problem to be overcome. In addition, income disparity between the rich and the poor (rather than among regions), difficulty of enrollment in higher education, protection from crime, and housing shortage, in the descending order, were their most important concerns.

[9]Coates, B.E. et al. (1977). Geography and Inequality. Oxford: Oxford University Press, p. 58.

[10]For example, see Frank M. Andrews and Stephen B. Withey (1976). Social Indicators of Well-being: American's Perceptions of Life Quality. New York: Plenum Press. Their purposes are to find valid and efficient ways of measuring the perceptions, to suggest way these measurement methods could be implemented to yield a series of social indicators, and to provide some information about the levels of well-being perceived by Americans.

[11]Schlegel, Charles C. (1978). Social Indicators and Social Structure in Peninsular Malaysia. Unpublished Ph.D. dissertation, Cornell University, p. 14.

The Economic and Social Indicators: Dependent Variables

As mentioned previously, development involves not only improvements in social well-being, but also changes in structure. In order to identify static and dynamic factors of development in the Cholla region and the Kyongsang region, it is necessary to examine the causal relationship between these factors and end results in development. The dependent variables in this study--those whose variations to be explained--are economic and social indicators of cities and towns in the two regions. Four dependent variables were arbitrarily selected as end results in development in connection with the availability of relevant data. The economic indicators include local taxes per capita and bank deposits per capita, while the social ones consist of mortality (crude death rate) and housing ownership. All variables selected are assumed to be attributes of level of socio-economic conditions for an individual.

Material well-being, generally expressed in terms of income and wealth, can be seen as in terms of full command over material resources. In this respect, individual or household expenditures may also be an appropriate measure of material well-being. Data about expenditures are, however, rarely available by city and town over time in Korea. Instead local taxes[12] are used in this study, since these may reflect an aggregate sum of individual incomes. Furthermore, each item of local

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[12]The items of local taxes include personal income, corporation income, resident tax, business tax, acquisition tax, automobile tax, entertainment and restaurant tax, slaughter tax, permission tax, parimutuel tax, property tax, farm land tax, and objective tax.

taxes is collected on the basis of the same rate throughout the country. This enables one to examine consistent variations in local taxes among localities in the two regions.

On the other hand, bank deposits, which represent savings, may provide a measure of cumulative wealth, even though savings do not necessarily indicate people's material possessions or resources. Income and wealth as used here may reflect not only the importance of money to provide access to the goods and services that fulfill needs and bring satisfaction, but also the importance of the capacity for self-support as measures of personal status in a society. Therefore, the economic indicators can be regarded as the level of economic achievement.[13]

Income is closely related to health and housing.[14] Mortality is used as an indicator of health levels, even though infant mortality, toddler mortality or maternal mortality may be better indicators of overall health condition of a society.[15] Unfortunately, these statistics are not available by city and town in Korea. Instead crude death rate was used in this study as a proxy for health level. This mortality is regarded as a negative variable, i.e., the higher its value, the lower the level of health condition.

Housing is one of the basic needs of human beings. In Korea, as in most developing countries, the housing shortage is very severe and

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[13]Smith, op. cit., p. 80.

[14]Coates et al. op. cit., p. 43.

[15]Schlegel, op. cit., pp. 49-50.

demand always exceeds supply. The physical level of housing conditions in this study is not measured by structural conditions or the availability of plumbing amenities because of the difficulties of enumeration and the lack of such data. It is measured by ownership, since no other data on housing conditions, such as overcrowding (persons per room) and the number of slum dwellings, are available.

The Hypotheses: Independent Variables

Among the factors usually given for regional disparities between leading and lagging regions are differences in (i) their industrial structure; (ii) their infrastructural facilities; (iii) their human capital; (iv) their private investment; and (v) the way they are affected by development policy. On the basis of these considerations, the following null hypothesis and alternative hypotheses were derived. Each was in turn used as independent variables in a series of regression analyses.

1) The degree of regional development is expected to be greater in industrialized regions than in agricultural regions.

Industrialization has usually been regarded as the golden remedy for 'underdevelopment' for more than a generation. This argument has been reinforced by the historical experience of Europe and North America, and of other industrialized countries like Japan.[16] The major transformation has traditionally been from primary to secondary and tertiary sectors. Productivity differs between sectors and changes at different rates.

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[16] Brookfield, Harold. (1975). Interdependent Development. Pittsburgh: The University of Pittsburgh Press, pp. 70-74.

The more developed Kyongsang region has substantially transformed from agriculture to manufacturing and services, while the less developed Cholla region has remained little changed as a major agricultural region of Korea. In this study, the sectoral distribution is defined as the ratios of production in the primary, secondary, and tertiary sectors of the region to its gross regional product (GRP).

2) The degree of regional development is expected to be greater where there are more infrastructural facilities. Many insist that the provision of critical facilities in designated areas, such as transport networks, water supply, health and communication facilities, is one of the most important keys to the developmental process to regions.[17] Infrastructure investment can act as a stimulus, providing a necessary, if not sufficient, condition for local productive investment. The improvement of infrastructural facilities is thus supposed to help establish conditions favorable for private investment and set in motion a self-sustaining process of regional growth.

Transport network in this study is meant to include national and

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[17]For example, see John Friedmann (1973). Urbanization, Planning, and National Development. Beverly Hills: Sage, pp. 245-246; William R. Stanley (1971). "Evaluating Construction Priorities of Farm-to-Market Roads in Developing Countries: A Case Study," The Journal of Developing Areas. vol. 5, no. 3 (April), pp. 371-400; William Alonso (1975). "Location Theory," in John Friedmann and William Alonso (eds.), Regional Policy: Readings in Theory and Applications. Cambridge: M.I.T. Press. pp. 35-63; Edward J. Taaffe et al. (1963). "Transport Expansion in Underdeveloped Countries: A Comparative Analysis," Geographical Review. vol. 53, no. 4 (October), pp. 503-529; Herbert C. Weinand (1973). "Some Spatial Aspects of Economic Development in Nigeria," The Journal of Developing Areas. vol. 7, no. 2 (January), pp. 247-264; and A.J. Youngson (1967). Overhead Capital: A Study in Development Economics. Edinburgh: University Press.

local highways and freeways[18] which connect junctions and termini. According to graph theory, the connectivity of each vertex (or node) in a region can be measured by the Shimbel index, which represents the total number of routes to connect each vertex in the region with all other vertices in the network by the shortest path.[19] The connectivity variable is also regarded as a negative variable, like mortality. It allows to look either at the system as a whole or at individual parts of the whole.[20]

Water supply is simply defined as the percentage of households provided by piped water supply, not as water consumption per capita, because of data limitations. On the other hand, communication facilities are measured by the number of telephone subscriptions per 100 people. Finally, health facilities are measured by the number of health personnel including physicians, herb doctors, dentists, midwives and nurses per 1,000 people because of data limitations, even though the number of hospital beds may be a more direct measure of health facilities.

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[18]The Seoul-Pusan Freeway (22.4 m wide, 428 km long), passing through the Kyongsang region, was opened in 1970. The Honam Expressway (10.7-13.2 m wide, 260 km long) running from Taejon to Sunch'on in the Cholla region was completed in 1973, and extended to Pusan (10.7-13.2 m wide, 177 km long) as the Namhae Expressway in the same year. The Namhae Expressway is one of the two main networks which connect the two regions.

[19]Bradford, M.G. and W.A. Kent (1977). Human Geography: Theories and Their Applications. Oxford: Oxford University Press, pp. 93-96; Carter, F.W. (1969). "An Analysis of the Medieval Serbian Oecumune: A Theoretical Approach," Geografiska Annaler. vol. 51B, no. 1, pp. 39-56.

[20]Garrison, William L. (1960). "Connectivity of the Interstate Highway System," Papers and Proceedings of the Regional Science Association. vol. 6, pp. 121-137.

3) The higher the level of human capital formation, the greater is the degree of regional development that should be expected. One of the major shifts in economics during the last two decades has been the immense attention devoted to investment in human resources or, as some would refer to it, human capital. It is apparent that among the factors which contribute to economic growth, the quality of the human input ranks very high,[21] even though Carnoy[22] argues that education is not always an important contributor to economic development. As Hinderink and Sterkenburg[23] point out, in an industrial society, access to education may be a more important determinant of income inequality than in an agrarian society in which access to land is a crucial factor. Both formal and technical education can be seen as an investment[24] in human capital, which pays dividends not only in terms of economic development but also in terms of cultural development and social equality.[25]

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[21]Hanoch, Giora. (1967). "An Economic Analysis of Earnings and Schooling," The Journal of Human Resources. vol. 2, no. 3, pp. 310-329.

[22]Carnoy, Martin. (1977). "Education and Economic Development: The First Generation," in Manning Nash (ed.), Essays on Economic Development and Cultural Change in Honor of Bert F. Hoselitz. Chicago: University of Chicago Press. pp. 428-448.

[23]Hinderink, J. and J.J. Sterkenburg (1978). "Spatial Inequality in Underdeveloped Countries and the Role of Government Policy," Tijdschrift voor Economische en Sociale Geografie. vol. 69, nos. 1-2, p. 6.

[24]The attributes of educational achievement, completion, and quality are sometimes used as measures of development. But the accumulation of human capital should be regarded as an investment, like on-the-job training, rather than consumption. In the case of national accounting system, however, education is considered consumption.

[25]Becker, Gary S. (1962). "Investment in Human Capital: A Theoretical Analysis," The Journal of Political Economy. vol. 70, no. 5 (October), Part 2, pp. 9-49; Coates et al. op. cit., p. 13.

Investment in education can be measured by stocks of human capital. Data on stocks of human capital are, however, not available by city and town in Korea. Moreover, technical and higher education institutes are heavily concentrated in a few large urban centers. Instead the human capital of an area is measured by its number of high school graduates, the number admitted to institutions of higher education (colleges and universities), its enrollment in high schools, and its number of high school pupils per teacher.[26]

4) The more private investment activities in a region, the greater one would expect its degree of regional development to be. The capacity and willingness to undertake risks and to adopt innovations constitute the ingredients of private investment. Hirschman[27] and McClelland[28] have stressed the role of entrepreneurs in coordinating activities, bearing risks and uncertainties, and mobilizing the resources of developing countries. Private investment thus contribute to economic and social changes and its magnitude subsequently becomes one of major differentiating elements in regional development.[29] According to Pred,[30] the

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[26]Educational experts tend to agree on teacher-pupil ratio as an indicator of quality of education, on the assumption that the more attention to the individual student, the better the education. See McGranahan, op. cit., p. 101.

[27]Hirschman, Albert O. (1958). The Strategy of Economic Development. New Haven: Yale University Press.

[28]McClelland, David C. (1961). The Achieving Society. Princeton: D. Van Nostrand, pp. 231-233.

[29]Cochran, Thomas C. (1965). "The Role of Entrepreneur in Economic Change," Exploration in Entrepreneurial History. vol. 3, no. 1, pp. 25-38.

[30]Pred, Allan R. (1977). City-Systems in Advanced Economics. New York: John Wiley & Sons, pp. 22-26.

private entrepreneur engaged in investment activities is in a sense an organization, in other words a firm which provides job opportunities and controls capital and assets, since such activities involve risks and uncertainties. In this respect, the end results of private investment activities can be measured by capital per capita, tangible fixed assets per capita and the number of employees per capita in all industrial establishments of an area.[31]

5) Central government policies are expected to affect the spatial distribution of infrastructure, human development, and private investment. In almost all nations, the central government has profound spatial impact on development, because the central government has the funds, the power, and the capabilities to deal with regional problems, even though the effects of national development policy implementation on regional development are only rarely considered in an explicit manner.[32] A wide range of development actions has been taken by the central government of Korea, especially to expand exports through various incentives during the past decade. In Korea the central government's role is not merely to set the broad rules of the game and to influence the economy through indirectly market forces. The government seems to influence nearly all of the key economic decisions.[33] In order to examine the relationship between the

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[31]Data for some variables are not available. Tangible fixed assets are missing in 1964 and 1967, and capital in 1967.

[32]Coates et al. op. cit., pp. 214-223; Rodwin, Lloyd. (1978). "Regional Planning in Less Developed Countries: A Retrospective View of the Literature and Experience," International Regional Science Review. vol. 3, no. 2, pp. 113-131.

[33]Hasan, Parvez. (1976). Korea: Problems and Issues in a Rapidly Growing Economy. Baltimore: The Johns Hopkins University Press, p. 29.

central government's explicit policy and factors in regional development, the regional share of the nation's total exports is treated as an exogenous policy variable, and infrastructural, human resources and private investment factors are treated as endogenous variables that affect the level of development in each region.

Analytical Methods

On the basis of data collected on 67 localities in the two regions (Figure 14), all dependent and independent variables were transformed into standard scores known as Z-scores.[34] The Z-score is a linear transformation of the original data such that its mean becomes zero and its standard deviation becomes unity; more formally, it has unit variance. Transforming the values of a distribution into Z-scores does not change the shape of the original distribution; it simply changes the original units to standard deviation units.[35] Through this procedure, very dissimilar variables can be converted to a common basis of measurement.[36] This enables scores on different variables to be combined by simple addition, and negative variables such as mortality, road connectivity

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[34] The standard score (Z_i) is given by: $Z_i = (X_i - \overline{X})/S$, where X_i is the original value for observation i (the number of observations is 67 in this study), $\overline{X}$ is the mean for the variable, and S is the standard deviation.

[35] Wright, Sonia R. (1979). Quantitative Methods and Statistics. Beverly Hills: Sage, p. 73.

[36] Norcliffe, G.B. (1977). Inferential Statistics for Geographers. New York: John Wiley & Sons, pp. 61-62.

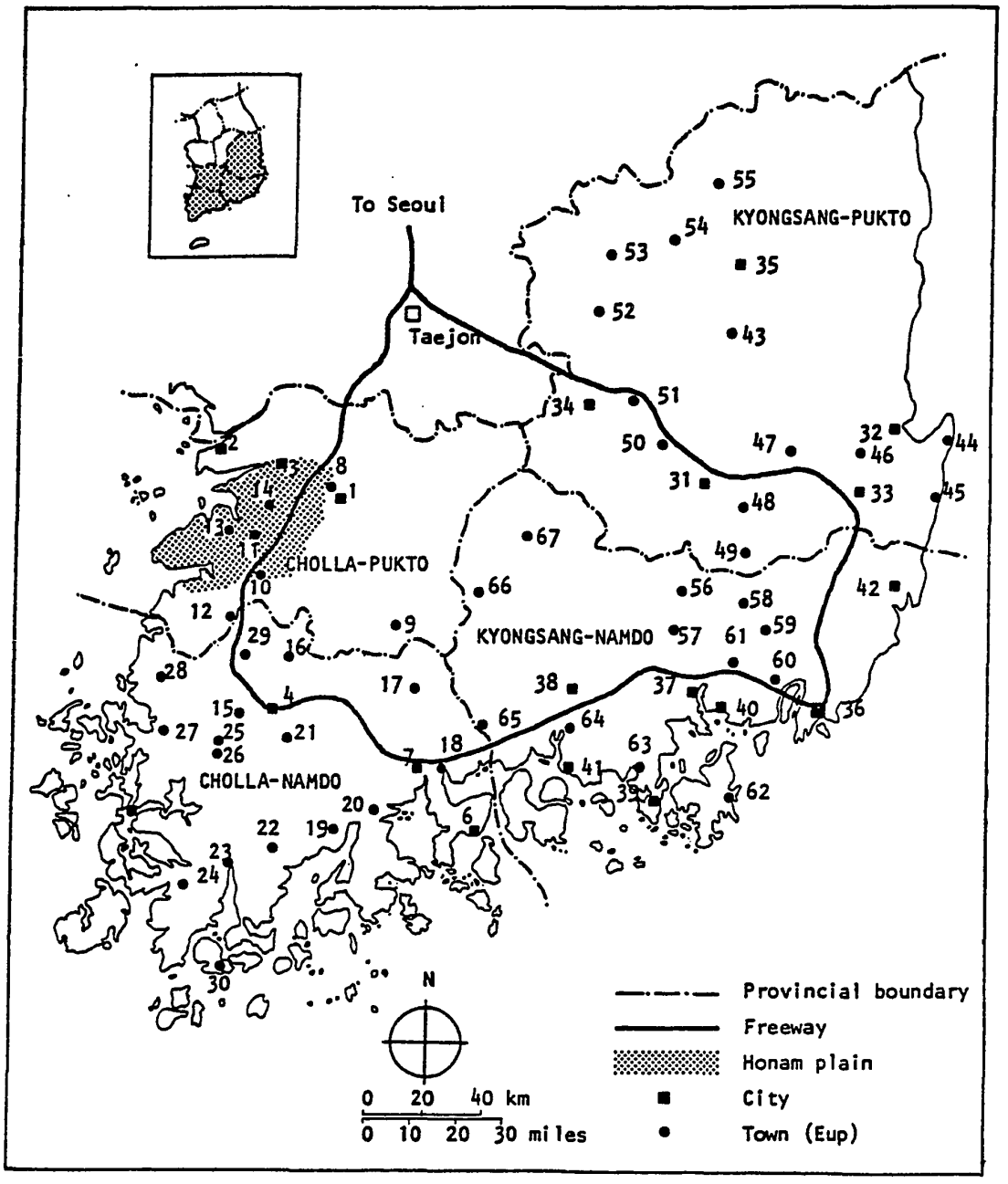

FIGURE 14. -- LOCATION OF CITIES AND TOWNS IN THE CHOLLA AND KYONGSANG REGIONS

Names of Cities and Towns

Cholla Region

1. Chonju
2. Kunsan
3. Iri
4. Kwangju
5. Mokp'o
6. Yosu
7. Sunch'on
8. Samrye
9. Namwon
10. Chongju
11. Sintaein
12. Koch'ang
13. Puan
14. Kimche
15. Songchong
16. Tamyang
17. Kurye
18. Kwangyang
19. Posong
20. Pulkyo
21. Hwasun
22. Changhung
23. Kangjin
24. Haenam
25. Naju
26. Yongsanp'o
27. Hamp'yong
28. Yongkwang
29. Changsong
30. Wando

Kyongsang Region

31. Taegu
32. P'ohang
33. Kyongju
34. Kimch'on
35. Andong
36. Pusan
37. Masan
38. Chinju
39. Ch'ungmu
40. Chinhae
41. Samch'onp'o
42. Ulsan
43. Uisong
44. Kuryongp'o
45. Kamp'o
46. Ankang
47. Yongch'on
48. Kyongsan
49. Ch'ongdo
50. Waekwan
51. Kumi
52. Sangju
53. Chomch'on
54. Yech'on
55. Yongju
56. Ch'angyong
57. Namji
58. Milyang
59. Samrangjin
60. Kimhae
61. Chinyong
62. Changsungp'o
63. Kosong
64. Sach'on
65. Hadong
66. Hamyang
67. Koch'ang

FIGURE 14. (Continued) LOCATION OF CITIES AND TOWNS IN THE CHOLLA AND KYONGSANG REGIONS

and pupil-teacher ratio can be easily manipulated by reversing their signs.

Based on this standard score additive procedure, three composite indicators for the dependent variables are constructed. The economic indicator is constructed by adding local taxes and bank deposits, and social indicator is by adding mortality and housing ownership. Similarly, the overall indicator is constructed by combining the economic and social indicators. Same procedures are applied to the independent variables. For example, the infrastructure variable is combined by road connectivity, public water supply, and the numbers of health personnel and telephone subscriptions.

In the process of constructing the composite development indicators and factors, equal weighting is given to each variable, since there is no sound theoretical principle and no evidence to do otherwise. The proper procedure for establishing the weighting system is to derive it from some hierarchy of values or preferences. Preferences of this nature are contained in a nation's development plan,[37] but these are not explicitly ranked.

The above hypotheses are examined by both two-way analysis of variance and the least significant difference (LSD) test, and the stepwise multiple regression technique. In testing the null hypothesis, the region was used as units of analysis through four time periods,

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[37]Drewnoski, Jan. (1972). "Social Indicators and Welfare Measurement: Remarks on Methodology," in Nancy Baster (ed.), Measuring Development: The Role and Adequacy of Development Indicators. London: Frank Cass. p. 87.

since the sectoral distribution of GRP is rarely available in smaller spatial units. A stepwise multiple linear regression model is subsequently employed, using the Z-scores for both dependent and independent variables aforementioned, in order to examine the reasons for regional disparities between the two regions.

Finally, Spearman's rank correlation technique[38] is applied to determine the strength of the relationship between the provincial contribution to the nation's total exports and these endogenous variables over time. In addition, qualitative indicators of regional bias, based on interviews, feelings, or views, and the distribution of public investment and high public officials by place of birth are also used to ascertain variations in implicit regional policy. Table 15 summarizes the research design and methodology.

Furthermore, a set of dummy variables[39] is introduced to the analysis. A dummy variable is simply a set of binary indicators consisting of 0's and 1's, which indicates whether a given locality (city or town) is located in the Cholla region or the Kyongsang region. Regional identity is therefore seen as one more variable which may further explain regional disparity. The purpose is simply to find out whether there are remaining variations in the level of regional development between the two regions

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[38]Spearman's rank correlation coefficient (r_s) is given by: $r_s = 1 - (6 \sum_i D_i^2 / N^3 - N)$, where N is the number of observations (11 in this study), and D is the difference between the two rankings of the first and second variables. See Norcliffe, op. cit., pp. 115-121.

