

DISCUSSION PAPER

Report No.: UDD-65

CHANGING LOCATION PATTERNS OF POPULATION AND EMPLOYMENT
IN THE SEOUL REGION

by

Dong Hoon Chun
and
Kyu Sik Lee

April, 1965

Water Supply and Urban Development Department
Operations Policy Staff
The World Bank

The World Bank does not accept responsibility for the views expressed herein which are those of the author(s) and should not be attributed to the World Bank or to its affiliated organizations. The findings, interpretations, and conclusions are the results of research supported by the Bank; they do not necessarily represent official policy of the Bank. The designations employed, the presentation of material, and any maps used in this document are solely for the convenience of the reader and do not imply the expression of any opinion whatsoever on the part of the World Bank or its affiliates concerning the legal status of any country, territory, city, area, or its authorities, or concerning the delimitation of its boundaries, or national affiliation.

Dong Hoon Chun, who teaches at Kyung Hee University, Seoul, worked on this paper while he was a consultant at the World Bank. Kyu Sik Lee, a Senior Economist in the Water Supply and Urban Development Department of the Bank, directed the Industrial Location Policies Research Project (RPO 672-91).

The authors would like to thank the staff members of the Korean National Bureau of Statistics, specially, Mr. Hyun Moo Shin, for assisting with the data used, and Mrs. Morallina Fanwar George for processing the manuscript efficiently.

Research Project No. RPO 672-91

Research Project Name: An Evaluation of Industrial Location Policies for Urban Deconcentration, Phase II

Abstract

The second phase of the Industrial Location Policies Research Project (RPO 672-91) has generated a series of UDD Discussion Papers in the following three categories: (1) Descriptive studies on observed location patterns and policy planning and implementation experiences; (2) theoretical development and policy simulation studies; and (3) empirical studies of the firm's location behavior.

This paper as part of the descriptive studies documents the changing location patterns of population and employment in the Seoul region during 1960-1981, using the population census, the annual manufacturing survey, and other secondary data. The analysis shows strong evidence of decentralization of both population and employment; the latter, however, decentralizing much faster than the former. The findings in this paper "set the stage" for further detailed analyses in the research project regarding possible impacts of various spatial policies on the observed location patterns.

Table of Contents

	<u>Page</u>
List of Tables.....	ii
List of Figures.....	iii
List of Maps.....	iv
1. Introduction.....	1
2. Long-term Trends of Population and Employment Concentration in Korea	2
2-1 Trends of Population Concentration.....	2
2-2 Trends of Employment Concentration by Industry.....	5
2-3 Trends of Employment Concentration by Occupation.....	5
2-4 Relative Shares of increases in Population and Employment.....	8
3. Population Growth in SMR.....	10
3-1 Natural Population Growth.....	10
3-2 Net Migration.....	12
4. Changing Patterns of Population Distribution in SMR.....	16
4-1 Changing Patterns by City.....	16
4-2 Changing Patterns by Ring.....	18
4-3 Changing Patterns by Radial Sector.....	20
5. Changing Patterns of Employment Distribution in SMR.....	22
5-1 Changes in Composition of Employment.....	22
5-2 Decentralization Trends.....	24
5-3 Changing Location Patterns of Employment: Selected Sectors.....	24
a) Manufacturing.....	24
b) Retail, Wholesale, and Personal Services.....	28
6. Comparisons of Changing Location Patterns of Population and Employment.....	30
7. Gradient Measures for the Decentralization Trend of Manufacturing Employment.....	33
8. Summary of Findings.....	40
Maps	44-46
Appendix Tables.....	47-58
References.....	59

List of Tables

1. Population Share and Growth of Seoul Metropolitan Region (SMR), 1960-1980.....	3
2. Share of Population Increase in Korea, 1960-1980.....	4
3. SMR's Share of Employment in Korea by Sector, 1960-1980.....	6
4. SMR's Share of Employment in Korea by Occupation, 1960-1980.....	7
5. SMR's Share of Increases in Population and Employment in Korea, 1960-1980.....	9
6. Birth and Death Rates by City in the SMR, 1975-1980.....	11
7. Natural Population Change by City in the SMR, 1971-1981.....	13
8. Contribution of Net Migration to Population Growth, 1970-1980.....	14
9. Net Migration in the SMR, 1971-1981.....	15
10. Changes in Population Distribution by City in the SMR, 1960-1980.....	17
11. Changes in Population by Ring in the SMR, 1966-1980.....	19
12. Changes in Population by Radial Sector in the SMR, 1960-1980.....	21
13. Changes in Composition of Employment by Sector, 1960-1980.....	23
14. Changes in Composition of Employment by Occupation, 1960-1980.....	25
15. Changes in Spatial Distribution of Employment by Sector in the SMR, 1960-1980.....	26
16. Changes in Distribution of Manufacturing Employment by Ring in the SMR, 1966-1980.....	27
17. Distribution of Retail Employment in the SMR, 1968-1979.....	29
18. Distribution of Wholesale Employment in the SMR, 1968-1979.....	31
19. Distribution of Selected Personal Service Employment: Restaurants and Hotels, 1968-1979.....	32
20. Changes in the Share of Employment and Population in the SMR, 1960-1980.....	34
21. Manufacturing Employment Density Gradients by Industry for Seoul, 1977 and 1981.....	38
22. Manufacturing Employment Density Gradients by Industry for the SMR, 1977 and 1981.....	41