[39]Belsley, David A. et al. (1980). Regression Diagnostics: Identifying Influential Data and Sources of Collinearity. New York: John Wiley & Sons, p. 10; Draper, Norman R. and Harry Smith (1966). Applied Regression Analysis. New York: John Wiley & Sons, pp. 134-142.

TABLE 15

SUMMARY OF RESEARCH DESIGN AND METHODOLOGY

Part I (Development factors)

Dependent variables	Independent variables	Analytical methods
1) Economic indicators a. local taxes per capita b. bank deposits per capita 2) Social indicators a. mortality (crude death rate) b. housing ownership	Null hypothesis: 1) Industrial structure Alternative hypotheses: 2) Infrastructure a. road connectivity b. water supply c. health personnel d. telephone 3) Human capital a. graduates of high school b. numbers admitted to colleges c. enrollments in high school d. pupil-teacher ratio 4) Private investment a. employment b. capital c. fixed assets	1) Two-way analysis of variance (region vs. time) and LSD test 2) Stepwise multiple linear regression (F test) Units of analysis 37 cities and towns in the Kyongsang region and 30 in the Cholla region

Part II (Regional Policies)

Exogenous variables	Endogenous variables	Analytical methods
1) Explicit policy 2) Implicit policy	1) Infrastructure 2) Human capital 3) Private investment	1) Rank correlation (2 special cities and 9 provinces) 2) Qualitative indicators

after all independent variables from both regions are taken into account. If significant differences do emerge, regional disparities between the two regions are probably due to regional location.[40] If the regional dummy variable does not provide additional significant explanation, then observed regional disparities are largely attributable to unspecified structural factors in the model.

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[40]Schlegel, op. cit., p. 77.

CHAPTER IV

STATIC ANALYSIS OF REGIONAL DEVELOPMENT

Testing the Null Hypothesis

The null hypothesis offered in this study is that different levels of regional development are associated with sectoral variations in regional production. As an aggregate measure, the sectoral distribution of regional output is measured by the index values of primary, secondary, and tertiary product, that is, the composition of GRP per capita. A two-way classification, consisting of 6 regions[1] on the one hand, and 4 discrete years (1961, 1966, 1971 and 1976) on the other, is employed here to test the null hypothesis by a two-way analysis of variance model.[2]

Table 16 shows an analysis of variance results for primary industry. It was expected that the F-value, computed by dividing the mean square of regions by the mean square of error, would be less than 7.57, the critical value of F at the significance level of 0.001 with 5 and 15 degrees of

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[1] Instead of 11 provinces (including 2 special cities), 6 regions were used here because Pusan became a Special City in 1963. Pusan is included in the Kyongsang region so that its effect can be taken into account in the analysis over time. The six regions are the Capital, Kangwon, Ch'ungch'ong, Cholla, Kyongsang, and Cheju.

[2] There is much in the literature about analysis of variance. For example, see Hubert M. Blalock (1960). Social Statistics. New York: McGraw-Hill, pp. 242-272; Robert R. Sokal and F. James Rohlf (1969). Biometry. San Francisco: W.H. Freeman, pp. 203-403; and Robert G. Steel and James H. Torrie (1976). Introduction to Statistics. New York: McGraw-Hill, pp. 276-295.

TABLE 16

ANALYSIS OF VARIANCE RESULTS FOR PRIMARY INDUSTRY (N=6)

Source of variation	Degrees of freedom	Sum of squares	Mean square	F-value	E^2
Years	3	1,883.0	627.7		
Regions	5	25,700.0	5,140.0	13.86***	0.78
Error	15	5,561.9	370.8		
Total	23	33,144.9			

***significant at 0.001.

Note: The discrete years can be grouped according to expected response when treated alike. Such a group is called a block. On the other hand, region is called treatment.

freedom. Since the calculated F-value of 13.86 exceeds the 0.001 rejection value of 7.57, the null hypothesis for primary industry is supported. Therefore, differences in agricultural production among regions appear to be more striking than expected. In addition, regional effect is strong because of fairly high correlation ratio (0.78).

Regional variations in the distribution of secondary and tertiary industries are shown in Tables 17 and 18 respectively. Again the calculated F-values indicate that regional differences in both secondary and tertiary production are significant at the 0.001 level, as marked by three asterisks, i.e., there are real differences among regions. Regional effect is particularly strong for tertiary industry (0.92). As a result, these tests support the alternative hypotheses.

Finally, a least significant difference (LSD) test[3] is applied to

[3]Sokal and Rohlf, op. cit., pp. 234-235.

TABLE 17

ANALYSIS OF VARIANCE RESULTS FOR SECONDARY INDUSTRY (N=6)

Source of variation	Degrees of freedom	Sum of squares	Mean square	F-value	E^2
Years	3	1,917.5	639.2		
Regions	5	38,662.5	7,732.5	25.31***	0.86
Error	15	4,582.0	305.5		
Total	23	45,162.0			

Note: ***significant at 0.001.

TABLE 18

ANALYSIS OF VARIANCE RESULTS FOR TERTIARY INDUSTRY (N=6)

Source of variation	Degrees of freedom	Sum of squares	Mean square	F-value	E^2
Years	3	134.2	44.7		
Regions	5	44,796.3	8,959.3	36.84***	0.92
Error	15	3,648.2	243.2		
Total	23	48,578.7			

Note: ***significant at 0.001.

find out whether there are significant variations in sectoral output between the Cholla region and the Kyongsang region. LSD is a single value which permits the investigator to determine whether any pair of means are significantly different. One of its advantages over the t-test is simplicity and elegance, according to Sokal and Rohlf.[4] Its formula

[4]Sokal and Rohlf, op. cit., p. 227.

is given by:

$$LSD = t_{\alpha(v)} \cdot \sqrt{2/n \cdot MS_{error}},$$

where $t_{\alpha(v)}$ is a selected level of significance of Student's t at α, with v degrees of freedom in the error mean square; n is the number of observations per block (6 in this study); and MS_{error} is the error mean square derived from the analysis of variance tables. Using this equation, the results of the LSD tests are given in Table 19. In the case of primary

TABLE 19

LSD TESTS BETWEEN THE TWO REGIONS

Industry	Degrees of freedom	α	LSD	MD*
Primary	15	0.05	29.0	31.1
Secondary	15	0.001	50.3	66.2
Tertiary	15	0.05	23.5	27.4

*MD stands for the difference of means in average index values of 4 years between the two regions.

industry, any two means differing by 29.0 are significantly different from each other at the significance level of 0.05. The LSD value indicates that the Cholla region differs significantly from the Kyongsang region in primary industrial output because the difference in means (31.1) is greater than LSD (29.0). Differences in the secondary sector between the two regions are even more highly significant than are those in the primary and tertiary sectors. In other words, there are much great differences in secondary industry than in primary and tertiary industries between the two regions throughout the period.

Stepwise Multiple Regression Analysis

The general linear (first-order) multiple regression model is

$$Y = a + b_o X_o + b_1 X_1 + b_2 X_2 + \ldots + b_n X_n + e,$$

where Y is the dependent variable, X_o is the dummy variable, the X's are the explanatory independent variables (predictors), a is the intercept or constant, the b's are the regression coefficients and e is the residual or error term. In general, the dummy variable (X_o) is not shown in the equation,[5] but it is sometimes included when geographic space is taken into account as an explanatory variable. The dependent variable is associated with the independent variables in a linear, first-order combination. For each independent variable, most computer programs calculate various statistics such as regression coefficients (b_i), standard errors of the coefficients ($S(b_i)$), and standardized regression coefficients ($b_i S_i / S_y$) which are sometimes called beta coefficients.

Stepwise regression procedures are used to find the best regression, involving the re-examination at every stage of the regression of the independent variables incorporated into the model in previous stages. A variable that may have been the most powerful single variable at an early stage may be rejected at a later stage because of the relationships between the variable and other variables in the regression at that time.[6] The order of entry of variables into the model

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[5] Draper, N.R. and H. Smith (1966). Applied Regression Analysis. New York: John Wiley & Sons, p. 128.

[6] Ibid., p. 171.

is determined by the preassigned F levels.[7] Any variable which does not provide a significant contribution is omitted from the model. This process is continued until no more variables are admitted to the model and no more are rejected. At the final stage of the procedure, the following values are derived for use in this study: (a) R^2, the multiple correlation coefficient; and (b) the partial F-statistic which is helpful in determining the relative importance of the selected independent variables.

Development Factors in the Cholla Region

In stepwise regression analysis specific and consistent reference to the individual relationships between each dependent and independent variable is not possible. Therefore, it is useful first to examine the simple correlation matrices. By examining the simple correlations of all independent variables with the dependent variable[8] for both regions and each of the two regions, it is possible to find out whether there is any deviation between patterns of each region and both regions taken together. While correlation does not directly establish a causal relationship but merely provides an empirical measure of the linear association between dependent and independent variables, it may furnish

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[7] Minimum acceptable F to enter and maximum acceptable F to remove are 4.0 and 3.9 respectively in BMDP2R version, on which this study is based.

[8] In order to avoid difficulties in interpreting the results and confusion, only the correlations between all independent variables and the overall indicator of development (dependent variable) are shown here.

clues to causes.[9]

Table 20 shows the simple correlation matrix of the Cholla region between the overall indicator of development and the independent variables used in the subsequent regression analyses. Immediately apparent is the increasing correlation between infrastructural facilities and the level of regional development. In comparison, the correlation of development with education and private investment has declined since 1967. Of particular interest in the differences between 1964 and 1975 correlations is that correlations in 1975 were higher for all three variables. The highest increase rate was recorded in the infrastructure variable. The importance of infrastructure seems to rise over time, while that of education and private investment decline.

In contrast, Table 21 indicates the combined effects on the independent variables using a stepwise multiple linear regression model. In 1964 the level of regional development in terms of economic and overall development was dependent upon infrastructural facilities, even though the variable accounted for less than 40 percent of the total variation. No social variables were admitted into the equation. Regression analysis based on individual variables rather than composite variables shows that communication facilities as measured by telephone subscriptions were the only infrastructural variable to be entered in the stepwise model. This is surprising in view of its relatively low correlation with

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[9]Gillard, Quentin. (1977). Incomes and Accessibility: Metropolitan Labor Force Participation, Commuting, and Income Differentials in the United States, 1960-1970. Chicago: The University of Chicago, Department of Geography Research Paper No. 175, p. 44.

TABLE 20

CORRELATIONS WITH THE DEPENDENT VARIABLE: OVERALL INDICATOR OF DEVELOPMENT IN THE CHOLLA REGION OVER TIME (N=30)

Independent variable	1964	1967	1971	1975
Connectivity*	.172	.041	.348	.266
Water supply	.351	.765	.712	.519
Medical personnel	.540	.107	.556	.474
Telephone subscrip.	.121	.563	.467	.455
INFRASTRUCTURE	.551	.540	.729	.656
No. of high s. gradu.	.656	.605	.542	.556
Admitted to colleges	.692	.753	.666	.706
No. of high s. enroll.	.680	.594	.542	.447
Pupil-teacher ratio	.316	.442	.444	.319
EDUCATION	.520	.712	.615	.600
Employment per capita	.207	.734	.107	.522
Capital per capita	.433	-	.554	.232
Assets per capita	-**	-	.630	.447
PRIVATE INVESTMENT	.374	.734	.560	.446

*Connectivity of each locality is calculated on the basis of a short-path matrix (67 x 67 matrix in this study). It is measured by the total number of edges needed to connect any vertex (locality) with all other vertices in the network by the shortest path. Row total of each vertex from the matrix is sometimes called the Shimbel index. Lower values indicate greater accessibility.

**Indicates missing data.

Note: The infrastructure variable is henceforth a composite index derived from its individual variables. The education and private investment variables are based on the same procedure.

TABLE 21

DEVELOPMENT FACTORS OF THE CHOLLA REGION OVER TIME (N=30)

Year	Dependent variable	Independent variable*	R^2
	Economic	Infra.	.381
1964	Social	-	-
	Overall	Infra.	.303
	Economic	Educ., Invest.	.781
1967	Social	-	-
	Overall	Invest., Educ.	.599
	Economic	Educ., Invest.	.641
1971	Social	Infra.	.204
	Overall	Infra.	.532
	Economic	Invest., Educ.	.761
1975	Social	-	-
	Overall	Infra.	.430

*The independent variables entered into the model are henceforth arranged in the order of their relative importance.

development shown in Table 20.

By contrast, the education and private investment variables were the only ones to be entered into the 1967 model. The level of economic development was primarily associated with the number of high school graduates and numbers admitted to colleges and universities, and to a lesser extent employment opportunities. The degree of explanation achieved was quite high, 78 percent as a whole. In other words, human capital was the most important determinant in economic development of the Cholla region in the late 1960s in terms of the results of the model.

In the 1971 model, the same composite variables were statistically significant in explaining economic development as in 1967, even though the variance explained was to some extent lower in 1971. Numbers admitted to colleges and universities were still important as was investment in tangible fixed assets, which together accounted for 64 percent. However, both social and overall development was mainly attributable to infrastructural facilities, especially public water supply.

The 1975 model included the same variables as in 1967 and 1971, with a change in the order of entry and thus their relative importance. Tangible fixed assets and numbers admitted to tertiary education institutes accounted for relatively high portion of the variance (76 percent). The infrastructure variable explained only 43 percent. In terms of the level of explanation achieved, private investment played a key role in development, and particularly in economic development, of the Cholla region in the 1970s.

Unfortunately, few variables were entered into the equations to explain variations in social development probably because of the counteracting effects of mortality and housing ownership. In contrast with mortality, housing ownership is usually less in relatively large cities than in small cities. These two combined variables may thus counteract each other so that the composite variable may not be satisfactory as a dependent variable. However, if these individual variables are disaggregated and used as the dependent variables in the regression analysis, then a few predictors account for most of the variance after the late 1960s, as shown in Table 22. In brief, social development in the Cholla region was largely associated with employment

TABLE 22

DEVELOPMENT FACTORS OF THE CHOLLA REGION WITH SOCIAL INDICATORS OVER TIME (N=30)

Year	Dependent variable	Independent variable	R^2
1964	Mortality	No. of high s. enroll.	.545
	Housing	Medical personnel	.266
1967	Mortality	Employ. p.c., water supply	.721
	Housing	Emp. p.c., no. of graduates	.646
1971	Mortality	Water supply, connectivity	.554
	Housing	Water supply, employ. p.c., medical personnel	.737
1975	Mortality	Capital p.c., employ. p.c.	.580
	Housing	Assets p.c., water supply	.614

per capita and water supply, whereas economic development in the region was closely related to private investment activities.

Development Factors in the Kyongsang Region

Table 23 shows the simple matrix of correlations between the level of overall development and the independent variables used in subsequent regression analyses in the Kyongsang region. The infrastructure and private investment variables had somewhat weak correlations, while the correlation for the education variable was in fact negligible in 1964. However, after 1964 private investment had a strong correlation with

TABLE 23

CORRELATIONS WITH THE DEPENDENT VARIABLE: OVERALL INDICATOR OF DEVELOPMENT IN THE KYONGSANG REGION OVER TIME (N=37)

Independent variable	1964	1967	1971	1975
Connectivity	.070	.043	.080	.138
Water supply	.395	.589	.561	.563
Medical personnel	.547	.324	.456	.491
Telephone subscrip.	.310	.675	.471	.449
INFRASTRUCTURE	.468	.592	.590	.600
No. of high s. gradu.	.011	.221	.023	.073
Admitted to colleges	.060	.472	.504	.507
No. of high s. enroll.	.327	.248	.186	.134
Pupil-teacher ratio	.151	.413	.315	.280
EDUCATION	.085	.380	.303	.299
Employment per capita	.422	.816	.659	.620
Capital per capita	.388	-	.654	.752
Assets per capita	-*	-	.713	.735
PRIVATE INVESTMENT	.451	.816	.745	.784

*Indicates missing data.

development. Compared to employment opportunities, the correlations for capital and tangible fixed assets have continuously increased, particularly in the first half of the 1970s. Infrastructure had relatively moderate correlations with the dependent variable in the early 1970s. Education had quite weak correlations with development throughout the period.

Correlations of the independent variables of the Kyongsang region differ to a great extent from those of the Cholla region. The private investment variable, which declined in magnitude in the Cholla region in the 1970s, was much higher in the Kyongsang region during the same period. Education had much weaker correlations in the Kyongsang region than in the Cholla region between 1964 and 1975. On the other hand, infrastructure was moderately correlated with development in both regions throughout the period.

The determinants of development in the Kyongsang region (Table 24) differ from those in the Cholla region, as might be expected by the differences in the simple correlation matrices. Private investment has clearly played the most crucial role in development of the Kyongsang region since 1967. Education has played a relatively minor role in regional development, particularly in comparison to the Cholla region. Variations in private investment activities nonetheless appear to be prominent factors in economic development of both regions. Regression analysis based on individual variables of private investment indicates that since the early 1970s capital has been a crucial factor in the Kyongsang region, while that tangible fixed assets have been important in the Cholla region.

TABLE 24

DEVELOPMENT FACTORS OF THE KYONGSANG REGION OVER TIME (N=37)

Year	Dependent variable	Independent variable	R^2
	Economic	Infra., Invest.	.471
1964	Social	-	-
	Overall	Infra., Invest.	.389
	Economic	Invest., Infra.	.719
1967	Social	-	-
	Overall	Invest., Infra.	.666
	Economic	Invest.	.684
1971	Social	-	-
	Overall	Invest.	.556
	Economic	Invest.	.674
1975	Social	Educ.	.312
	Overall	Invest.	.614

Table 25 shows the results of stepwise regression analysis with mortality and housing ownership as the dependent variables for all independent variables. In 1964 infrastructure and education were important factors, even though the level of explanation was less than 50 percent. Private investment and infrastructure variables in social development accounted for much more of the variance in 1975. Social development of the Kyongsang region seems to be associated mainly with employment opportunities and telephone service, and to a lesser extent with water supply.

In contrast to the Cholla region, transport networks in the Kyongsang region as measured by road connectivity have not played an important

TABLE 25

DEVELOPMENT FACTORS OF THE KYONGSANG REGION WITH SOCIAL INDICATORS OVER TIME (N=37)

Year	Dependent variable	Independent variable	R^2
1964	Mortality	Medical personnel, pupil-teacher ratio	.484
	Housing	Telephone subscrip., pupil-teacher ratio	.340
1967	Mortality	Employment p.c., telephone subscrip.	.600
	Housing	Telephone subscriptions	.411
1971	Mortality	Water supply, employment p.c.	.532
	Housing	Capital p.c., medical personnel	.555
1975	Mortality	Capital p.c., telephone subscriptions	.553
	Housing	Employment p.c., water supply, capital p.c.	.760

role in either economic or social development, despite the central government's efforts to open the nation's first freeway in 1970. Freeways may not improve substantially the connectivity of road networks, contrary to expectations, because of already established national and local highways, which provide web-like connections among localities. Instead freeways help reduce travel time and increase the vehicular capacity of service between large cities, as noted by Morrill.[10]

[10]Morrill, Richard L. (1974). The Spatial Organization of Society. North Scituate, Massachusetts: Duxbury Press (2nd ed.), p. 134.

Development Factors with the Regional Control Variable

As mentioned earlier, the regional dummy variable is used to determine the extent to which differences in development are associated with regional distinction after the independent variables of both regions, consisting of 67 localities, are taken into consideration. Table 26 shows the simple correlation matrix between the overall indicator of development and the independent variables including the regional dummy variable. First of all, the coefficients for three composite independent variables are more similar to those for the Kyongsang region, probably because of the larger number of observations in this region than in the Cholla region. The private investment variable had the highest correlations, except in 1964 when the infrastructure variable had somewhat higher correlation coefficient.

Correlations of the overall indicator with the regional dummy variable are not too strong. Nevertheless, it indicates that disparities attributable to their regional locations rose sharply from 1964 to 1967, declined by 1971, but again increased by 1975. Such shifts in the correlations of development with the regional control variable coincide exactly with the trend of regional disparities between the two regions examined by one-way analysis of variance as shown in Table 14.

Private investment and infrastructure were the dominant forces in all models for both regions, except in 1964 (Table 27). In 1967 development was associated with employment opportunities and public water supply, accounting for 72 percent of the variance in economic development. Their importance was still visible in 1975. Despite a fairly large number of

TABLE 26

CORRELATIONS WITH THE DEPENDENT VARIABLE: OVERALL INDICATOR OF DEVELOPMENT FOR BOTH REGIONS OVER TIME (N=67)

Independent variable	1964	1967	1971	1975
Connectivity	.119	.067	.239	.199
Water supply	.371	.693	.656	.586
Medical personnel	.476	.232	.435	.451
Telephone subscrip.	.244	.596	.408	.429
INFRASTRUCTURE	.503	.592	.639	.625
No. of high s. gradu.	.174	.407	.287	.237
Admitted to colleges	.165	.488	.565	.573
No. of high s. enroll.	.469	.417	.377	.217
Pupil-teacher ratio	.218	.454	.420	.274
EDUCATION	.232	.519	.467	.398
Employment per capita	.274	.794	.502	.621
Capital per capita	.376	-	.658	.596
Assets per capita	-*	-	.692	.675
PRIVATE INVESTMENT	.419	.794	.715	.711
REGION	.014	.369	.304	.394

*Indicates missing data.

TABLE 27

DEVELOPMENT FACTORS OF BOTH REGIONS OVER TIME:
WITHOUT REGIONAL CONTROL VARIABLE (N=67)

Year	Dependent variable	Independent variable	R^2
	Economic	Infra., Invest.	.423
1964	Social	-	-
	Overall	Infra., Invest.	.351
	Economic	Invest., Infra.	.722
1967	Social	Invest., Infra.	.156
	Overall	Invest.	.631
	Economic	Invest., Educ.	.699
1971	Social	Infra.	.072
	Overall	Invest., Infra.	.601
	Economic	Invest., Infra.	.712
1975	Social	-	-
	Overall	Invest., Infra.	.573

observations (N=67) used in the regression analyses, the power of the models is no greater than that for each region.

Table 28 shows the effects of adding the regional control variable to the models. Compared with Table 27, Table 28 reveals that region appeared twice in 1967 and once in 1975. In 1967 the regional control variable explained less than 3 percent. Nevertheless, the inclusion of the regional control variable in the 1967 model indicates that the level of overall development in the two regions may at least in part be attributable to regional location, even though its power of explanation is weak. The other two regional dummy variables included in social

TABLE 28

DEVELOPMENT FACTORS OF BOTH REGIONS OVER TIME:
WITH REGIONAL CONTROL VARIABLE (N=67)

Year	Dependent variable	Independent variable	R^2
	Economic	Infra., Invest.	.423
1964	Social	-	-
	Overall	Infra., Invest.	.351
	Economic	Invest., Infra.	.722
1967	Social	Region	.099
	Overall	Invest., Region, Educ.	.682
	Economic	Invest., Educ.	.699
1971	Social	Infra.	.072
	Overall	Invest., Infra.	.601
	Economic	Invest., Infra.	.712
1975	Social	Region	.060
	Overall	Invest., Infra.	.573

development in 1967 and 1975 models likewise failed to raise the level of explained variance very much, but do provide some clues to the existence of inherent regional disparities between the two regions. Regional disparities appear, therefore, to be largely due to structural factors in the prevailing political, economic, and social system, as far as regional economic development in the two regions is concerned.

Social development of both regions without the regional control variable was largely due to public water supply and medical personnel between 1964 and 1971, with the variance ranging from 26 to 66 percent (Table 29). On the other hand, capital was the dominant force in social

TABLE 29

DEVELOPMENT FACTORS OF BOTH REGIONS WITH SOCIAL INDICATORS OVER TIME: WITHOUT REGIONAL CONTROL VARIABLE (N=67)

Year	Dependent variable	Independent variable	R^2
1964	Mortality	Medical personnel, pupil-teacher ratio	.488
	Housing	Telephone subscriptions, medical personnel	.261
1967	Mortality	Water supply, employment p.c., telephone subscriptions	.663
	Housing	Telephone subscriptions	.451
1971	Mortality	Medical personnel, road connectivity	.513
	Housing	Medical personnel, assets p.c., water supply	.610
1975	Mortality	Capital p.c., admitted to colleges, pupil-teacher ratio	.587
	Housing	Capital p.c., employment p.c., water supply	.668

development in 1975, with almost same level of explanation (66.8 percent).

The determinants of social development with the regional control variable (Table 30) are the same in all cases, except in 1967, compared with Table 29. The increased level of the variance, 2.1 percent, in the housing development of the 1967 model was too weak, however, to demonstrate much of a relationship with inherent regional differentiation.

Major findings from the static models of development can be summarized as follows:

1) Economic development in the Cholla region was largely associated with

TABLE 30

DEVELOPMENT FACTORS OF BOTH REGIONS WITH SOCIAL INDICATORS OVER TIME: WITH REGIONAL CONTROL VARIABLE (N=67)

Year	Dependent variable	Independent variable	R^2
1964	Mortality	Medical personnel, pupil-teacher ratio	.488
	Housing	Telephone subscriptions, medical personnel	.261
1967	Mortality	Water supply, employment p.c., telephone subscriptions	.663
	Housing	Telephone subscriptions, region	.472
1971	Mortality	Water supply, road connectivity	.513
	Housing	Medical personnel, assets p.c., water supply	.610
1975	Mortality	Capital p.c., admitted to colleges, pupil-teacher ratio	.587
	Housing	Capital p.c., employment p.c., water supply	.668

private investment, whereas social development was closely related to employment opportunities and water supply after the late 1960s.

2) Private investment clearly played a crucial role in both economic and social development of the Kyongsang region after the late 1960s.

3) The regional dummy variable in all models failed to raise the level of explained variance very much, but does provide some clues to the existence of inherent regional disparities between the two regions.

CHAPTER V

DYNAMIC ANALYSIS OF REGIONAL DEVELOPMENT

Measurement of Change in Development

In general, development involves not only improvements in material and non-material well-being, but also changes in composition of inputs and outputs.[1] Changes in structure in this context refer to changes in relation between elements of social and economic conditions. Therefore, these include changes in the pattern of production away from primary toward secondary and tertiary activities, changes in the occupational structure of the population, and changes in the social structure and pattern of distribution.[2] Structural changes can also include changes in institutions, such as legal, administrative and religious institutions. In other words, development in its totality deals with changes in, and not just with levels of, the human condition.

Although there are no clear methodological approaches to assess the extent of changes in development, particularly institutional changes, it may be assumed that changes in socio-economic attributes can capture

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[1] Kindleberger, Charles P. and Bruce Herrick (1977). Economic Development. New York: McGraw-Hill (3rd ed.), pp. 1-2.

[2] Baster, Nancy. (1972). "Development Indicators: An Introduction," in Nancy Baster (ed.), Measuring Development: The Role and Adequacy of Development Indicators. London: Frank Cass. p. 2.

the multi-faceted character of development because both structural and institutional changes are explicitly and implicitly included by end results and determining factors in development. On the basis of this assumption, this study attempts to determine factors behind changes in regional development using the same dependent and independent variables as in the previous chapter.

One of the most common approaches to measuring changes, whether it is longitudinal or cross-sectional relationships, is proportions or percentages.[3] A proportion, measuring relative change, is expressed as: X_2/X_1. On the other hand, percentage change is simply an extension of the proportion: $(X_2/X_1 - 1.0) \times 100$. The logic of a proportion or percentage change is that the amount of change takes into account the value of variable X at time 1.

According to Pendleton et al.,[4] percentage change is generally used in more sophisticated correlational computations. Although various techniques such as the difference score and the residualized difference scores for measuring change are developed, these also have limitations. For example, the difference score is highly unreliable in some cases. The problem is generally referred to 'regression toward the mean.' Both individual or single units of analysis at extreme ends of the variable's value range, and positive error components characteristic of extreme

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[3]Pendleton, Brian F. et al. (1980). "Correlated Denominators in Multiple Regression and Change Analyses," in Edgar F. Borgatta and David J. Jackson (eds.), Aggregate Data: Analysis and Interpretation. Beverly Hills: Sage. pp. 87-94.

[4]Ibid., p. 90.

scores, tend to regress toward the mean when measured over time. This produces a deflating correlation and regression effect, respectively. On the other hand, the residualized scores are not recommended in correlational work because it cannot be determined how much of the observed difference over time is due to any given predictor, and inasmuch as X_2 is regressed on X_1 before it is regressed on other independent variables, the correlation between X_1 and these other independent variables cannot be determined. Therefore, percentage change is employed here to measure changes in regional development over time. Two points in time for the measurement of change include the periods between 1964 and 1967, 1967 and 1971, 1971 and 1975, and 1964 and 1975. The span of time between 1964 and 1975 may represent the whole spectrum of changes in regional development over the 1960s-1970s decade.

Stepwise Multiple Regression Analysis

As in the previous chapter, the results of stepwise multiple linear regression analyses are presented for the individual regions, followed by the results for both regions taken together, with and without the regional control variable.

Changes in Development of the Cholla Region

Table 31 shows the matrix of simple correlation coefficients for the independent variables used in the 'change' model with the change in overall development between 1964 and 1975. The variables, although now

TABLE 31

CORRELATIONS WITH THE DEPENDENT VARIABLE: CHANGE IN OVERALL DEVELOPMENT INDICATOR OF THE CHOLLA REGION (N=30)

Change in independent variable	1964-67	1967-71	1971-75	1964-75
Connectivity	.014	.169	.229	.132
Water supply	-.234	.057	-.027	.232
Medical personnel	.131	-.207	-.024	.319
Telephone subscrip.	-.175	.081	.142	.313
INFRASTRUCTURE	.042	.055	.042	.343
No. of high s. gradu.	.384	.204	.326	.268
Admitted to colleges	-.109	.113	-.077	.058
No. of high s. enroll.	-.127	.132	.017	.242
Pupil-teacher ratio	.135	.367	.033	.113
EDUCATION	.114	.265	.190	.245
Employment per capita	.097	.071	-.052	.272
Capital per capita	-*	-	.153	.096
Assets per capita	-	-	.086	-
PRIVATE INVESTMENT	.097	.071	.163	.141

*Indicates missing data.

measured in terms of percentage changes, are the same ones used in the static analysis of regional development. In general, the correlations of overall developmental change with the independent variables are not as large as expected, the strongest correlation being between changes in development and the number of high school graduates between 1964 and 1967. Most of the other coefficients are less than 0.300, indeed, with only 5 other variables having a correlation greater than 0.300.

Also unexpected are the negative correlation coefficients for change in some variables. Although the negative coefficients are very small, the results suggest a negative relationship between changes in development and these independent variables. Such relationships emerge, for example, between 1964 and 1967. Local taxes per capita, one of the dependent variables, in smaller towns including Sint'aein, Kimche, Haenam and Yongkwang decreased very slightly during this period probably because of out-migration of the relatively rich people and in-migration of poor people from the surrounding rural areas. Changes in housing ownership are also negatively related to changes in levels of development, particularly in large cities. Changes in mortality may sometimes be negative because of inconsistent methods[5] employed in measuring death rates over time. These interacting effects may result in some negative correlation coefficients of change. Although the negative coefficients are negligible

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[5]Crude death rates are sometimes estimated using the population and housing census data, like the mortality in 1967, for each city and town. These are also enumerated with a notice of death from residents. In a strict sense, it is thus not possible to find any consistent trend in changes in mortality, since its magnitude varies from year to year. However, the criterion of enumeration applied to each year is uniform.

in terms of their magnitude, they weaken the relationship. The same situation also applies to the Kyongsang region. In any event, the change in infrastructural facilities had the strongest correlation coefficient (0.343) with the change in the level of overall development between 1964 and 1975; the education variable had the next higher coefficient.

Table 32 shows the regression results for the dynamic development models. As might be expected from the simple correlation matrix, the results are not as strong as those derived from static development models. The highest level of explanation in the change of social development between 1971 and 1975 achieved by any independent variable is only 56.8

TABLE 32

FACTORS OF CHANGES IN DEVELOPMENT OF THE CHOLLA REGION (N=30)

Period	Dependent variable	Independent variable	R^2
	Economic	Educ.	.141
1964-67	Social	-	-
	Overall	Educ., Infra.	.268
	Economic	Infra., Educ.	.498
1967-71	Social	Educ., Infra.	.340
	Overall	Infra., Educ.	.411
	Economic	Infra.	.169
1971-75	Social	Infra.	.568
	Overall	Infra.	.464
	Economic	Infra.	.545
1964-75	Social	-	-
	Overall	Educ.	.348

percent. The single most important determinant in explaining social developmental change, and the first variable to enter the equation in the stepwise mode during the same period, was the change in road connectivity, by itself accounting for 24.0 percent of the variance. The opening of the Honam (the section between Taejon and Chonju was opened in December, 1970, and its extension to Sunch'on was completed in November, 1973) and Namhae Expressways at the end of 1973 seemed to play a vital role in accelerating social development in the Cholla region.

By and large, the greater the change in infrastructural facilities such as public water supply and telephone subscriptions, the greater is the change in economic development of the Cholla region, particularly between 1964 and 1975. In contrast to the static models of development examined in the previous chapter, changes in private investment variable did not play an important role in the Cholla region. The absolute values of the private investment variable, especially capital and tangible fixed assets per capita, are not large enough throughout the period. Percentage changes in investment variables are so small that their contribution is not significant at all. Throughout most of the 1960s and 1970s changes in education have been an important determinant of changes of overall development in the Cholla region, even though less than 40 percent of the variance is explained.

Changes in Development of the Kyongsang Region

As in the case of the Cholla region, none of the correlation coefficients for the Kyongsang region are particularly large, as shown

in Table 33. The largest coefficient is the change in the education variable (0.459) between 1967 and 1971, which is higher than that for the Cholla region. Also surprising are the generally negative coefficients for changes in medical personnel, telephone subscriptions, the number of high school graduates and enrollments between 1964 and 1967. Despite the positive changes in medical personnel and telephone subscriptions during the same period, the negative coefficients arise mainly owing to slight decreases in local taxes per capita in some of the Kyongsang's small towns,[6] as in the Cholla region. Meanwhile, the numbers of high school graduates and enrollments decreased in a few large cities and small towns between 1964 and 1967, probably because of school transfers to larger cities such as Pusan and Taegu in the region, and especially to Seoul.

However, the reasons may be different for the negative coefficients of the education variable between 1971 and 1975. The municipal boundaries of 6 cities and 3 towns[7] were expanded by a Presidential Decree No. 6543 in 1973, to include part of their peripheral rural areas. As a result, numbers admitted to tertiary education institutes per capita and the pupil-teacher ratio might have decreased during the period.

Changes in private investment had the highest positive coefficient (0.397) between 1971 and 1975, even though changes in the infrastructure were stronger (0.360) than changes in investment prior to this period.

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[6]These towns include Euisong, Kuryongp'o, Ankang, Kyongsan, Chomch'on, Yech'on and Yongju.

[7]Six cities are P'ohang, Kyongju, Masan, Chinju, Ch'ungmu and Samch'onp'o, and three towns are Ankang, Kumi and Yech'on. See Han'guk tosi yonkam (Municipal Yearbook of Korea). Seoul: Ministry of Home Affairs, 1976-77, pp. 36-43.

TABLE 33

CORRELATIONS WITH THE DEPENDENT VARIABLE: CHANGE IN OVERALL DEVELOPMENT INDICATOR OF THE KYONGSANG REGION (N=37)

Change in independent variable	1964-67	1967-71	1971-75	1964-75
Connectivity	.021	.053	.078	.343
Water supply	.043	-.118	.054	.216
Medical personnel	-.071	-.045	-.028	.144
Telephone subscrip.	-.063	.415	.031	.233
INFRASTRUCTURE	.018	.126	.041	.360
No. of high s. gradu.	-.110	.370	.243	.173
Admitted to colleges	.076	.302	-.051	-.230
No. of high s. enroll.	-.059	.450	.266	.243
Pupil-teacher ratio	.080	.343	-.190	.375
EDUCATION	.041	.459	.101	.108
Employment per capita	.272	.424	.143	.061
Capital per capita	-*	-	.248	.195
Assets per capita	-	-	.215	-
PRIVATE INVESTMENT	.272	.424	.397	.134

*Indicates missing data.

This indicates that private investment variables played an important role in recent overall developmental changes of the Kyongsang region.

The explanatory power of the dynamic models for the Kyongsang region is just as weak as that for the Cholla region. Independent variables were at most able to account for 62.5 percent of the variance in economic development over the period 1967-71, as shown in Table 34. Telephone subscriptions, themselves, accounted for 52.0 percent in economic change; the pupil-teacher ratio achieved an additional level of explanation of 10.5 percent. As might be expected from the simple correlation matrix, the dynamic model between 1964 and 1967 explains very little of the variance in development (13.8 percent).

TABLE 34

FACTORS OF CHANGES IN DEVELOPMENT OF THE KYONGSANG REGION (N=37)

Period	Dependent variable	Independent variable	R^2
1964-67	Economic	-	-
	Social	Infra.	.138
	Overall	-	-
1967-71	Economic	Infra., Educ.	.625
	Social	-	-
	Overall	Infra., Invest.	.575
1971-75	Economic	Invest., Educ.	.476
	Social	Invest.	.339
	Overall	Invest.	.402
1964-75	Economic	Educ.	.314
	Social	Infra., Educ.	.527
	Overall	Educ., Infra.	.491

A remarkable difference between results for the two regions is the fact that the change in percent private investment (i.e., capital per capita) was an overwhelmingly important determinant in the Kyongsang region over the period 1971-75, while the change in infrastructure (i.e., road connectivity) played a key role in changes of economic, social, and overall development in the Cholla region. In contrast, changes in the education variable had a relatively large impact on changes in overall development of both regions over the period 1964-75. The next important variable in overall development of the Kyongsang region during the decade was the change in road connectivity mainly because of the improvement in connections among large cities by the Seoul-Pusan Freeway built in 1970, even though the level of explanation is not strong.

Changes in Development with the Regional Control Variable

Table 35 gives the simple correlation matrix for the change in overall development of both regions with the independent variables and the regional dummy variable. At a glance it is clear that there are only minor differences between the correlation coefficients for both regions combined together and for individual regions. The correlations of changes in overall development with the independent variables are again quite small. None of the coefficients are greater than 0.400, with only one regional control variable having a correlation higher than 0.500 between 1971 and 1975. Again, the counteracting effects of the two heterogeneous regions in terms of the level of regional development seem to be reflected by the relatively lower correlation coefficients for the two regions

TABLE 35

CORRELATIONS WITH THE DEPENDENT VARIABLE: CHANGE IN OVERALL DEVELOPMENT INDICATOR OF BOTH REGIONS (N=67)

Change in independent variable	1964-67	1967-71	1971-75	1964-75
Connectivity	.018	.090	.011	.089
Water supply	-.071	.025	-.064	.220
Medical personnel	.007	-.108	.130	.244
Telephone subscrip.	-.048	.195	.187	.137
INFRASTRUCTURE	.047	.063	.062	.379
No. of high s. gradu.	.064	.273	.074	.146
Admitted to colleges	-.046	.177	-.055	-.058
No. of high s. enroll.	-.121	.252	.017	.100
Pupil-teacher ratio	.130	.313	.227	.200
EDUCATION	.118	.334	.185	.071
Employment per capita	.252	.223	.064	.086
Capital per capita	-*	-	-.018	.061
Assets per capita	-	-	.291	-
PRIVATE INVESTMENT	.252	.223	.103	.082
REGION	.322	.286	.510	.282

*Indicates missing data.

compared to those of each region.

The correlation coefficients of changes in overall development between 1971 and 1975 were surprisingly smaller than those between 1967 and 1971. The influx of relatively poor people by the annexation of peripheral areas into cities in both regions[8] in 1973 may be one of the possible reasons for such weak relationships, as previously suggested. Differences between the independent and regional control variables are particularly striking. Much higher correlations are derived for the regional control variable, especially over the period 1971-75. In other words, changes in overall development of both regions are much more closely related to the attributes of regional location than to changes in the independent variables. Regional distinctions in the change of overall development became increasingly apparent in this period.

Table 36 shows the regression results of the dynamic development models for both regions incorporated together without the regional control variable. The results are not nearly as powerful as those of the static models. Between 1964 and 1967 changes in private investment variable (i.e., employment opportunities) accounted for only 16.5 percent of the variance, which seemed to be hardly emphasizing, even though the variable itself was statistically significant.

Changes in education (i.e., pupil-teacher ratio) were, however, dominant over the period 1967-71 with less than 40 percent of the

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[8]In the Cholla region, the boundaries of 5 cities and 4 towns were expanded by the same presidential decree in 1973. Five cities consist of Chonju, Kunsan, Iri, Mokp'o and Yosu, and four towns are Hwasun, Kangjin, Haenam and Wando.

TABLE 36

FACTORS OF CHANGES IN DEVELOPMENT OF BOTH REGIONS: WITHOUT REGIONAL CONTROL VARIABLE (N=67)

Period	Dependent variable	Independent variable	R^2
	Economic	-	-
1964-67	Social	-	-
	Overall	Invest.	.165
	Economic	Educ.	.333
1967-71	Social	Educ., Infra.	.191
	Overall	Educ.	.328
	Economic	Invest., Educ.	.308
1971-75	Social	Educ.	.199
	Overall	Invest.	.292
	Economic	Infra.	.497
1964-75	Social	Invest.	.268
	Overall	Infra.	.396

variance. By contrast, the relationships during the period 1971-75 were dominated by changes in private investment (i.e., tangible fixed assets) and education (i.e., the number of high school enrollments), both of which accounted for approximately 30 percent of the variance.

Changes in infrastructure, which were dominant in the Cholla region over the period 1971-75, did not have any impact on the change in regional development of both regions, mainly because of the much stronger influence of changes in investment activities in the Kyongsang region. Nevertheless, changes in the infrastructure variable (i.e., road connectivity) alone account for 49.7 percent of the variance in economic

change between 1964 and 1975, which indicates the increasing role of three freeways built in both regions. It also accounts for almost 40 percent of the overall change. Changes in capital investment were a crucial determinant of changes in social development over the period 1964-75.

Table 37 gives the regression results for the change in development models with the regional control variable. The additional variance explained solely by that variable is shown in Table 38. The addition of the regional dummies contributed to some extent to increase the level of explained variance in economic change (0.190) and to a lesser extent in

TABLE 37

FACTORS OF CHANGES IN DEVELOPMENT OF BOTH REGIONS: WITH REGIONAL CONTROL VARIABLE (N=67)

Period	Dependent variable	Independent variable	R^2
	Economic	Region	.069
1964-67	Social	Region	.127
	Overall	Invest., Region	.269
	Economic	Educ., Region	.398
1967-71	Social	-	-
	Overall	Educ., Region	.385
	Economic	Invest., Region	.506
1971-75	Social	Educ., Region	.206
	Overall	Invest., Region	.452
	Economic	Infra.	.497
1964-75	Social	Invest., Region	.370
	Overall	Infra.	.396

TABLE 38

ADDITIONAL VARIANCE OF REGIONAL CONTROL VARIABLE IN THE DYNAMIC MODELS (N=67)

Period	Dependent variable	Independent variable	R^2
1964-67	Economic	Region	.069
	Social	Region	.127
	Overall	Region	.104
1967-71	Economic	Region	.065
	Social	-	-
	Overall	Region	.057
1971-75	Economic	Region	.198
	Social	Region	.007
	Overall	Region	.160
1964-75	Economic	-	-
	Social	Region	.102
	Overall	-	-

overall change (0.160) between 1971 and 1975. By contrast, between 1964 and 1967 the regional dummy was the only variable explaining economic and social changes, and the single important variable entered into the equations in the stepwise mode. Although the explanatory power of the regional control variable over the period 1967-71 was relatively weak, 6.5 percent in economic change and 5.7 percent in overall change, its additional power increased to some extent between 1971 and 1975.

The attribute of regional location is a relatively strong factor between 1964 and 1967, and between 1971 and 1975, which coincides with the magnitude of regional disparities between the Cholla region and the

Kyongsang region. Its magnitude increased during these periods in terms of both index values among regions and between localities in the two regions, as examined in Chapter II. Differences in the impact of industrial structure and explicit and implicit regional policies (which will be discussed in the following chapter) may be thus more crucial in explaining changes in regional development than in explaining variations in levels of regional development.

Although there is no large impact of the regional dummies on the long-term change in regional development over the decade (1964-75), these account for 10.2 percent of the change in social development during this period. In terms of long-term economic change, the regional dummy variables are thus not very significant; changes in economic development are more closely associated with the independent variables, which account for most of such changes.

Major findings from the dynamic models of regional development can be summarized as follows:

1) Over the period 1971-75, changes in private investment activities were an important factor in the Kyongsang region, while changes in infrastructure played a key role in the Cholla region.
2) Over the 1960s-1970s decade, changes in education had a relatively large impact on the change in overall development of both regions.
3) The change in overall development of both regions is much more closely related to the attribute of regional location than to changes in the independent variables.
4) Differences in the impact of industrial structure and regional policies appear to be more crucial in explaining the dynamic models than in

explaining the static models of regional development in terms of the unexplained variance (regression residuals).

CHAPTER VI

THE EFFECTS OF REGIONAL DEVELOPMENT POLICY

An Overview of National Economic Policy

In the post-Korean War period, the main national economic objectives were to: (1) reconstruct the infrastructure and industrial capacity; (2) reinforce national defense; and (3) improve private consumption.[1] In order to achieve these objectives, foreign assistance, especially aid from the United States, was heavily relied upon. The United Nations Korea Reconstruction Agency (UNKRA) provided assistance from 1953 to 1960 totalling about $120 million. Official U.S. aid during the same period amounted to $1,745 million, including $158 million of PL 480 goods (mainly food grains). Between 1954 and 1960 foreign assistance financed more than 70 percent of total imports. About 74 percent of national investment was financed by foreign aid from 1953 to 1960.[2]

Over the period 1953 to 1960, exports of goods and services were negligible, ranging from 1.1 to 2.4 percent of GNP. Exports were composed primarily of mining, agricultural, and fishery products. Imports of goods

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[1] Cole, David C. and Princeton N. Lyman (1971). Korean Development: The Interplay of Politics and Economics. Cambridge: Harvard University Press, pp. 164-165.

[2] Frank, Charles R. Jr. et al. (1975). Foreign Trade Regimes and Economic Development: South Korea. New York: National Bureau of Economic Research, p. 12.

and services were substantial, ranging from 8.8 to 14.3 percent of GNP or almost seven times export earnings.[3] Food grains and manufactured goods were the most important imports. Nevertheless, changes in social and industrial structure in the 1950s enabled the nation to increase its stocks of physical and human capital. According to Bergsman,[4] Korea was far richer in human resources than its low income level suggested.

Since the inception of the Military Government in May 1961, there was a growing emphasis on accelerating growth in output. After many economic reforms, including budget and tax reforms, reform of the foreign exchange control system, and currency reform[5] between 1961 and 1962, the target growth rate under the First Five-Year Economic Development Plan (1962-66) rose to 7.1 percent per annum. The plan reflected the basic policies of the military government. In order of priority, it called for: (1) an increase in energy supply (electric power and coal); (2) an increase in agricultural production and in farmers' incomes; (3) expansion of key industries and social overhead capital; (4) national land conservation and development of manpower; (5) expansion of exports; and (6) promotion of technology.[6] However, these explicit economic policies

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[3] Ibid., pp. 12-13.

[4] Bergsman, Joel. (1980). "Growth: A Tale of Two Nations; Korea and Argentina," Report: News and Views from the World Bank. May-June, p. 2.

[5] The currency denomination was changed from hwan to won at 10:1. See Frank et al. op. cit., p. 24.

[6] Ibid., p. 18.

were soon abandoned in favor of export-oriented industrialization, a path it has followed ever since. The government placed heavy emphasis on continued growth of output of consumer nondurables for export, primarily because of its desire to earn foreign exchange.

During the period 1961-76 the economy grew at an average rate of 10 percent per annum, accelerating from 7.7 percent annually in the period of the first plan, 1961-66, to 10.5 percent in 1967-71 (the period of the second plan) and 11.9 percent in 1972-76, the period of the third plan (Table 39).

TABLE 39

ANNUAL GROWTH OF GROSS NATIONAL PRODUCT (%)

Sector	1961-66	1966-71	1971-76
Primary	5.1	2.3	5.4
Secondary	14.2	20.3	19.9
Tertiary	23.6	29.1	19.1
Total	7.7	10.5	11.9

Note: All figures are in 1970 prices.

Source: Hasan, Parvez. and D.C. Rao (1979). Korea: Policy Issues for Long-Term Development. Baltimore: The Johns Hopkins University Press, p. 16, Table 1.1.

Such rapid economic growth was accompanied by changes in industrial structure. Despite a previous annual growth rate in the value of agricultural output of about 4 percent, agriculture's contribution to GNP declined sharply, from 44.1 percent in 1961 to 20.4 percent in 1976, as shown in Table 40. The main reason for this decline was due primarily to

TABLE 40

COMPOSITION OF GROSS NATIONAL PRODUCT (%)

Sector	1961	1966	1971	1976
Primary	44.1	38.9	26.5	20.4
Secondary	12.0	15.9	24.4	35.9
Tertiary	43.9	45.2	49.1	43.7
Total	100.0	100.0	100.0	100.0

Source: Hasan and Rao, op. cit., p. 16.

increasing emphasis on manufacturing growth of nearly 19 percent per annum, almost double the growth rate of aggregate GNP, which reflects the government's emphasis on manufacturing throughout this period.[7] Agriculture was relatively well advanced by the mid-1960s as a result of government sponsored or subsidized reclamation projects, land consolidation activities, fertilizer production, and agricultural loans.[8] The agricultural sector was, by and large, ignored in terms of national economic policy objectives during the second plan period probably because of the government's emphasis on manufacturing within limited resources.

The continued growth of manufactured exports has been a main driving force in Korean economic expansion. Exports had averaged barely 2 percent of GNP in the 1950s. Opportunities for import substitution were

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[7]Hasan, Parvez. and D.C. Rao (1979). Korea: Policy Issues for Long-Term Development. Baltimore: The Johns Hopkins University Press, pp. 16-18.

[8]Kuznets, Paul W. (1977). Economic Growth and Structure in the Republic of Korea. New Haven: Yale University Press, pp. 133-136.

seen as unprofitable,[9] and there were no abundant natural resources to export. The only alternative perceived was to export manufactured goods. In 1962 commodity exports were valued at $54.8 million, of which 19.3 percent consisted of manufactured goods. By 1976 the value of exports had soared to nearly $8 billion (Table 41), having grown at an average rate of 40 percent per annum at current prices and 32 percent at constant prices. Exports of goods and services rose at current prices from 8.5 percent of GNP in 1965 to 15 percent in 1970 and 36 percent in 1976.[10] Although exports of primary products rose rapidly in the 1960s, the growth of manufactured exports overshadowed their rise. In 1965 about 65 percent of total manufactured goods was exported; in 1976 their share rose to about 90 percent. Thus, Korea is an extreme example of an export-oriented economy.[11]

It is not easy, however, to explain the phenomenal success of Korea's export expansion. Hasan and Rao[12] argue that central government policies provided the appropriate impetus and framework for export promotion, along with Korea's comparative advantage of relatively abundant labor with low wages and salaries. Government incentives and subsidies clearly favored export sales over import substitution. Producers of goods for export were permitted to import raw materials free of duty.

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[9] Bergsman, op. cit., p. 3.

[10] Hasan and Rao, op. cit., pp. 16-17.

[11] Bergsman, op. cit., p. 2; Lim, Youngil. (1977). "Sources of Economic Growth in Korea: With Emphasis on the Export Sector," Seminar Series SS-77-10, Seoul: Korea International Economic Institute, p. 15.

[12] Hasan and Rao, op. cit., p. 18.

TABLE 41

COMMODITY COMPOSITION OF EXPORTS
(IN MILLIONS OF DOLLARS IN FOB PRICES)

Commodity	1962	1966	1970	1976
Food & live animals	21.8	28.2	65.6	508.3
Beverage & tobacco	0.1	0.9	14.2	78.3
Crude materials, inedible	19.4	37.0	100.0	195.8
Mineral fuels	2.8	1.9	8.7	144.6
Animal & vegetable oils	0.1	0.1	0.1	1.2
Chemicals	1.0	0.4	11.4	119.5
Manufactured goods	6.2	66.4	220.9	2,336.4
Machinery & transport equipments	1.4	5.5	61.5	1,280.4
Miscellaneous manufactured articles	1.9	34.5	352.5	3,028.1
Unclassified	0.1	0.2	0.4	22.5
Adjustments*	n.a.	n.a.	47.0	99.5
Total	54.8	175.1	882.2	7,814.6

*Covers exports to military forces in Vietnam, offshore sales of tuna, expenses on the spot, and other.

Source: Hasan and Rao, op. cit., pp. 475-477.

They were also exempted from all indirect taxes, and paid reduced rates of income tax on profits earned from exports, received low-interest loans, and were granted other subsidies as well.[13] In addition, the President and the central government were strongly commited to export expansion. Monthly foreign trade-promotion meetings were called by the

[13]Bergsman, op. cit., p. 2.

President himself, to review achievements, to revise targets, and to direct the government to solve problems and ease the path for exporters.[14] Export expansion seems to have been one of Korea's most important economic policies to date.

Outstanding economic gains by Korea can furthermore be attributable to three other important sets of programs, as shown in Chapters IV and V. First, the growing demand by the industrial sector for particular services has stimulated the development of the nation's infrastructural facilities, particularly social overhead capital. Substantial government efforts were also made toward improving its physical infrastructure, such as roads, electricity, telephones, and piped water supply.[15] The nation's road and rail networks now extend to all parts of the territory. However, the highway network was still 80 percent unpaved in 1975.

Second, Korean society has traditionally placed a high value on education, as discussed earlier. According to Jeong,[16] only 0.3 percent of the total population had 13 years or more of education in 1944, and 86.6 percent was completely illiterate. By 1974 the proportion with no education declined to 20.3 percent, and 5.7 percent had 13 years or more of education. Lim[17] contends that such a dramatic improvement is partly due to the nation's compulsory education system and the society's willingness to pay for it. The investment made in the education system

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[14] Ibid., p. 2.

[15] Hasan and Rao, op. cit., p. 4.

[16] Cited from Lim, op. cit., pp. 23-24.

[17] Lim, op. cit., p. 24.

provided a sound base for further development and adaptation to newly created economic environment and conditions.

Finally, Frank et al[18] argue that Korea also has had an abundant supply of entrepreneurial and managerial expertise, which is another essential catalyst in economic development. Although very few Koreans were managers under the Japanese colonial regime, it did not take them long to develop managerial skills after independence. Although a large proportion of them migrated from the North, many of the most successful private entrepreneurs are of southern origin.

Infrastructure, education and private investment have contributed much to improve the quality of life as a whole. However, rising levels of economic development were mainly the result of the growth of exports, which in turn have been an outgrowth of explicit national policy throughout the two most recent economic development plan periods. To what extent has the national policy of export expansion in different regions supported infrastructural, human resources, and private investment expansion in these regions?

Explicit Regional Policy and Development Factors

For most part, export production has been concentrated in the Capital and Kyongsang regions. This fact is also revealed by the heavy concentration of workers of the secondary sector (including construction)

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[18]Frank et al., op. cit., p. 226.

in Seoul and Pusan. Again, South Cholla Province had the lowest number of employees per 1,000 people in the secondary sector in 1975, if Cheju island, where main activities are tangerine cultivation and tourism, is excluded (Table 42). The number of employees in the secondary sector in the Cholla region and the Cheju region continuously rose from 1960 to 1970, but declined from 1970 to 1975, while that in the rest of the country rose steadily after 1960.

TABLE 42

NUMBER OF EMPLOYEES IN SECONDARY SECTOR*
(PER 1,000 PEOPLE)

Province	1960	1966	1970	1975
Nation	25.9	42.5	63.8	80.3
Seoul	53.3	78.4	113.0	131.3
Pusan	-**	89.6	121.2	150.6
Kyonggi	23.9	33.7	60.0	99.7
Kangwon	32.2	44.0	48.4	55.3
N. Ch'ungch'ong	17.8	25.9	31.9	37.2
S. Ch'ungch'ong	26.8	32.0	45.7	50.2
N. Cholla	16.3	26.8	45.9	39.5
S. Cholla	15.4	33.6	34.7	30.8
N. Kyongsang	25.0	41.3	60.2	76.1
S. Kyongsang	27.9	30.6	47.6	62.1
Cheju	12.4	24.8	30.8	28.0

*Includes mining, manufacturing and construction.

**In 1960 Pusan was included in South Kyongsang Province.

Source: Ch'ong inku mit chutaek chosa poko (Population and Housing Census). Seoul: Economic Planning Board, 1960, 1966, 1970 and 1975.

The result has been increasing differentials among sectors in output per worker and widening regional income disparities in line with the sectoral variations, as also pointed out by Kuznets.[19] Table 43 shows exports per capita by province over time. Although the provincial shares of the nation's total exports in 1964 are not available, the data given clearly reveal the spatial imprint of the shift in economic policy favoring export expansion. The importance of the Kyongsang region has

TABLE 43

EXPORTS PER CAPITA IN CURRENT PRICES BY PROVINCE

	1967		1971		1975	
Province	$	rank	$	rank	$	rank
Nation	8.6		33.9		223.3	
Seoul	15.6	2	29.8	4	149.1	5
Pusan	37.1	1	116.8	1	734.8	1
Kyonggi	7.2	5	53.1	2	433.5	2
Kangwon	10.7	3	23.5	7	93.5	8
N. Ch'ungch'ong	9.4	4	25.8	6	164.8	6
S. Ch'ungch'ong	4.3	9	18.9	9	110.7	7
N. Cholla	2.7	11	18.3	10	84.6	9
S. Cholla	5.3	7	21.1	8	63.0	10
N. Kyongsang	5.7	6	33.8	3	165.4	4
S. Kyongsang	4.4	8	26.2	5	338.0	3
Cheju	4.1	10	8.9	11	26.6	11

Source: Chumin sodeuk yonpo (Annual Report of Gross Regional Product). Seoul: Ministry of Home Affairs, 1973, 1976.

[19] Kuznets, op. cit., pp. 92-99.

continuously increased, while that of the Cholla region has been placed in a lower rank over the period 1967-75. The contribution of Seoul has also declined, partly because of the government's industrial redistribution policy in favor of surrounding areas and partly because of its continued population growth.

In order to determine the strength of the relationship between the provincial contribution to the nation's total exports (exogenous variable) and development factors (endogenous variables) used in Chapters IV and V, Spearman's rank correlation technique was used, as mentioned previously. This technique is a test for correlation using ranked data on the ordinal scale of measurement. It is useful when the number of observations is not large, compared to Kendall's tau. An additional advantage is its simplicity in computation. To simplify the model the endogenous variables are again separated into three groups, as used in a series of regressions.

The infrastructure variable contains the percentage of roads that were paved, the percentage of public water supply, the numbers of medical personnel and telephone subscriptions per 1,000 people. The education variable consists of the stocks of human capital per capita as an overall measure of educational attainment in a region, the ratios of highly educated to population of 6 years of age and over and technical[20] to formal education which appear to be important factors in industrial development, and the number of high school students per 1,000 people. Finally, the private investment variable includes value added per capita in manufacturing which may represent the end results of such investment

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[20]Institutes of technical education include vocational high schools and junior technical colleges.

activities, capital per capita, tangible fixed assets per capita, and the number of employees per 1,000 people in the secondary sector (including mining, manufacturing and construction), as defined in Chapter III. The units of analysis employed in the rank correlation technique are 11 provinces (including 2 special cities).

Table 44 shows the rank correlation matrix between the exogenous policy variable--exports per capita--and the endogenous variables over the period 1967-75. The relative importance of correlation coefficients for each endogenous variable in different years is also given to show shifts in regional policy. In 1967 the number of medical personnel was the most important variable, as opposed to its being low in 1971 and 1975. Road pavement, which was relatively important at first, declined thereafter. Unexpected are the relatively weak correlations for the education variables in 1967. However, their importance emerged in both 1971 and 1975, when education ranked fourth in relative importance.

Another notable shift is the sharply increased importance of most of the investment variables, except for the size of employment in the secondary sector. The relative importance of capital per capita increased from eighth in 1967 to first in 1971 and 1975; value added per capita in the secondary sector also increased slightly from fourth in 1967 to third in 1971 and second in 1975. Tangible fixed assets per capita remained relatively unimportant throughout the period. In general, the emphasis of regional policy was fairly highly related to infrastructure in 1967, but shifted toward private investment in 1971 and 1975.

Although there is little information to explain variations in

TABLE 44

RANK CORRELATIONS WITH THE EXOGENOUS VARIABLE:
EXPORTS PER CAPITA (N=11)

Endogenous variable	1967 rho[a]	1967 Relative importance	1971 rho	1971 Relative importance	1975 rho	1975 Relative importance
Road pavement	.700*	3	.581*	5	.527	5
Water supply	.309	9	.400	9	.182	11
No. of medical p.	.755**	1	.036	12	.191	10
Telephone subscr.	.518	5	.436	8	.346	7
Stocks of human c.	.456	7	.586*	4	.582*	4
Ratio of highly ed.	.464	6	.455	7	.509	6
Technical to formal	.045	12	.191	11	.173	12
High s. students	.055	11	.255	10	.255	9
V.A. in mfg.	.664*	4	.673*	3	.927**	2
Capital per capita	.455	8	.827**	1	.946**	1
Assets per capita	.282	10	.503	6	.327	8
Employ. in second.[b]	.733*	2	.818**	2	.873**	3

*significant at .05 level with 10 degrees of freedom.
**significant at .01 level with 10 degrees of freedom.

Note: a) Spearman's rank coefficients are generally called rho.
b) The employment is based on the 1966, 1970 and 1975 population and housing censuses.

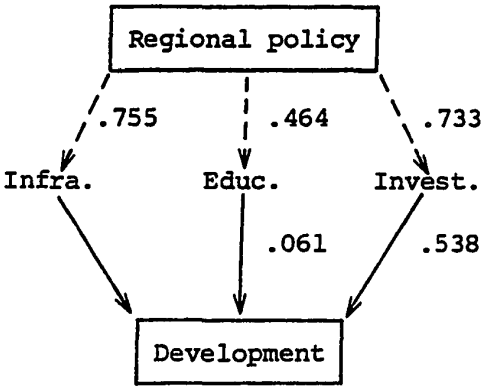
entrepreneurs in Korea, as Lim[21] points out, their creativeness and risk-taking must be the crucial determinants of regional economic development, particularly in the Kyongsang region. This is also revealed by a series of stepwise regression models as examined in Chapters IV and V.

[21] Lim, op. cit., p. 26

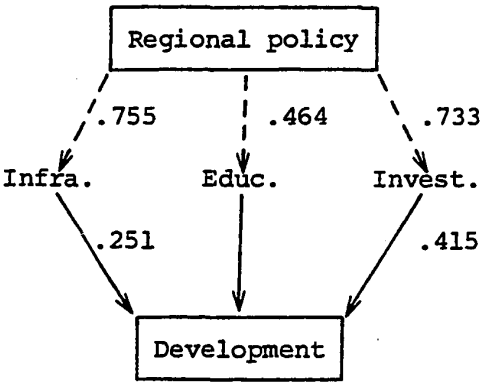
Under conditions of political stability, strong leadership and the government's firm commitment to development, managerial expertise in connection with private investment has flourished to stimulate the production of manufactured goods for exports. Corresponding to the national economic policy, the Kyongsang region has played a crucial role as a major area in Korea since the early 1970s.

In order to identify the impact of regional development policy, it is necessary to examine further the behavior of the three main determinants of development with the changing policies. As discussed previously, the rank correlations do not necessarily furnish direct causal relationships between the exogenous policy variable and the endogenous variables, but they may provide clues to causes. The relationships between regional policy and development factors of the two regions identified in Chapter IV are illustrated in Figures 15 through 17. For the exogenous relationship, variables which have the highest rank correlation coefficient among the three main endogenous variables with regional policy are shown in each figure. For example, the highest coefficient of the private investment variable with regional policy is 0.733 for the size of employment in the secondary sector in 1967, 0.827 and 0.946 for capital per capita in 1971 and 1975 respectively. Similarly, among the infrastructure variable, the number of medical personnel has the highest correlation coefficient with regional policy, 0.755, in 1967, and 0.581 and 0.527 for road pavement in 1971 and 1975 respectively. On the other hand, the multiple correlation coefficients (R^2) for overall development indicator of each region in 1967, 1971 and 1975, as examined in Chapter IV, are given to illustrate the causal relationships.

Cholla region



Kyongsang region

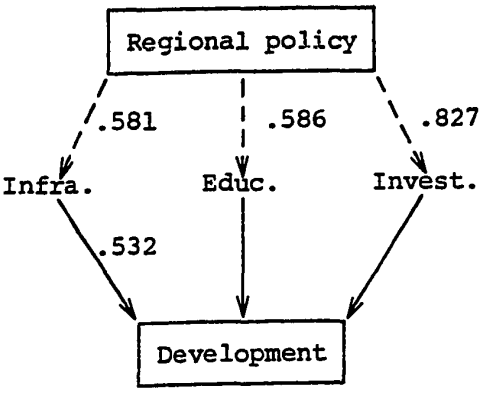


- - - → Exogenous relationships (rho)

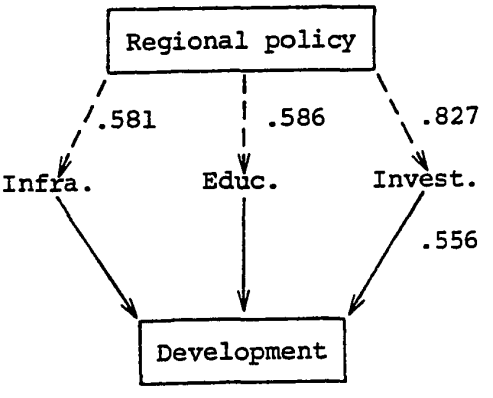
——→ Causal relationships (R^2)

FIGURE 15. -- A SYNTHETIC MODEL OF REGIONAL POLICY AND DEVELOPMENT, 1967

Cholla region



Kyongsang region

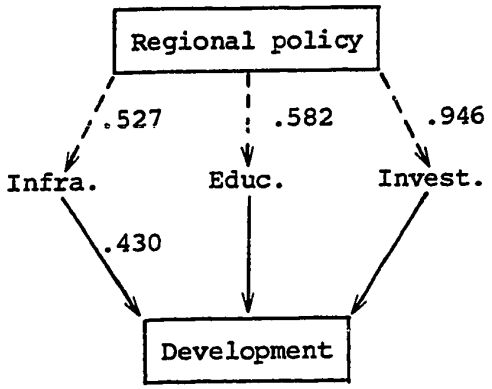


- - - → Exogenous relationships (rho)

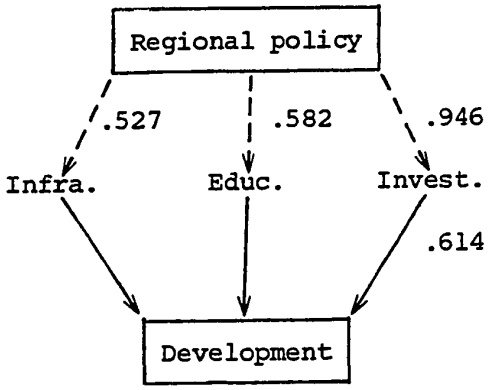
——→ Causal relationships (R^2)

FIGURE 16. -- A SYNTHETIC MODEL OF REGIONAL POLICY AND DEVELOPMENT, 1971

Cholla region



Kyongsang region



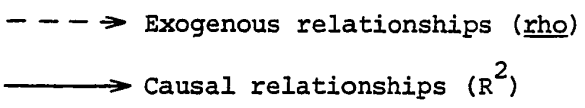


FIGURE 17. -- A SYNTHETIC MODEL OF REGIONAL POLICY AND DEVELOPMENT, 1975

In 1967 the regional policy placed emphasis on infrastructure development and to a lesser extent on investment activities in both regions. However, regional development of the two regions was primarily associated with private investment during this period. Infrastructure was less important in the Kyongsang region, while education played only a minor role in the Cholla region. Development in both regions was not strongly directed by regional policy itself in 1967.

The situation is, however, reversed in both 1971 and 1975. Regional policy heavily encouraged private investment in 1971 and 1975. The investment variable was the single determinant of overall development in the Kyongsang region in 1971 and 1975, whereas the overall development of the Cholla region was largely attributable to infrastructure in the same period. However, the linkage between export policy and infrastructure had declined since 1967.

The results indicate that private investment appears to have been an important catalyst in regional development of the Kyongsang region. The relatively well-developed infrastructural facilities, such as transport networks, industrial water supply and ports, have encouraged private entrepreneurs to expand capital and assets investment in the region. Furthermore, highly educated and abundant labor, along with a relatively high in-migration to the region, has also been a crucial factor to attract private investment activities. The Cholla region, however, appears to be relatively neglected by private entrepreneurs probably because of the lack of such physical and human resources compared to the Kyongsang region.

Implicit Regional Policy and Sub-national Favoritism

Korea's rapid growth of manufactured goods for exports also generated rising demands for investment, especially public utilities and industrial facilities, and the other inputs essential for manufacturing production. The substantial increase in investment was probably one of the important proximate causes of Korea's accelerated growth.

As shown in Table 45, between 1966 and 1976 the Cholla region has been the least recipient of public investment. Spatial variations in public investment may illustrate the impact of implicit regional policy on development because the increase in public investment may be a cause rather than an effect, and plays a major role in supporting explicit regional economic policy.

According to the government accounting system, revenue and expenditure are divided into two accounts: general and special. General account investment includes: (1) agriculture and fishery such as farmland improvement, forestation, flood control and electrification of rural areas; (2) construction such as water works, roads, drainage and bridges; and (3) general investment such as tourist facilities, education facilities and safety management. On the other hand, special projects undertaken by either government (central and local) or public enterprises are usually included in the special account. These are, for example, land subdivision, sewage disposal, housing, dam construction, industrial parks, disaster relief, small and medium industry assistance, medical works and subway construction (in Seoul, which accounts for the unusual high investment per capita in the Capital region).

TABLE 45

PUBLIC INVESTMENT PER CAPITA BY REGION

Region	1966	1971	1976	Annual growth rate (1966-76)
Nation	0.46	2.08	7.21	131.7
Capital	0.89	3.59	11.81	129.5
Kangwon	0.22	1.55	4.79	136.1
Ch'ungch'ong	0.27	1.35	4.33	132.0
Cholla	0.18	1.13	4.65	138.4
Kyongsang	0.44	1.75	5.63	129.0
Cheju	0.43	2.19	4.96	127.7

Note: a) All figures are in 1,000 won of current prices.
b) Annual growth rate is in percentage.

Source: Chibang chaechong yonkam (Financial Abstract of Local Government). Seoul: Ministry of Home Affairs, 1967, 1972, and 1977.

Regional variations in investment seem to be converging in 1976 because of higher annual average growth rate of public investment in the Cholla, Kangwon and Ch'ungch'ong regions than in the Capital and Kyongsang regions. This may reflect the central government's attempts to reduce discrepancies in the distribution of resources. Despite such efforts, in 1976 investment in the Cholla region was the second lowest (a little ahead of the Ch'ungch'ong region), and lagged far behind even the Cheju region throughout the period. The gap between the Cholla region and the Kyongsang region was the greatest in 1966 when the first five-year plan ended, and declined until 1976 (last year of the third plan). If Seoul in the Capital region is disregarded because of its unusual position as the national capital, the Kyongsang region also appears to

have benefited from the allocation of public investment. Any sort of discrepancy resulting from either explicit policy or implicit policy can be looked upon as an expression of sub-national favoritism, whether it is intentional or not.

Although it is not easy to trace monetary flows among regions in the allocation of public investment, the proportion of public investment to national tax revenues in each region may furnish clues to possible discrepancies expressed in implicit regional policy. Table 46 gives national tax revenues[22] per capita by region. Over the period 1966-76, the Capital region and the Kyongsang region paid the highest and the second highest taxes respectively. In contrast, the Cholla region, of which annual average growth rate of tax revenues was the highest between 1966 and 1976, was likely to pay much more taxes, despite its lowest GRP per capita throughout the period.

Table 47 shows the ratio of public investment to national tax revenues per capita by region. The Cheju region benefited most in the country throughout the period. The Kangwon and Ch'ungch'ong regions also received higher proportions in the distribution of public investment. The Capital region was, however, most deprived of its tax revenues, of which 12 percent and 15 percent was invested in 1966 and 1971 respectively. In 1976 the lowest ratio was recorded in the Kyongsang region. The Cholla

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[22]National taxes are composed of direct taxes and indirect taxes. Direct taxes include income tax (real estate income tax, dividend and interest tax, wage and salary income tax, capital income tax), corporation tax, business tax, inheritance tax, registration tax, reevaluation tax, real estate speculation control tax, and excess profits tax. Indirect taxes include transportation tax, liquor tax, commodity tax, textile tax, petroleum products tax, electricity and gas tax, admission tax, and telephone tax.

TABLE 46

NATIONAL TAX REVENUES PER CAPITA BY REGION

Region	1966	1971	1976	Annual growth rate (1966-76)
Nation	3.34	11.03	28.06	123.5
Capital	7.61	23.25	50.79	121.1
Kangwon	1.51	3.57	7.18	117.6
Ch'ungch'ong	1.16	2.95	6.74	119.8
Cholla	1.03	4.95	14.44	128.5
Kyongsang	3.31	9.17	26.36	123.0
Cheju	0.98	3.35	7.34	124.7

Note: a) All figures are in 1,000 won of current prices.
b) Annual growth rate is in percentage.

Source: Kukse t'ongkye yonpo (Statistical Yearbook of National Tax). Seoul: Office of National Tax Administration, 1967, 1972, and 1977.

TABLE 47

RATIO OF PUBLIC INVESTMENT TO TAX REVENUES

Region	1966	1971	1976
Nation	0.14	0.19	0.26
Capital	0.12	0.15	0.23
Kangwon	0.15	0.43	0.67
Ch'ungch'ong	0.23	0.46	0.64
Cholla	0.17	0.23	0.32
Kyongsang	0.13	0.19	0.21
Cheju	0.44	0.65	0.68

region also seemed to be comparatively deprived throughout the period, even though the proportion in the region was slightly higher than that of the Capital and Kyongsang regions. If much higher levels of development in these two regions are, however, taken into account, the central government's practice in the allocation of public investment in the Cholla region also appears to be biased.

Another example of possible biases expressed in implicit regional policy may be distortions in the distribution associated with high public officials by place of birth. In rapidly developing countries like Korea, where government decisions play a vital role in economic and social development, centralized planning is the rule, not the exception.

As Rondinelli[23] points out, planning procedures of the Korean plans have been top-down planning in the last two decades. Top-down planning, he continues, usually begins with designation of broad national development goals and targets. Furthermore, macro-economic analyses and econometric models are employed to forecast long range conditions and to compare development objectives with forecasted conditions, based on predictions regarding operation of the economy and the influence of exogenous policy variables. Likewise, decision-making for Korean economic development, especially in its determining factors, is heavily centralized. Under these circumstances, the role of high public officials of the central government can never be ignored, even though it is by no means easy to demonstrate a clear causal relationship between government

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[23]Rondinelli, Dennis A. (1978). "National Investment Planning and Equity Policy in Developing Countries: The Challenge of Decentralized Administration," Policy Sciences. vol. 10, no. 1 (August), pp. 47-48.

organization and regional development. The spatial distribution of high public officials' origins may thus provide an intuitive insight to implicit regional policy, since their decisions often reflect explicit or implicit regional biases.

Table 48 gives the native places of all government ministers and their equivalents including Director of the Legislative Office, Director of the Veterans Relief Office, Mayor of Seoul, Director of the Inspection and Audit Office, and Director of the Central Intelligence Agency from 1961 to March 1, 1980. Approximately 28 percent of the 287 ministers has come from the Kyongsang region, while the Cholla region produced 13 percent, being ahead of the Kangwon and Cheju regions.

Regional variations based on the estimates of 1979 population are quite different from the simple comparison of its distribution. The Cheju region records by far the highest proportion, followed by the Ch'ungch'ong, Kyongsang, and Cholla regions. Surprisingly, the Capital region is the lowest in its rank probably because of the relatively low number of people born in Seoul. Although the gap between the Cholla region and the Kyongsang region seems to be negligible, the Cholla region has rarely produced ministers dealing with the national economic policies such as Prime Minister, Ministers of Economic Planning and Finance as well as Ministers of Foreign Affairs and Justice since liberation.[24]

On the other hand, more than 65 percent of high public officials of the central government as a whole came from either the Capital region

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[24] Chosun Ilbo (Chosun Daily Newspaper). Seoul: Chosun Ilbo, July 20, 1980, p. 3.

TABLE 48

DISTRIBUTION OF GOVERNMENT MINISTERS BY PLACE OF BIRTH, 1961-1980

Region	Number	Per million people	
		Number	Index value
Nation	287 (100.0)*	5.65**	100.0
Capital	39 (13.6)	3.04	53.8
Kangwon	10 (3.5)	5.42	95.9
Ch'ungch'ong	42 (14.6)	9.44	167.1
Cholla	36 (12.5)	5.65	100.0
Kyongsang	79 (27.5)	6.93	122.7
Cheju	5 (1.7)	10.94	193.6
N. Korea	76 (26.5)	-	-

*The figures in parentheses indicate the percentage.
**It is based on the total number of only of only South Korean origin (211), because the population of North Korea is not available.

Source: Chosun Ilbo (Chosun Daily Newspaper). Seoul: Chosun Ilbo, July 20, 1980, p. 3.

or the Kyongsang region as of March 1, 1980 (Table 49). High public officials include Rank 2-B and above[25] in terms of job grade in the central government. They are not only responsible for implementing established policies and given a wide range of discretion, but they are also deeply involved in decision-making processes. In this regard, their places of birth may directly or indirectly influence the pace and direction of their regions' economic and social progress.

[25] In general, they include deputy bureau chief (2-B), bureau chief (2-A), administrator (1-A), and assistant deputy minister.

TABLE 49

DISTRIBUTION OF HIGH PUBLIC OFFICIALS BY PLACE OF BIRTH, 1980

Region	Number	Per 100,000 people	
		Number	Index value
Nation	1,357 (100.0)*	3.39**	143.6
Capital	437 (32.2)	3.40	144.1
Kangwon	49 (3.6)	2.66	112.7
Ch'ungch'ong	171 (12.6)	3.84	162.7
Cholla	150 (11.1)	2.36	100.0
Kyongsang	450 (33.2)	3.95	167.4
Cheju	10 (0.7)	2.19	92.8
N. Korea	90 (6.6)	-	-

*The figures in parentheses indicate the percentage.
**It is computed on the basis of South Korean origin (1,267).
Source: As in Table 48.

In terms of index values per 100,000 people, the Cheju region has produced the least public officials, and is slightly lower than the Cholla region. Also unexpected is the relatively high proportion of high public officials from the Ch'ungch'ong region. The number from the Kyongsang region is also greater than one and a half the number from the Cholla region, even though the figures may have changed recently because of the large-scale purge of high public officials. In any event, the Kyongsang region appears to have been largely favored by the nation's political and economic elites, who have mainly come from the region, with most of the key economic development projects and other "goodies" at their disposal.

In contrast, the struggle for development in the Cholla region appears to have been relatively handicapped by both explicit and implicit policies. As the biggest rice producer and yet the poorest region, it has been long victimized by occasional floods and by especially tight-fisted landlords.[26] Even in Korea's recent rapid industrial development, the Cholla region continues to be comparatively neglected.

Although Lim[27] argues that private entrepreneurs rather than the government plans have played the major role in achieving national economic growth in Korea, it appears that the energetic industrialization policy has actually created an ever widening disparity among regions. In fact, opinions prevail among insiders as well as outsiders that the gap between the Cholla region and the Kyongsang region has become a gulf to date.[28] The gulf may have been worsened by the sub-national favoritism as expressed in locationally biased distribution of political and economic power. Furthermore, Bark[29] argues that the Cholla region has been traditionally known as an opposition area. As a result, the central

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[26]White, Peter T. (1975). "South Korea: What Next?" National Geographic. vol. 148, no. 3 (September), p. 415.

[27]Lim, Youngil. (1980). "Government Policy and Private Enterprises: Korean Experience in Industrialization," a Report submitted to Foundation for Research in Economics and Education in Los Angeles, California (mimeo.), pp. 16-25.

[28]For example, see Dong Suh Bark (1971). "Comparison of Provincial Development Administration in Korea," Journal of Social Sciences and Humanities. no. 34 (June), pp. 1-23; Bradley K. Martin (1980). "Where 'Hawaii' is an Insult," Honolulu Star-Bulletin. May 24, p. A-8; "Season of Spleen: Outright Insurrection Raises Alarm about an Invaluable Pacific Ally," Time. June 2, 1980, p. 36; and Peter T. White, op. cit., p. 415.

[29]Bark, op. cit., p. 22.

government is likely to have adopted discriminatory development policies against the region. The people of Cholla seem to be losers in receiving the benefits of development. As Holland[30] points out, the political factor in regional development policies is in many cases as important or more important than the policies themselves.

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[30]Holland, Stuart. (1976). Capital versus the Regions. New York: St. Martin's Press, p. 28.

CHAPTER VII

SUMMARY AND CONCLUSIONS

A frequently stated and widely believed maxim of economic development holds that strong central planning is necessary to achieve rapid economic growth, even though Dick[1] argues that authoritarian governments are not necessarily capable of achieving fast economic growth in the early stages of development. Economic growth in the Third World, as in Korea, during the post-war period presumably accelerates as a result of deliberate attempts to maximize aggregate output, particularly under centralized planning and implementation. Korea's enormous expansion of GNP and exports has been a shining example of such efforts among developing countries as well as industrialized countries since the mid-1960s. Less impressive has been Korea's ability to share the benefits of development, especially among regions. Regional disparities have accelerated in many respects, even though Korea has attempted deliberately to lower its growth rate to promote a 'balanced economy' by achieving more equitable regional development and improving the quality of life, as emphasized in the Third Five-Year Economic Development Plan (1972-76). The plan, however, seems to be unsuccessful in achieving those objectives as a whole.

The spatial manifestations of disparity are not obvious, and

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[1]Dick, G. William (1974). "Authoritarian versus Nonauthoritarian Approaches to Economic Development," Journal of Political Economy. vol. 82, no. 4 (July-August), p. 817.

inductive explanation based on associated characteristics can only be the first approximations of the truth.[2] An awareness of regional disparities and their magnitude must be the first step towards their removal. The economic growth of the Kyongsang region dating back to the Japanese colonial period was primarily affected by its strategic location, connecting the rest of the Korean peninsula to Japan. The Japanese began the development of Pusan in the early 1900s as the natural base for their colonial operations. The Pusan-Seoul double-track railway was built in 1905 and subsequently Pusan harbor was expanded on a large-scale as a major development project. Meanwhile, the Cholla region played an important role as rice supplier to the Japanese. Kunsan and Mokp'o were developed as the ports for shipping rice from the region. Whatever their underlying motives, regional specialization led to the emergence of regional disparities, but the gap between the two regions remained slight.

Current development of the Kyongsang region, as a specialized place in the national economy especially for manufacturing of export goods, has surpassed that of the Capital region in some instances. It far surpassed the Cholla region in terms of nearly every facet of development, except for rice productivity. In particular, the gap between the Kyongsang region and the Cholla region, especially in terms of gross regional product per capita has accelerated since the early 1960s. Furthermore, disparities between localities in the two regions appear to

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[2]Coates, B.E. et al. (1977). Geography and Inequality. Oxford: Oxford University Press, p. 53.

have significantly accelerated since the mid-1960s. It is, however, not clear whether disparities appear to be greater in smaller geographic units into which data are broken down,[3] since the methods and data employed in multiple levels of analysis are not identical.

The magnitude of regional disparities measured by GRP per capita and other socio-economic development indicators may be different, if negative externalities and disamenities, such as environmental pollution, traffic congestion and other urban problems, were taken into account. Such considerations are not taken into account in measuring the level of regional development, even though efforts to measure Net National Welfare (NNW) and Quality of Life (QOL) have been made for other nations.

Of the many possible determinants of regional development, private investment appears to be a crucial factor in development of the Kyongsang region during the first half of the 1970s. Regional development seems to depend upon the volume of innovations transferred and adopted by private entrepreneurs engaged in investment activities, even though it is not clear whether entrepreneurs caused economic growth or the incentive effects of growth caused entrepreneurial activities, as pointed out by Papanek.[4] In any event, the experience of Korea's development, especially the Kyongsang region, is fully compatible with

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[3]Stöhr, Walter B. (1974). Interurban Systems and Regional Economic Development. Resource Paper No. 26, Washington, D.C.: Association of American Geographers, p. 3.

[4]Papanek, Gustav F. (1977). "Economic Development Theory: The Earnest Search for a Mirage," in Manning Nash (ed.), Essays on Economic Development and Cultural Change in Honor of Bert F. Hoselitz. Chicago: The University of Chicago Press. p. 274.

Schumpeter's theory of regional development--which emphasizes the role of entrepreneurs.[5] During the 1960s, however, education played much more important role in development, and particularly in economic development, of the Cholla region than the Kyongsang region probably because of the relatively evenly distributed stocks of human capital among localities in the Kyongsang region in the early stage of development. This at least partially supports the contention of Hinderink and Sterkenburg, who argue that unequal access to education may be an important determinant of income inequality in an industrial society.

While infrastructure was by far a crucial factor in explaining developmental changes in the Cholla region between 1971 and 1975, private investment was more important in the Kyongsang region during the same period. Between 1964 and 1975 infrastructure and, to a lesser extent, education both played an important role in developmental changes in the two regions. The regional dummy variables were more significant in accounting for changes in levels of development than in explaining the levels, themselves. Disparities in changes in levels of development between the two regions are thus much more attributable to locational than to structural (political, economic and social) conditions. On the other hand, disparities in the level of development between the two regions appear to be associated with structural conditions.

Finally, not only have explicit economic policies accelerated the pace and shaped the structure of regional development in the Kyongsang

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[5] Brookfield, Harold. (1975). Interdependent Development. Pittsburgh: University of Pittsburgh Press, pp. 86-90.

region, implicit politically determined policies have also favored the region, where opportunities of political influence and participation in nearly all of the key economic decisions are wider, as indicated by the larger proportion of high public officials from the region. In contrast, the struggle for development in the Cholla region appears to have been relatively handicapped by both explicit and implicit policies in the last two decades.

Although clear-cut methods to establish causal links between policy instruments and their impacts have yet to be developed, the rank correlation technique employed here seems to furnish some clues to broad relationships between regional policy and development factors. The questions of time lags from policy input to end results of development need further scrutiny. It is hoped that this research will facilitate attempts to apply alternative models as well as methods.

On the basis of these findings, one may conclude that regional disparities between Korea's leading and lagging regions exist for a variety of reasons:

1) Regional variations in infrastructure are closely associated with developmental changes, particularly in the lagging region.
2) Regional variations in education are an important factor at least in the early stage of regional development, particularly in the lagging region.
3) Regional variations in private investment activities are by far a crucial factor in accounting for changes in levels of development as well as the levels, themselves, in both leading and lagging regions.
4) Regional variations in development appear to be attributable to both

locational and structural conditions.

5) Regional variations in development appear to be both an outgrowth of explicit aggregate policies aimed at national efficiency and an expression of implicit sub-national favoritism.

Interdependency among regions within a country implies that it is not possible to raise the well-being of one region without raising that of other regions. Clark[6] argues that lagging regions are usually presumed to be dependent colonies providing reserves of labor, capital, and markets for exploitation by the core economy. The Cholla region has provided one of the basic necessities, namely foodstuffs, to industrial workers at relatively inexpensive prices. Government pricing policies have enabled manufacturers to maintain a low industrial wage. Korea's comparative advantage in competing in international markets has been primarily due to its cheap skilled and unskilled labor. The Cholla region, which has played a vital role as the nation's rice basket, in a sense paved the way for national economic development.

A dual process of polarization has thus prevailed in Korea. At one end of the scale, the benefits of development are decreasing. At the other, there is increasing concentration of economic and social activities through politically and economically determined regional development policies. The implication is that explicit and implicit policies aimed at accelerating national economic development through regional polarization in Korea cannot be successful without negative side effects.

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[6]Clark, Gordon L. (1980). "Capitalism and Regional Inequality," Annals of the Association of American Geographers. vol. 70, no. 2 (June), p. 277.

The efficiency goal pursued in the last two decades, therefore, may not be compatible with the equity goal. Disparities do not necessarily diminish even in the long run, since changes in levels of development appear to be closely associated with locational distortions. It appears from Korea's experience that polarization policies perpetuate regional disparities arising in the early stage of economic development.

Other examples of centralized national planning and policy in the Third World, according to Mehmet,[7] include Malaysia, Pakistan, Brazil and Uganda. Such unbalanced national economies come about within a highly elitist political system controlled by feudal landlords, military and civilian elites. Spatially biased policies based on the efficiency goal may indeed result in successful efforts by these countries to maximize their aggregate output.

However, a growing number of countries now emphasize more spatially balanced and functionally integrated development. The Government of the Philippines, for example, proclaims that 'no longer is maximum economic growth the singular apex of goals; equally desired are maximum employment, promotion of social development and more equitable distribution of income and wealth.'[8] This is another example of pessimistic views in pursuing the efficiency goal in national development. Centralized

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[7]Mehmet, Ozay. (1978). Economic Planning and Social Justice in Developing Countries. New York: St. Martin's Press, pp. 95-122.

[8]Rondinelli, Dennis A. and Kenneth Ruddle (1978). "Political Commitment and Administrative Support," Journal of Administration Overseas. vol. 17, no. 1 (January), p. 43.

countries in the Third World, including Korea, may no longer be able to afford the luxury of politically as well as economically polarized development from the perspective of equity and social justice.

There is wide agreement that social justice is one of the goals that most Koreans continuously desire.[9] In order to relieve prevailing social unrest and thereby realize social and spatial justice, preconditions for an equity policy must be laid out. The rationale for such a policy is that "free" operation of the market seldom prevails to promote spatially balanced growth. Since the public sector is the dominant force in development in rapidly developing countries like Korea, the allocation of available resources and investment decisions have to be effectively and objectively determined to stimulate the economy of lagging regions.

As preconditions for an equity policy, political commitment to more equitable regional development is of great importance in Korea where implicit sub-national favoritism appears to prevail in the existing political and economic system. Inequitable patterns of development cannot be changed without intense political commitment. Political commitment involves a pervasive and sustained determination by top level leaders to achieve the goals of economic reorganization and social equity. Continuous attention and almost single-minded commitment of political leaders are required to transform efficiency-oriented programs into equity-oriented action, such as the provision of infrastructure, education and information concerning innovations in production technology,

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[9]Oka, Takashi. "Asia-Pacific Focus," The Honolulu Advertiser. August 6, 1980, p. A-15.

training of and financial assistance to private entrepreneurs.

In addition, planners and administrators participating in the key economic decisions must be recruited to insure that entrenched interests do not prevent the redistribution of resources necessary for equitable regional development. For many countries in the Third World with long traditions of centralized political and economic control, opportunities for political participation are far from equal.[10] It appears that strong political commitment, which has been greatly successful in promoting Korea's export expansion, changes in policy priorities, and more political participation are the basic preconditions for more equitable regional development.

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[10]Kuklinski, Antoni. (1975). "Regional Development, Regional Policies and Regional Planning," in Antoni Kuklinski (ed.), Regional Disaggregation of National Policies and Plans. The Hague: Mouton. p. 5.

APPENDIX

DATA USED IN THE REGRESSION ANALYSIS

Local Taxes Per Capita (won)

City and Town	1964	1967	1971	1975
1. Chonju	290	393	1,363	4,377
2. Kunsan	392	434	1,440	4,330
3. Iri	288	361	1,136	3,614
4. Kwangju	318	465	1,413	4,603
5. Mokp'o	244	286	944	2,848
6. Yosu	222	247	906	3,063
7. Sunch'on	228	280	678	2,268
8. Samrye	291	377	787	1,642
9. Namwon	146	271	450	1,943
10. Chongju	117	169	630	2,362
11. Sintaein	274	273	608	2,092
12. Koch'ang	230	259	391	2,036
13. Puan	294	393	685	2,279
14. Kimche	304	251	871	2,822
15. Songchong	173	136	478	2,078
16. Tamyang	203	225	432	1,820
17. Kurye	181	200	444	1,768
18. Kwangyang	177	199	301	1,455
19. Posong	243	143	548	2,253
20. Pulkyo	235	211	418	2,051
21. Hwasun	154	116	384	952
22. Changhung	277	256	596	1,388
23. Kangjin	312	170	597	2,096

City and Town	1964	1967	1971	1975
24. Haenam	391	184	645	1,026
25. Naju	162	179	608	1,472
26. Yongsanp'o	158	122	519	1,321
27. Hamp'yong	170	176	396	1,246
28. Yongkwang	173	123	398	1,481
29. Changsong	237	140	508	2,102
30. Wando	51	114	293	921
31. Taegu	339	722	1,698	5,313
32. P'ohang	325	536	1,412	6,024
33. Kyongju	283	418	1,148	2,920
34. Kimch'on	116	373	868	2,931
35. Andong	239	471	601	3,538
36. Pusan	437	922	2,100	6,506
37. Masan	278	528	1,389	4,330
38. Chinju	231	420	1,360	4,500
39. Ch'ungmu	183	293	1,081	3,942
40. Chinhae	151	483	1,002	3,896
41. Samch'onp'o	124	241	658	2,270
42. Ulsan	412	841	2,345	9,324
43. Uisong	258	234	320	2,097
44. Kuryongp'o	220	91	129	1,182
45. Kamp'o	104	387	494	1,631
46. Ankang	275	245	382	1,596
47. Yongch'on	276	328	494	1,827
48. Kyongsan	210	122	708	3,249
49. Ch'ongdo	200	312	532	2,533
50. Waekwan	243	299	492	2,204
51. Kumi	251	278	635	2,792
52. Sangju	211	297	589	2,559
53. Chomch'on	312	285	507	2,281
54. Yech'on	260	203	503	2,162
55. Yongju	317	311	792	2,801

City and Town	1964	1967	1971	1975
56. Ch'angyong	172	185	357	1,484
57. Namji	163	174	427	1,827
58. Milyang	175	356	624	2,557
59. Samrangjin	75	338	524	2,257
60. Kimhae	255	279	672	3,268
61. Chinyong	175	260	565	2,926
62. Changsungp'o	71	170	401	1,495
63. Kosong	279	296	682	1,783
64. Sach'on	212	234	646	1,513
65. Hadong	252	283	622	1,498
66. Hamyang	106	186	349	1,312
67. Koch'ang	252	295	524	1,718

Bank Deposits Per Capita (won)

City and Town	1964	1967	1971	1975
1. Chonju	1,958	8,410	26,195	65,886
2. Kunsan	1,603	9,376	31,207	68,754
3. Iri	866	7,699	23,664	49,882
4. Kwangju	2,063	8,813	29,171	104,084
5. Mokp'o	2,203	8,901	29,399	75,579
6. Yosu	1,878	6,854	35,869	84,280
7. Sunch'on	1,134	6,257	23,045	48,626
8. Samrye	417	2,480	10,026	28,785
9. Namwon	1,041	2,549	8,871	14,339
10. Chongju	1,102	3,575	12,789	26,257
11. Sintaein	351	2,084	-- *	23,595
12. Koch'ang	362	3,031	--	29,904
13. Puan	355	2,337	10,334	27,148

City and Town	1964	1967	1971	1975
14. Kimche	650	4,680	13,626	24,639
15. Songchong	412	1,496	15,148	24,878
16. Tamyang	327	1,042	13,407	30,989
17. Kurye	252	1,047	15,347	29,502
18. Kwangyang	311	1,044	20,684	26,502
19. Posong	362	1,149	17,761	31,057
20. Pulkyo	357	1,207	17,761	20,056
21. Hwasun	248	1,268	22,129	15,686
22. Changhung	269	1,046	11,922	26,026
23. Kangjin	277	1,144	19,539	25,360
24. Haenam	303	1,244	12,360	31,736
25. Naju	411	1,251	11,328	39,760
26. Yongsanp'o	392	1,302	18,137	19,357
27. Hamp'yong	312	1,139	13,168	18,580
28. Yongkwang	347	1,046	18,141	21,862
29. Changsong	403	1,145	18,670	18,594
30. Wando	388	1,033	15,561	23,215
31. Taegu	3,845	11,685	51,166	127,636
32. P'ohang	1,415	8,470	33,023	90,996
33. Kyongju	941	4,334	26,627	48,806
34. Kimch'on	1,921	5,741	29,916	50,199
35. Andong	2,488	8,913	25,817	64,682
36. Pusan	3,867	14,463	54,292	132,067
37. Masan	2,715	9,338	33,361	116,694
38. Chinju	1,608	8,781	25,613	75,586
39. Ch'ungmu	1,828	8,108	27,578	99,376
40. Chinhae	1,033	6,604	19,216	43,484
41. Samch'onp'o	786	3,519	18,832	67,625
42. Ulsan	1,272	6,627	31,569	72,204
43. Uisong	--	1,817	17,266	34,649
44. Kuryongp'o	377	--	--	54,050
45. Kamp'o	--	--	--	20,037

City and Town	1964	1967	1971	1975
46. Ankang	362	--	--	30,453
47. Yongch'on	391	2,922	23,117	64,495
48. Kyongsan	376	1,746	24,196	40,684
49. Ch'ongdo	300	1,922	--	47,256
50. Waekwan	403	2,347	21,622	30,015
51. Kumi	311	2,016	25,146	67,113
52. Sangju	431	3,408	22,676	42,087
53. Chomch'on	499	2,832	22,111	45,045
54. Yech'on	--	2,022	10,305	44,359
55. Yongju	501	5,346	23,176	59,811
56. Ch'angyong	398	1,728	12,984	46,130
57. Namji	406	--	--	28,071
58. Milyang	493	1,834	16,744	54,536
59. Samrangjin	426	1,904	17,407	34,668
60. Kimhae	506	2,127	25,314	40,767
61. Chinyong	241	1,607	19,156	34,785
62. Changsungp'o	314	1,606	12,388	27,695
63. Kosong	434	1,036	13,968	20,578
64. Sach'on	360	1,709	15,751	42,641
65. Hadong	345	1,609	22,208	48,370
66. Hamyang	356	1,599	16,804	22,253
67. Koch'ang	472	1,800	14,456	35,865

Note: *Indicates the missing data.

Mortality (Number of Death per 1,000 People)

City and Town	1964	1967	1971	1975
1. Chonju	2.22	3.23	2.48	4.61
2. Kunsan	2.05	4.08	3.40	8.71
3. Iri	2.02	3.24	3.89	5.56

City and Town	1964	1967	1971	1975
4. Kwangju	1.97	2.04	3.95	4.53
5. Mokp'o	1.89	2.24	4.13	5.58
6. Yosu	4.08	2.89	4.36	3.99
7. Sunch'on	3.73	5.82	6.25	6.81
8. Samrye	4.37	7.25	4.43	7.56
9. Namwon	2.47	9.02	4.83	8.32
10. Chongju	4.05	6.88	3.69	8.04
11. Sintaein	4.25	7.17	4.14	14.66
12. Koch'ang	3.09	7.96	3.81	10.81
13. Puan	2.42	7.66	3.27	10.92
14. Kimche	4.56	7.21	3.69	9.55
15. Songchong	5.46	6.72	8.42	10.09
16. Tamyang	5.63	6.58	8.14	9.38
17. Kurye	6.02	7.96	9.88	9.29
18. Kwangyang	5.92	8.60	10.16	13.40
19. Posong	6.12	6.81	10.62	7.29
20. Pulkyo	5.88	7.02	9.52	11.86
21. Hwasun	5.01	6.68	9.83	11.62
22. Changhung	6.36	5.52	11.11	13.38
23. Kangjin	6.11	7.27	10.77	13.41
24. Haenam	6.33	6.90	18.42	10.87
25. Naju	5.85	6.26	9.66	12.35
26. Yongsanp'o	5.28	7.06	9.09	10.87
27. Hamp'yong	5.17	7.86	14.19	14.25
28. Yongkwang	6.12	5.60	8.47	7.55
29. Changsong	4.99	6.80	10.74	14.90
30. Wando	6.52	7.52	6.88	10.04
31. Taegu	2.02	2.33	2.42	2.39
32. P'ohang	3.26	3.39	3.96	2.79
33. Kyongju	5.38	3.70	6.41	6.76
34. Kimch'on	3.96	4.54	5.98	6.95

City and Town	1964	1967	1971	1975
35. Andong	3.31	3.29	4.56	4.57
36. Pusan	2.33	1.83	3.05	2.89
37. Masan	2.65	3.10	2.72	3.25
38. Chinju	4.26	4.43	2.82	4.93
39. Ch'ungmu	4.56	5.31	5.11	4.41
40. Chinhae	3.97	3.67	6.23	3.79
41. Samch'onp'o	4.69	5.90	7.63	6.27
42. Ulsan	4.14	4.01	5.05	3.23
43. Uisong	5.24	8.61	7.45	9.46
44. Kuryongp'o	5.23	5.10	9.57	13.95
45. Kamp'o	5.06	5.83	10.53	11.11
46. Ankang	5.31	5.39	10.17	11.38
47. Yongch'on	5.12	5.44	7.59	7.84
48. Kyongsan	5.05	5.08	6.92	6.07
49. Ch'ongdo	5.60	7.04	8.60	9.76
50. Waekwan	5.83	6.01	5.77	6.16
51. Kumi	5.85	6.32	7.30	6.50
52. Sangju	4.97	6.11	7.29	5.75
53. Chomch'on	4.53	5.85	6.59	4.68
54. Yech'on	5.01	6.62	7.77	8.35
55. Yongju	5.08	6.28	4.26	4.51
56. Ch'angyong	5.33	6.74	10.16	9.21
57. Namji	5.01	6.74	8.32	8.87
58. Milyang	5.80	6.28	5.30	8.19
59. Samrangjin	4.52	5.80	5.37	13.90
60. Kimhae	4.27	5.23	--	9.15
61. Chinyong	6.09	5.73	11.03	12.17
62. Changsungp'o	5.80	7.29	11.58	10.50
63. Kosong	5.77	7.38	11.96	4.85
64. Sach'on	5.37	7.35	--	12.67
65. Hadong	5.72	6.83	10.22	6.59
66. Hamyang	4.52	7.03	6.85	10.38
67. Koch'ang	6.19	7.33	10.17	7.17

Housing Ownership (%)

City and Town	1964	1967	1971	1975
1. Chonju	47.0	65.0	57.0	54.7
2. Kunsan	64.8	66.3	68.5	56.0
3. Iri	58.1	61.6	63.2	64.5
4. Kwangju	76.5	66.7	59.0	56.9
5. Mokp'o	64.3	65.7	62.3	53.9
6. Yosu	70.3	70.7	53.0	61.0
7. Sunch'on	85.0	77.9	71.0	73.5
8. Samrye	79.3	82.7	84.0	88.0
9. Namwon	81.6	67.7	70.0	73.2
10. Chongju	74.0	68.5	71.9	66.2
11. Sintaein	83.1	82.6	66.0	84.6
12. Koch'ang	84.7	75.6	81.0	77.0
13. Puan	96.0	77.1	77.0	77.8
14. Kimche	66.2	70.9	70.0	87.2
15. Songchong	92.0	78.3	67.0	55.5
16. Tamyang	74.0	84.2	81.2	68.3
17. Kurye	82.7	85.5	88.0	90.2
18. Kwangyang	89.7	91.6	88.0	90.0
19. Posong	77.0	95.6	80.0	84.1
20. Pulkyo	94.0	93.4	94.0	87.0
21. Hwasun	86.0	88.0	89.0	78.2
22. Changhung	81.9	87.5	81.0	86.7
23. Kangjin	91.0	78.7	83.0	76.2
24. Haenam	86.6	81.9	72.0	80.5
25. Naju	88.0	73.4	77.2	62.6
26. Yongsanp'o	70.0	76.4	87.6	52.3
27. Hamp'yong	75.2	90.0	84.7	70.0
28. Yongkwang	74.0	76.0	78.6	77.4
29. Changsong	61.5	76.0	82.2	75.8
30. Wando	77.5	82.6	64.3	81.3

City and Town	1964	1967	1971	1975
31. Taegu	64.7	50.7	48.3	47.8
32. P'ohang	67.2	66.1	65.5	57.7
33. Kyongju	83.4	85.4	75.2	66.8
34. Kimch'on	77.1	71.3	70.5	69.0
35. Andong	71.4	63.8	66.1	56.5
36. Pusan	67.4	63.1	54.3	50.0
37. Masan	59.2	78.1	64.8	52.1
38. Chinju	80.1	69.8	70.2	61.9
39. Ch'ungmu	75.3	93.2	78.2	61.2
40. Chinhae	61.6	68.9	62.6	68.7
41. Samch'onp'o	72.5	87.3	83.0	65.1
42. Ulsan	86.7	65.8	58.7	51.3
43. Uisong	87.4	82.9	77.2	76.1
44. Kuryongp'o	70.1	80.8	80.1	77.5
45. Kamp'o	86.2	90.1	76.1	86.8
46. Ankang	75.7	93.8	89.0	83.5
47. Yongch'on	77.2	66.4	74.4	62.0
48. Kyongsan	88.1	84.5	68.6	60.0
49. Ch'ongdo	64.3	88.4	91.6	76.0
50. Waekwan	47.2	69.8	71.0	71.7
51. Kumi	93.5	94.8	84.2	56.0
52. Sangju	84.5	84.8	82.1	76.7
53. Chomch'on	76.5	97.1	92.8	75.5
54. Yech'on	89.4	83.4	73.6	67.9
55. Yongju	56.3	68.1	62.1	64.5
56. Ch'angyong	91.9	94.8	82.0	82.3
57. Namji	66.9	88.3	97.0	91.8
58. Milyang	96.9	92.6	71.0	70.7
59. Samrangjin	93.3	87.7	93.0	79.9
60. Kimhae	93.5	77.9	76.7	64.6
61. Chinyong	91.0	92.1	79.0	82.4
62. Changsungp'o	86.4	80.0	87.8	76.3

City and Town	1964	1967	1971	1975
63. Kosong	71.6	86.0	82.0	78.1
64. Sach'on	87.1	81.1	87.0	81.5
65. Hadong	90.1	86.9	77.0	75.3
66. Hamyang	89.7	83.6	96.0	83.7
67. Koch'ang	62.5	79.2	84.5	78.4

Road Connectivity (Shimbel Index)

City and Town	1964	1967	1971	1975
1. Chonju	223	221	214	212
2. Kunsan	359	354	321	314
3. Iri	366	359	275	271
4. Kwangju	284	278	265	219
5. Mokp'o	378	375	373	368
6. Yosu	337	330	332	258
7. Sunch'on	270	270	270	197
8. Samrye	288	284	277	274
9. Namwon	235	235	233	226
10. Chongju	242	240	234	231
11. Sintaein	278	272	262	257
12. Koch'ang	284	283	280	278
13. Puan	298	295	291	286
14. Kimche	280	277	271	270
15. Songchong	341	333	323	282
16. Tamyang	237	235	226	216
17. Kurye	255	255	253	243
18. Kwangyang	267	267	266	254
19. Posong	363	360	354	283
20. Pulkyo	317	317	317	248
21. Hwasun	310	309	307	236

City and Town	1964	1967	1971	1975
22. Changhung	403	403	403	264
23. Kangjin	424	422	415	337
24. Haenam	433	433	431	387
25. Naju	328	324	316	264
26. Yongsanp'o	377	374	367	323
27. Hamp'yong	324	323	318	315
28. Yongkwang	327	326	322	299
29. Changsong	279	275	269	258
30. Wando	503	498	493	447
31. Taegu	222	219	215	193
32. P'ohang	310	306	297	286
33. Kyongju	309	299	260	236
34. Kimch'on	264	262	261	257
35. Andong	313	311	307	291
36. Pusan	337	328	303	281
37. Masan	271	268	261	234
38. Chinju	224	224	224	188
39. Ch'ungmu	385	385	385	350
40. Chinhae	313	313	313	280
41. Samch'onp'o	335	335	335	299
42. Ulsan	304	302	301	272
43. Uisong	265	263	261	239
44. Kuryongp'o	373	373	372	338
45. Kamp'o	352	345	306	284
46. Ankang	310	310	310	286
47. yongch'on	262	262	262	241
48. Kyongsan	272	267	265	246
49. Ch'ongdo	271	267	264	244
50. Waekwan	243	241	240	230
51. Kumi	304	304	304	295
52. Sangju	289	289	289	280
53. Chomch'on	352	349	347	344

City and Town	1964	1967	1971	1975
54. Yech'on	375	375	375	354
55. Yongju	377	377	376	355
56. Ch'angyong	236	236	235	229
57. Namji	273	269	258	223
58. Milyang	301	292	268	246
59. Samrangjin	341	336	313	293
60. Kimhae	353	348	334	282
61. Chinyong	303	303	301	269
62. Changsungp'o	462	456	445	412
63. Kosong	323	322	319	288
64. Sach'on	282	280	275	245
65. Hadong	248	245	242	241
66. Hamyang	226	226	224	222
67. Koch'ang	215	213	210	207

Water Supply (%)

City and Town	1964	1967	1971	1975
1. Chonju	16.5	52.2	65.1	71.8
2. Kunsan	74.3	81.5	86.5	84.4
3. Iri	44.9	53.6	60.8	63.5
4. Kwangju	39.1	51.0	57.6	67.5
5. Mokp'o	95.8	91.7	95.1	95.5
6. Yosu	69.0	59.0	58.4	68.7
7. Sunch'on	83.0	79.2	77.0	61.1
8. Samrye	0.0	0.0	0.0	0.0
9. Namwon	0.0	8.3	10.7	17.0
10. Chongju	0.0	15.0	35.0	55.5
11. Sintaein	0.0	0.0	0.0	0.0
12. Koch'ang	0.0	0.0	0.0	0.0

City and Town	1964	1967	1971	1975
13. Puan	0.0	13.2	46.2	56.8
14. Kimche	64.1	25.0	35.0	50.0
15. Songchong	0.0	7.5	10.6	39.8
16. Tamyang	0.0	17.8	28.0	32.2
17. Kurye	0.0	0.0	0.0	0.0
18. Kwangyang	0.0	0.0	0.0	0.0
19. Posong	0.0	5.1	12.7	19.3
20. Pulkyo	0.0	0.0	0.0	0.0
21. Hwasun	0.0	0.0	0.0	0.0
22. Changhung	0.0	6.2	7.7	34.3
23. Kangjin	82.0	8.5	14.0	36.8
24. Haenam	0.0	0.0	0.0	0.0
25. Naju	0.0	4.8	6.7	20.7
26. Yongsanp'o	0.0	19.0	13.5	25.2
27. Hamp'yong	11.0	17.5	24.7	21.4
28. Yongkwang	0.0	29.3	46.4	52.1
29. Changsong	0.0	5.7	10.0	23.7
30. Wando	80.0	18.5	30.0	44.7
31. Taegu	60.0	69.5	75.0	81.0
32. P'ohang	63.0	94.8	80.3	74.0
33. Kyongju	89.0	42.8	46.8	50.7
34. Kimch'on	32.0	57.9	59.1	86.0
35. Andong	48.0	62.2	83.6	76.7
36. Pusan	60.0	68.3	74.1	78.0
37. Masan	18.0	55.3	81.2	74.3
38. Chinju	53.0	55.3	77.4	75.8
39. Ch'ungmu	46.0	66.3	66.5	74.8
40. Chinhae	46.3	51.8	71.1	71.8
41. Samch'onp'o	52.0	48.5	37.3	49.4
42. Ulsan	44.0	46.4	51.9	61.1
43. Uisong	10.0	37.6	58.1	55.5
44. Kuryongp'o	1.5	11.2	16.4	38.4

City and Town	1964	1967	1971	1975
45. Kamp'o	0.0	13.6	15.5	50.8
46. Ankang	0.0	0.0	0.0	0.0
47. Yongch'on	79.0	54.6	64.8	81.0
48. Kyongsan	0.0	0.0	0.0	0.0
49. Ch'ongdo	68.0	19.7	21.1	28.3
50. Waekwan	0.0	20.2	38.5	64.5
51. Kumi	0.0	18.9	30.0	64.0
52. Sangju	0.0	10.2	11.8	47.0
53. Chomch'on	14.0	13.5	33.7	76.4
54. Yech'on	0.0	9.1	10.2	22.4
55. Yongju	0.0	23.2	63.1	69.9
56. Ch'angyong	0.0	27.5	32.3	33.0
57. Namji	0.0	9.8	10.8	13.2
58. Milyang	30.0	52.0	57.0	64.2
59. Samrangjin	0.0	27.2	34.7	25.8
60. Kimhae	50.0	53.7	45.7	40.4
61. Chinyong	0.0	18.6	20.5	23.9
62. Changsungp'o	35.0	29.2	33.8	46.2
63. Kosong	16.7	46.8	33.6	39.8
64. Sach'on	90.0	64.3	71.2	68.3
65. Hadong	0.0	17.7	19.2	33.5
66. Hamyang	0.0	0.0	0.0	0.0
67. Koch'ang	0.0	4.7	12.1	22.0

Number of Medical Personnel (per 1,000 people)

City and Town	1964	1967	1971	1975
1. Chonju	2.02	12.38	13.85	6.36
2. Kunsan	1.67	6.00	7.96	4.48
3. Iri	2.31	6.83	8.58	8.82

City and Town	1964	1967	1971	1975
4. Kwangju	2.69	6.24	12.84	16.32
5. Mokp'o	0.89	8.96	9.10	8.19
6. Yosu	0.80	5.44	9.36	4.83
7. Sunch'on	0.68	4.54	5.86	7.50
8. Samrye	0.30	5.40	5.48	5.57
9. Namwon	1.12	8.57	9.16	6.10
10. Chongju	0.41	7.96	6.37	5.11
11. Sintaein	0.55	3.79	2.30	1.49
12. Koch'ang	0.41	5.88	4.43	1.69
13. Puan	0.55	4.55	8.46	7.35
14. Kimche	0.59	17.40	8.05	12.26
15. Songchong	0.62	3.36	4.01	4.06
16. Tamyang	1.22	7.32	7.03	7.75
17. Kurye	0.77	3.39	3.78	6.53
18. Kwangyang	0.25	4.18	2.88	2.66
19. Posong	0.47	5.59	12.16	4.94
20. Pulkyo	0.23	3.03	4.68	2.06
21. Hwasun	0.33	2.48	2.98	1.75
22. Changhung	0.37	5.69	4.55	5.14
23. Kangjin	0.41	6.89	5.09	8.88
24. Haenam	0.62	7.18	5.74	14.58
25. Naju	0.84	6.73	4.24	6.85
26. Yongsanp'o	0.23	5.10	2.14	2.70
27. Hamp'yong	0.40	3.61	2.68	4.21
28. Yongkwang	0.71	5.20	4.65	5.02
29. Changsong	0.38	8.08	3.45	3.44
30. Wando	0.55	6.70	6.24	4.51
31. Taegu	1.33	10.19	9.18	11.67
32. P'ohang	0.65	8.24	8.39	14.38
33. Kyongju	0.44	5.78	6.49	6.83
34. Kimch'on	0.87	8.17	7.57	10.16
35. Andong	0.96	11.84	9.06	12.27

City and Town	1964	1967	1971	1975
36. Pusan	0.95	9.64	9.66	5.06
37. Masan	1.04	9.71	8.26	7.53
38. Chinju	0.64	7.67	6.82	7.37
39. Ch'ungmu	0.93	5.91	7.12	5.99
40. Chinhae	0.50	4.72	5.12	4.05
41. Samch'onp'o	0.33	3.09	4.67	3.18
42. Ulsan	0.53	5.47	6.51	7.61
43. Uisong	0.63	6.70	5.89	8.69
44. Kuryongp'o	0.32	2.01	2.20	2.83
45. Kamp'o	0.29	1.74	4.33	2.66
46. Ankang	0.17	1.16	3.73	1.44
47. Yongch'on	0.48	4.41	3.75	6.12
48. Kyongsan	0.33	7.33	6.15	5.55
49. Ch'ongdo	0.69	7.66	6.91	8.61
50. Waekwan	0.47	3.83	6.48	5.80
51. Kumi	0.36	3.73	7.13	8.52
52. Sangju	0.66	6.35	5.55	10.59
53. Chomch'on	0.72	4.42	5.05	6.24
54. Yech'on	0.38	12.62	4.98	6.89
55. Yongju	0.96	5.15	3.82	5.09
56. Ch'angyong	0.56	4.79	10.56	4.83
57. Namji	0.23	1.86	1.98	3.06
58. Milyang	0.51	6.47	6.02	5.83
59. Samrangjin	0.14	1.87	2.46	2.07
60. Kimhae	0.47	3.82	3.40	4.49
61. Chinyong	0.63	9.74	8.63	5.38
62. Changsungp'o	0.41	5.95	3.23	5.87
63. Kosong	0.59	4.34	4.03	4.43
64. Sach'on	0.79	8.38	4.02	5.60
65. Hadong	0.60	7.28	4.46	5.88
66. Hamyang	0.59	6.27	3.46	3.74
67. Koch'ang	0.69	5.22	4.58	4.57

Number of Telephone Subscriptions (per 100 people)

City and Town	1964	1967	1971	1975
1. Chonju	1.17	1.93	2.34	4.99
2. Kunsan	1.11	2.38	3.77	4.19
3. Iri	1.18	2.19	2.77	5.59
4. Kwangju	0.76	1.94	2.80	4.49
5. Mokp'o	1.23	2.24	2.64	5.01
6. Yosu	1.01	1.65	2.12	4.59
7. Sunch'on	0.98	1.17	2.04	3.35
8. Samrye	0.58	0.80	1.52	1.95
9. Namwon	0.76	1.41	2.41	3.98
10. Chongju	1.55	1.73	3.22	2.92
11. Sintaein	0.69	1.08	1.76	2.39
12. Koch'ang	0.67	0.96	1.58	4.61
13. Puan	0.91	1.43	2.92	4.78
14. Kimche	1.08	1.90	2.77	5.56
15. Songchong	0.76	1.03	2.02	3.27
16. Tamyang	1.11	2.04	3.35	5.83
17. Kurye	0.96	1.10	1.49	3.89
18. Kwangyang	0.56	0.81	1.80	2.98
19. Posong	0.90	1.45	1.85	2.28
20. Pulkyo	0.47	0.70	1.32	2.01
21. Hwasun	0.46	0.68	1.09	2.37
22. Changhung	0.84	1.32	2.47	3.67
23. Kangjin	1.31	1.68	1.93	3.37
24. Haenam	1.05	1.27	1.59	4.35
25. Naju	0.84	1.51	2.39	3.00
26. Yongsanp'o	1.03	1.24	2.40	3.00
27. Hamp'yong	0.63	0.94	1.78	1.88
28. Yongkwang	0.74	1.45	2.62	4.12
29. Changsong	0.69	1.45	1.92	3.37
30. Wando	0.82	1.23	1.89	1.80

City and Town	1964	1967	1971	1975
31. Taegu	1.23	2.55	2.79	5.91
32. P'ohang	1.49	2.26	3.10	4.66
33. Kyongju	0.92	1.33	2.03	4.44
34. Kimch'on	1.34	1.94	2.45	5.42
35. Andong	1.63	2.23	2.12	4.98
36. Pusan	1.04	2.99	2.72	6.36
37. Masan	1.05	2.61	3.46	3.45
38. Chinju	1.31	1.45	2.32	4.00
39. Ch'ungmu	1.34	1.56	2.09	4.16
40. Chinhae	1.07	1.31	2.84	3.68
41. Samch'onp'o	0.66	0.90	2.16	3.67
42. Ulsan	0.64	1.35	2.26	2.70
43. Uisong	1.00	1.34	1.66	3.73
44. Kuryongp'o	0.66	0.98	1.15	1.52
45. Kamp'o	0.79	1.06	1.18	1.90
46. Ankang	0.44	0.72	1.09	1.18
47. Yongch'on	1.29	1.51	1.96	3.48
48. Kyongsan	1.10	1.67	1.68	4.61
49. Ch'ongdo	0.67	1.04	2.22	4.53
50. Waekwan	0.99	1.19	2.19	4.03
51. Kumi	0.49	0.64	1.69	6.34
52. Sangju	0.92	1.32	1.90	3.85
53. Chomch'on	0.96	1.24	2.58	3.79
54. Yech'on	0.60	1.48	2.94	4.21
55. Yongju	1.74	1.64	2.11	4.43
56. Ch'angyong	0.66	1.10	2.31	3.35
57. Namji	0.36	0.44	0.83	1.23
58. Milyang	0.78	1.24	1.79	3.87
59. Samrangjin	0.07	0.43	0.80	1.25
60. Kimhae	0.37	0.77	2.02	2.78
61. Chinyong	0.69	0.84	1.20	2.14
62. Changsungp'o	0.44	0.68	1.15	4.67

City and Town	1964	1967	1971	1975
63. Kosong	0.88	1.16	2.34	3.88
64. Sach'on	0.88	1.26	1.94	2.85
65. Hadong	0.75	1.24	1.90	4.61
66. Hamyang	0.59	1.15	1.59	2.87
67. Koch'ang	0.80	1.56	2.24	3.91

Number of High School Graduates (per 1,000 people)

City and Town	1964	1967	1971	1975
1. Chonju	7.55	17.54	15.89	20.15
2. Kunsan	7.15	14.79	15.08	12.79
3. Iri	13.80	32.47	34.66	32.43
4. Kwangju	13.22	15.69	15.89	21.15
5. Mokp'o	9.77	19.74	17.02	22.03
6. Yosu	21.53	6.15	8.54	13.11
7. Sunch'on	13.82	4.27	14.29	17.79
8. Samrye	1.41	2.61	6.80	9.56
9. Namwon	9.12	7.40	7.97	11.39
10. Chongju	7.55	10.68	15.19	18.21
11. Sintaein	2.77	7.66	7.40	16.36
12. Koch'ang	8.31	9.61	9.75	18.10
13. Puan	6.78	7.47	5.85	18.09
14. Kimche	10.17	13.72	9.88	17.03
15. Songchong	4.06	5.22	3.08	5.33
16. Tamyang	5.89	3.53	8.22	14.02
17. Kurye	4.48	5.18	8.88	16.07
18. Kwangyang	1.49	2.44	3.57	7.70
19. Posong	3.92	3.35	7.71	12.74
20. Pulkyo	2.09	2.51	3.41	8.24
21. Hwasun	0.00	0.00	0.00	0.00

City and Town	1964	1967	1971	1975
22. Changhung	4.50	4.25	6.33	18.15
23. Kangjin	6.55	6.97	8.27	13.91
24. Haenam	6.11	5.55	7.95	14.17
25. Naju	3.39	3.30	7.03	13.14
26. Yongsanp'o	3.00	3.11	3.82	6.48
27. Hamp'yong	2.22	1.44	4.78	11.04
28. Yongkwang	3.53	3.16	7.48	15.60
29. Changsong	2.95	2.64	6.13	12.67
30. Wando	3.06	5.05	6.63	7.62
31. Taegu	7.75	12.29	11.82	16.30
32. P'ohang	8.96	10.86	11.14	16.18
33. Kyongju	9.50	10.53	13.67	19.16
34. Kimch'on	15.85	17.17	19.32	41.24
35. Andong	17.67	18.74	16.31	27.71
36. Pusan	7.49	9.14	9.88	11.39
37. Masan	11.08	14.83	13.81	11.11
38. Chinju	14.39	11.27	15.54	19.72
39. Ch'ungmu	7.96	12.21	9.89	10.79
40. Chinhae	6.08	7.10	7.41	9.59
41. Samch'onp'o	2.83	5.57	6.44	22.29
42. Ulsan	3.12	6.23	6.14	7.94
43. Uisong	8.18	9.02	11.50	15.54
44. Kuryongp'o	1.81	1.24	1.73	3.37
45. Kamp'o	1.45	1.97	1.73	3.53
46. Ankang	1.51	1.01	0.68	1.21
47. Yongch'on	2.37	2.58	2.96	5.70
48. Kyongsan	5.74	3.55	2.84	14.14
49. Ch'ongdo	3.51	0.00	0.00	0.00
50. Waekwan	4.25	6.52	5.02	11.18
51. Kumi	0.59	0.61	4.57	12.95
52. Sangju	9.99	13.70	7.86	18.65
53. Chomch'on	9.90	9.29	11.88	26.30

City and Town	1964	1967	1971	1975
54. Yech'on	11.40	12.32	17.53	18.60
55. Yongju	10.04	11.82	14.55	13.80
56. Ch'angyong	5.20	4.26	5.28	11.38
57. Namji	2.88	3.76	5.45	11.39
58. Milyang	14.52	13.73	10.49	19.61
59. Samrangjin	22.70	0.00	0.00	0.00
60. Kimhae	7.49	7.49	8.12	14.64
61. Chinyong	5.57	5.57	7.43	28.31
62. Changsungp'o	37.41	9.93	11.71	16.72
63. Kosong	5.90	6.28	9.86	13.32
64. Sach'on	6.42	6.31	12.30	16.36
65. Hadong	5.01	11.02	13.59	17.46
66. Hamyang	3.77	10.50	11.00	17.37
67. Koch'ang	11.88	15.84	23.51	27.96

Numbers Admitted to Colleges and Universities (per 1,000 people)

City and Town	1964	1967	1971	1975
1. Chonju	3.67	3.67	4.88	5.77
2. Kunsan	2.93	12.66	4.17	4.40
3. Iri	8.97	9.58	6.81	5.39
4. Kwangju	5.19	8.79	7.51	7.34
5. Mokp'o	3.31	14.77	5.87	5.35
6. Yosu	4.19	0.57	2.32	2.63
7. Sunch'on	3.92	3.92	4.97	3.41
8. Samrye	0.50	0.42	0.78	0.60
9. Namwon	1.44	0.86	1.00	1.02
10. Chongju	2.97	1.19	3.36	3.10
11. Sintaein	0.75	1.26	1.06	1.59
12. Koch'ang	3.31	1.76	1.94	1.94

City and Town	1964	1967	1971	1975
13. Puan	2.13	2.81	0.92	2.61
14. Kimche	3.86	2.12	2.55	2.93
15. Songchong	1.80	0.40	1.28	0.72
16. Tamyang	1.02	0.20	0.63	0.58
17. Kurye	1.59	0.82	0.28	1.00
18. Kwangyang	0.11	0.49	0.25	0.46
19. Posong	0.51	0.33	0.97	0.98
20. Pulkyo	0.00	0.30	0.51	1.07
21. Hwasun	0.00	0.00	0.00	0.00
22. Changhung	0.99	1.37	1.05	1.97
23. Kangjin	0.91	1.42	1.95	1.85
24. Haenam	1.41	1.08	2.09	1.34
25. Naju	2.13	0.54	0.99	0.62
26. Yongsamp'o	1.90	0.00	0.53	1.04
27. Hamp'yong	0.48	0.40	0.45	2.06
28. Yongkwang	0.85	0.35	0.37	1.46
29. Changsong	0.98	0.40	1.23	0.80
30. Wando	0.66	0.67	0.58	0.72
31. Taegu	3.91	4.53	4.16	5.13
32. P'ohang	8.96	4.56	2.95	3.27
33. Kyongju	3.22	3.02	3.30	3.79
34. Kimch'on	3.69	4.59	4.67	5.16
35. Andong	9.68	4.81	4.64	4.63
36. Pusan	3.12	2.40	4.77	5.20
37. Masan	2.80	3.59	4.80	3.45
38. Chinju	5.38	4.51	6.80	7.94
39. Ch'ungmu	0.91	2.48	3.03	2.98
40. Chinhae	0.29	0.92	1.56	2.24
41. Samch'onp'o	0.74	1.49	1.36	1.88
42. Ulsan	0.35	0.65	0.91	1.41
43. Uisong	3.37	0.62	0.67	0.72
44. Kuryongp'o	0.18	0.00	0.22	0.16

City and Town	1964	1967	1971	1975
45. Kamp'o	0.12	0.23	0.26	0.40
46. Ankang	0.49	0.00	0.21	0.43
47. Yongch'on	0.55	0.71	1.33	0.69
48. Kyongsan	2.64	0.00	0.23	1.54
49. Ch'ongdo	0.91	0.00	0.00	0.00
50. Waekwan	1.03	1.22	1.49	1.77
51. Kumi	0.09	0.09	0.44	0.73
52. Sangju	1.08	3.46	2.02	4.67
53. Chomch'on	3.30	3.10	2.42	5.71
54. Yech'on	3.58	3.67	3.71	1.63
55. Yongju	2.39	2.12	2.48	1.91
56. Ch'angyong	0.91	0.26	0.66	0.88
57. Namji	0.27	0.46	2.33	0.87
58. Milyang	3.05	1.07	3.55	2.94
59. Samrangjin	11.49	0.00	0.00	0.00
60. Kimhae	1.79	2.22	3.07	0.86
61. Chinyong	0.54	0.60	0.84	1.12
62. Changsungp'o	2.19	1.43	1.55	3.87
63. Kosong	0.78	0.91	1.06	3.54
64. Sach'on	1.58	1.01	1.55	2.58
65. Hadong	0.51	1.07	1.83	2.35
66. Hamyang	0.48	1.18	1.35	0.78
67. Koch'ang	1.29	1.83	3.59	4.81

Number of High School Enrollments (per 1,000 people)

City and Town	1964	1967	1971	1975
1. Chonju	53.14	58.13	81.62	70.29
2. Kunsan	49.26	45.47	50.05	45.08
3. Iri	47.99	115.13	123.96	123.34

City and Town	1964	1967	1971	1975
4. Kwangju	56.94	48.11	58.25	84.99
5. Mokp'o	28.48	46.34	76.66	77.89
6. Yosu	19.51	23.06	30.50	41.88
7. Sunch'on	43.87	39.66	53.45	69.34
8. Samrye	5.53	10.96	13.83	39.62
9. Namwon	26.53	26.27	27.89	69.87
10. Chongju	35.51	38.23	54.34	75.69
11. Sintaein	17.00	19.20	34.96	50.33
12. Koch'ang	27.96	29.92	38.59	79.24
13. Puan	24.87	30.58	33.23	73.02
14. Kimche	37.20	33.96	38.58	76.04
15. Songchong	17.24	11.53	16.17	23.06
16. Tamyang	15.92	18.97	38.37	64.86
17. Kurye	14.30	16.47	26.36	56.34
18. Kwangyang	7.44	7.38	10.17	29.51
19. Posong	11.59	21.53	25.20	63.89
20. Pulkyo	4.95	23.36	13.41	27.63
21. Hwasun	0.00	0.00	0.00	0.00
22. Changhung	12.50	12.63	41.24	63.85
23. Kangjin	23.43	22.97	30.28	47.44
24. Haenam	22.85	17.64	29.99	63.88
25. Naju	10.97	15.02	27.82	64.56
26. Yongsanp'o	0.00	3.64	8.66	22.18
27. Hamp'yong	7.27	8.30	15.20	71.88
28. Yongkwang	12.50	14.17	27.59	56.07
29. Changsong	10.00	13.88	25.81	37.94
30. Wando	12.96	22.33	21.86	36.08
31. Taegu	40.37	42.91	45.86	55.85
32. P'ohang	33.75	46.22	70.00	62.30
33. Kyongju	30.61	39.30	56.86	74.60
34. Kimch'on	58.77	56.61	73.48	116.08
35. Andong	69.78	64.49	68.39	114.76

City and Town	1964	1967	1971	1975
36. Pusan	26.32	30.37	58.33	42.75
37. Masan	40.29	50.61	50.87	40.11
38. Chinju	48.49	49.44	59.95	93.18
39. Ch'ungmu	37.16	34.40	35.96	39.89
40. Chinhae	22.99	24.48	22.60	40.97
41. Samch'onp'o	15.40	14.76	29.33	35.87
42. Ulsan	19.32	26.11	21.19	31.65
43. Uisong	30.58	33.63	42.22	57.08
44. Kuryongp'o	5.57	5.81	7.16	9.98
45. Kamp'o	7.25	5.27	10.34	15.04
46. Ankang	0.00	2.21	4.04	6.28
47. Yongch'on	10.09	9.37	13.41	21.90
48. Kyongsan	8.00	2.98	10.61	42.00
49. Ch'ongdo	0.00	0.00	0.00	14.01
50. Waekwan	19.25	17.47	21.70	38.25
51. Kumi	3.14	7.83	23.11	65.91
52. Sangju	35.02	42.62	37.02	86.20
53. Chomch'on	58.81	33.75	53.96	79.95
54. Yech'on	42.04	41.53	56.53	79.71
55. Yongju	37.95	43.34	47.42	75.21
56. Ch'angyong	15.46	16.19	24.20	53.09
57. Namji	10.73	14.48	20.11	36.96
58. Milyang	37.03	47.05	47.79	109.71
59. Samrangjin	0.00	0.00	0.00	0.00
60. Kimhae	23.80	26.71	32.94	82.74
61. Chinyong	20.94	20.56	32.45	45.13
62. Changsungp'o	28.23	45.85	48.70	51.56
63. Kosong	18.92	23.18	40.70	52.56
64. Sach'on	20.78	29.26	49.01	48.70
65. Hadong	32.85	33.40	51.08	57.91
66. Hamyang	15.23	26.94	50.12	64.47
67. Koch'ang	49.84	60.74	73.88	80.45

Pupil-Teacher Ratio (number of high school students/teacher)

City and Town	1964	1967	1971	1975
1. Chonju	31.86	30.32	31.88	33.10
2. Kunsan	28.57	24.60	28.77	31.44
3. Iri	29.16	31.59	31.71	32.97
4. Kwangju	35.99	33.40	30.95	31.96
5. Mokp'o	32.54	30.94	35.29	31.58
6. Yosu	31.98	31.25	25.91	30.01
7. Sunch'on	29.26	29.92	25.13	29.40
8. Samrye	20.71	24.00	13.77	24.40
9. Namwon	29.26	30.66	24.81	34.48
10. Chongju	38.18	33.81	28.82	31.66
11. Sintaein	22.58	21.71	34.59	29.85
12. Koch'ang	35.58	31.00	32.39	39.13
13. Puan	45.07	27.79	33.23	30.55
14. Kimche	30.87	26.61	23.89	28.13
15. Songchong	32.94	19.89	31.79	27.57
16. Tamyang	16.79	12.95	20.22	31.38
17. Kurye	27.00	24.29	24.26	35.06
18. Kwangyang	17.50	16.31	17.63	29.92
19. Posong	19.08	19.42	22.61	33.18
20. Pulkyo	18.17	44.96	28.67	29.00
21. Hwasun	0.00	0.00	0.00	0.00
22. Changhung	45.88	23.56	30.23	31.60
23. Kangjin	28.45	13.19	17.00	24.93
24. Haenam	28.89	24.56	17.28	30.52
25. Naju	22.43	16.52	17.91	27.89
26. Yongsanp'o	0.00	7.60	15.19	25.00
27. Hamp'yong	15.00	12.18	13.60	32.02
28. Yongkwang	20.00	14.86	25.83	25.90
29. Changsong	20.31	19.89	21.03	25.49
30. Wando	11.85	19.68	18.20	28.57

City and Town	1964	1967	1971	1975
31. Taegu	42.18	33.51	33.66	34.77
32. P'ohang	27.52	35.30	38.46	28.74
33. Kyongju	26.24	29.04	33.20	32.86
34. Kimch'on	26.40	29.59	32.14	29.38
35. Andong	36.05	33.12	31.60	35.99
36. Pusan	35.70	38.47	35.14	32.59
37. Masan	39.73	34.31	33.97	29.69
38. Chinju	34.75	37.06	33.92	33.50
39. Ch'ungmu	24.58	22.40	29.29	30.99
40. Chinhae	54.63	39.65	24.91	32.65
41. Samch'onp'o	39.43	32.44	28.17	29.75
42. Ulsan	27.34	34.37	29.17	26.62
43. Uisong	19.59	27.23	26.90	29.04
44. Kuryongp'o	19.63	34.60	28.50	24.38
45. Kamp'o	20.83	13.00	33.40	28.25
46. Ankang	0.00	15.20	9.29	24.22
47. Yongch'on	19.18	15.18	25.19	23.62
48. Kyongsan	13.08	30.50	14.53	31.37
49. Ch'ongdo	0.00	0.00	0.00	0.00
50. Waekwan	34.46	33.40	35.26	28.26
51. Kumi	8.63	28.00	14.50	20.52
52. Sangju	29.23	29.81	33.92	33.26
53. Chomch'on	35.32	30.92	44.13	34.35
54. Yech'on	27.24	27.29	30.14	31.40
55. Yongju	18.52	26.63	32.06	30.92
56. Ch'angyong	27.46	19.58	21.15	31.79
57. Namji	26.11	31.20	33.83	34.48
58. Milyang	24.48	26.28	31.27	33.86
59. Samrangjin	0.00	0.00	0.00	0.00
60. Kimhae	51.00	21.54	27.68	25.29
61. Chinyong	18.64	19.26	21.84	25.64
62. Changsungp'o	23.85	40.58	28.96	23.13

City and Town	1964	1967	1971	1975
63. Kosong	20.17	17.09	28.08	30.30
64. Sach'on	24.60	26.20	14.71	43.45
65. Hadong	23.60	19.66	28.61	30.28
66. Hamyang	22.89	17.00	28.33	31.38
67. Koch'ang	25.66	29.72	25.61	24.25

Capital Per Capita (1,000 won)

City and Town	1964	1967	1971	1975
1. Chonju	1.76	--	16.02	27.39
2. Kunsan	3.06	--	13.36	26.51
3. Iri	2.89	--	4.71	23.50
4. Kwangju	3.60	--	16.72	26.14
5. Mokp'o	1.67	--	7.44	10.32
6. Yosu	1.28	--	4.80	19.95
7. Sunch'on	2.04	--	1.26	19.07
8. Samrye	0.20	--	0.55	7.16
9. Namwon	1.32	--	2.05	13.97
10. Chongju	0.43	--	2.19	16.00
11. Sintaein	0.44	--	0.00	0.00
12. Koch'ang	0.05	--	0.92	7.69
13. Puan	0.83	--	0.00	0.00
14. Kimche	0.37	--	6.84	12.12
15. Songchong	0.20	--	8.75	17.68
16. Tamyang	0.51	--	1.66	13.19
17. Kurye	0.17	--	0.00	0.00
18. Kwangyang	0.21	--	0.18	8.38
19. Posong	0.11	--	0.00	0.00
20. Pulkyo	0.04	--	0.00	0.00
21. Hwasun	0.01	--	6.71	23.84

City and Town	1964	1967	1971	1975
22. Changhung	0.06	--	0.00	0.00
23. Kangjin	0.04	--	0.00	0.00
24. Haenam	1.23	--	0.00	0.00
25. Naju	6.18	--	13.40	22.91
26. Yongsanp'o	0.72	--	1.78	14.59
27. Hamp'yong	0.12	--	2.51	9.66
28. Yongkwang	0.00	--	1.08	8.15
29. Changsong	0.55	--	7.10	24.58
30. Wando	0.03	--	0.00	0.00
31. Taegu	2.66	--	19.08	38.92
32. P'ohang	1.85	--	12.69	41.63
33. Kyongju	0.40	--	5.76	17.28
34. Kimch'on	1.41	--	11.96	19.66
35. Andong	1.04	--	11.38	21.24
36. Pusan	3.86	--	20.67	43.81
37. Masan	1.47	--	22.55	31.47
38. Chinju	1.07	--	14.15	27.98
39. Ch'ungmu	0.34	--	2.97	22.55
40. Chinhae	0.58	--	23.12	35.86
41. Samch'onp'o	0.50	--	1.09	10.22
42. Ulsan	13.42	--	35.29	36.18
43. Uisong	0.11	--	0.00	0.00
44. Kuryongp'o	0.46	--	2.76	17.19
45. Kamp'o	1.04	--	0.00	0.00
46. Ankang	0.02	--	0.00	19.03
47. Yongch'on	0.08	--	6.20	12.88
48. Kyongsan	0.26	--	4.19	16.42
49. Ch'ongdo	0.11	--	0.00	0.00
50. Waekwan	0.03	--	3.89	13.22
51. Kumi	0.01	--	17.13	35.77
52. Sangju	0.10	--	9.52	16.65
53. Chomch'on	16.71	--	8.42	16.97

City and Town	1964	1967	1971	1975
54. Yech'on	0.76	--	6.57	10.63
55. Yongju	0.34	--	10.11	10.59
56. Ch'angyong	0.50	--	6.44	9.76
57. Namji	0.57	--	0.00	0.00
58. Milyang	1.17	--	7.85	17.48
59. Samrangjin	0.13	--	0.00	0.00
60. Kimhae	0.40	--	11.15	15.47
61. Chinyong	0.07	--	0.00	0.00
62. Changsungp'o	0.41	--	3.55	23.86
63. Kosong	0.28	--	7.81	12.43
64. Sach'on	0.32	--	6.34	14.20
65. Hadong	1.58	--	6.99	11.23
66. Hamyang	0.00	--	0.00	0.00
67. Koch'ang	0.31	--	4.85	18.03

Tangible Fixed Assets Per Capita (1,000 won)

City and Town	1964	1967	1971	1975
1. Chonju	--	--	67.84	163.85
2. Kunsan	--	--	63.77	118.34
3. Iri	--	--	44.55	91.79
4. Kwangju	--	--	85.60	180.66
5. Mokp'o	--	--	41.05	108.73
6. Yosu	--	--	61.70	181.36
7. Sunch'on	--	--	33.88	92.36
8. Samrye	--	--	10.68	41.86
9. Namwon	--	--	31.78	62.07
10. Chongju	--	--	30.30	42.83
11. Sintaein	--	--	0.00	0.00
12. Koch'ang	--	--	0.00	0.00

City and Town	1964	1967	1971	1975
13. Puan	--	--	0.00	0.00
14. Kimche	--	--	30.45	43.15
15. Songchong	--	--	46.86	61.76
16. Tamyang	--	--	32.18	63.36
17. Kurye	--	--	0.00	0.00
18. Kwangyang	--	--	21.66	43.50
19. Posong	--	--	0.00	0.00
20. Pulkyo	--	--	0.00	0.00
21. Hwasun	--	--	62.40	85.78
22. Changhung	--	--	0.00	0.00
23. Kangjin	--	--	0.00	0.00
24. Haenam	--	--	0.00	0.00
25. Naju	--	--	41.53	126.57
26. Yongsanp'o	--	--	24.31	52.92
27. Hamp'yong	--	--	22.35	83.09
28. Yongkwang	--	--	21.63	52.64
29. Changsong	--	--	73.58	71.79
30. Wando	--	--	0.00	0.00
31. Taegu	--	--	84.97	286.37
32. P'ohang	--	--	63.54	784.47
33. Kyongju	--	--	55.88	98.81
34. Kimch'on	--	--	44.05	112.30
35. Andong	--	--	32.70	114.28
36. Pusan	--	--	140.96	329.00
37. Masan	--	--	121.32	256.90
38. Chinju	--	--	57.42	168.97
39. Ch'ungmu	--	--	32.85	164.67
40. Chinhae	--	--	93.37	214.35
41. Samch'onp'o	--	--	31.76	104.77
42. Ulsan	--	--	145.75	341.47
43. Uisong	--	--	0.00	0.00
44. Kuryongp'o	--	--	23.26	91.37

City and Town	1964	1967	1971	1975
45. Kamp'o	--	--	0.00	0.00
46. Ankang	--	--	34.15	80.99
47. Yongch'on	--	--	30.82	91.87
48. Kyongsan	--	--	56.07	103.13
49. Ch'ongdo	--	--	0.00	0.00
50. Waekwan	--	--	28.46	99.76
51. Kumi	--	--	89.46	259.52
52. Sangju	--	--	45.89	104.25
53. Chomch'on	--	--	68.85	119.37
54. Yech'on	--	--	0.00	0.00
55. Yongju	--	--	40.59	92.11
56. Ch'angyong	--	--	32.95	76.94
57. Namji	--	--	0.00	0.00
58. Milyang	--	--	23.70	122.49
59. Samrangjin	--	--	0.00	0.00
60. Kimhae	--	--	81.29	153.78
61. Chinyong	--	--	0.00	0.00
62. Changsungp'o	--	--	44.08	121.24
63. Kosong	--	--	29.59	91.20
64. Sach'on	--	--	31.56	85.91
65. Hadong	--	--	28.31	92.09
66. Hamyang	--	--	0.00	0.00
67. Koch'ang	--	--	38.45	126.32

Number of Employees in Industrial Establishments (per 1,000 people)

City and Town	1964	1967	1971	1975
1. Chonju	89.37	34.56	95.53	158.05
2. Kunsan	123.77	37.97	128.95	105.42
3. Iri	68.09	26.26	73.97	64.59

City and Town	1964	1967	1971	1975
4. Kwangju	158.69	40.47	182.14	189.78
5. Mokp'o	42.30	39.26	69.00	157.16
6. Yosu	218.75	11.45	101.35	83.84
7. Sunch'on	218.31	12.43	61.49	41.43
8. Samrye	24.35	4.15	86.52	16.05
9. Namwon	76.34	11.40	69.49	76.66
10. Chongju	73.84	10.80	141.43	103.06
11. Sintaein	26.50	1.42	30.74	33.97
12. Koch'ang	23.83	4.15	27.95	44.60
13. Puan	46.34	2.16	13.42	63.17
14. Kimche	51.35	12.27	47.71	32.30
15. Songchong	37.09	4.58	89.26	67.76
16. Tamyang	30.41	10.17	64.52	48.90
17. Kurye	151.90	2.37	40.07	40.52
18. Kwangyang	132.39	3.87	30.32	48.21
19. Posong	97.36	3.73	20.65	45.72
20. Pulkyo	24.17	2.16	14.72	31.98
21. Hwasun	75.44	3.89	31.59	31.14
22. Changhung	60.88	2.61	14.59	38.61
23. Kangjin	60.91	4.25	29.64	33.11
24. Haenam	144.18	7.18	189.60	102.56
25. Naju	83.49	24.81	70.30	60.55
26. Yongsanp'o	45.01	7.11	41.40	24.88
27. Hamp'yong	76.70	4.29	56.29	48.31
28. Yongkwang	29.07	5.59	35.44	44.34
29. Changsong	37.19	12.37	48.35	79.20
30. Wando	115.97	2.99	58.89	67.43
31. Taegu	104.55	69.35	179.35	204.52
32. P'ohang	76.94	21.46	110.37	208.81
33. Kyongju	36.20	19.69	87.00	157.13
34. Kimch'on	42.35	17.90	83.57	146.68

City and Town	1964	1967	1971	1975
35. Andong	29.15	26.66	173.65	171.26
36. Pusan	109.79	72.15	182.96	210.41
37. Masan	98.82	102.03	305.04	349.95
38. Chinju	82.15	65.25	97.65	147.25
39. Ch'ungmu	113.94	58.46	160.17	202.91
40. Chinhae	71.15	32.11	75.67	107.41
41. Samch'onp'o	90.82	35.20	72.11	94.31
42. Ulsan	60.76	38.84	331.57	226.86
43. Uisong	9.66	3.70	86.83	100.52
44. Kuryongp'o	13.19	5.79	19.08	38.30
45. Kamp'o	15.84	2.26	81.41	37.06
46. Ankang	11.01	4.88	27.42	70.15
47. Yongch'on	12.05	4.21	132.20	34.86
48. Kyongsan	13.32	3.91	83.08	214.78
49. Ch'ongdo	13.94	5.47	121.14	40.39
50. Waekwan	21.91	2.02	115.89	66.74
51. Kumi	11.07	2.06	145.08	395.36
52. Sangju	22.96	4.41	151.76	44.20
53. Chomch'on	83.60	19.70	34.34	106.70
54. Yech'on	20.70	8.09	74.78	90.15
55. Yongju	13.77	13.47	54.43	53.50
56. Ch'angyong	97.97	5.83	62.16	44.61
57. Namji	55.29	1.35	92.62	25.94
58. Milyang	102.17	27.05	81.76	100.60
59. Samrangjin	54.60	20.29	33.83	41.40
60. Kimhae	52.75	4.53	18.23	135.32
61. Chinyong	51.33	7.29	44.01	37.36
62. Changsungp'o	54.69	14.93	11.55	36.37
63. Kosong	100.06	4.42	49.68	15.32
64. Sach'on	70.15	3.41	34.07	47.13
65. Hadong	58.38	5.49	83.56	78.65
66. Hamyang	33.53	1.67	33.51	22.00
67. Koch'ang	82.34	11.43	70.40	64.29

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