List of Figures

1. Changing Patterns of Population and Non-agricultural Employment
in the SMR, 1960-1980.....35
2. Changing Patterns of Population and Manufacturing
Employment by Ring, 1966-1980.....36
3. Decentralization Patterns of Manufacturing Employment
by Industry, 1977-1981: Seoul.....39

List of Maps

1. Forty-Nine Gu's and Gun's in the SMR.....44
2. Five Rings in the SMR.....45
3. Seven Radial Sectors in the SMR.....46

1. Introduction

This paper has been prepared as part of a World Bank research project, "An Evaluation of Industrial Location Policies for Urban Deconcentration," (RPO 672-91). The main objective of this paper is to summarize the changing location patterns of population and employment in the Seoul Region, the study area of the project.

The distribution and movements of people and jobs and their interrelationships are essential to understand the overall spatial structure and its changes over time. This paper presents a descriptive analysis by contrasting and comparing the changing location patterns of population and employment over the long time period with a special emphasis on the manufacturing sector.

The analysis in this paper shows clear evidence of decentralization of both population and employment during the past decade. However, the employment was decentralizing more rapidly than the population. Moreover, manufacturing jobs were decentralizing much faster than those in other sectors. These findings generate a set of important hypotheses concerning the relationships between movements of jobs and people and related policy implications. The main objective of this paper is to "set the stage" by documenting the aggregate patterns for further detailed analyses in the research project.

The data used in this paper came from various sources and they may not be comparable for certain types of analysis. Interpretations of the results based on different data sets should be made with some caution.

2. Long-term Trends of Population and Employment Concentration in Korea

The Seoul region in this study is defined as the area consisted of Seoul, the capital city, and Gyeonggi Province which surrounds Seoul. As of 1981 the administrative units in the SMR ^{1/} included the Special City of Seoul, 9 cities (Si's) and 19 counties (Gun's). (See Map 1.)

2-1. Trends of Population Concentration

During the 1960-1980 period, when Korea experienced a high rate of economic growth with rapid urbanization, the shift of population and employment into the SMR was remarkable. The region's population share rose from 21 percent in 1960 to 36 percent in 1980 (Table 1). This implies that the SMR was gaining about 400 thousand people yearly during this period: about 300 thousands by Seoul and 100 thousands by Gyeonggi Province, respectively. It is most striking to find that the SMR absorbed most of the country's net population increase. The SMR's share of net population increase was 55 percent for 1960-70 and it was 77 percent for 1970-80 (Table 2). In the latter period, the share including the SMR and Busan was 98 percent!

Within the SMR, however, the population growth patterns were different between Seoul and its surrounding Gyeonggi Province although the shares of national total by both of these areas have been continuously increasing (Table 1). Seoul experienced a high rate of growth of 9.3 percent per year in the late 1960's. In the 1970's, however, the growth rate tapered down to less than half (4.4 percent) of the previous period. On the other hand the annual growth rate of

^{1/} For convenience, the Seoul region will be denoted as SMR (Seoul Metropolitan Region) in the paper.

Table 1: POPULATION SHARE AND GROWTH OF SEOUL METROPOLITAN REGION (SMR), 1960-1980

Region	1960		1966		1970		1980		Annual Average Growth Rate (%)		
	Thousand Persons	%	Thousand Persons	%	Thousand Persons	%	Thousand Persons	%	60-70	70-80	60-80
SMR	5,203	20.8	6,912	23.7	8,730	27.7	13,302	35.5	5.31	4.30	4.81
Rest of Korea	19,791	79.2	22,296	76.3	22,739	72.3	24,147	64.5	1.40	0.68	1.00
Total	24,994	100.0	29,208	100.0	31,469	100.0	37,449	100.0	2.33	1.75	2.04
SMR:											
Seoul	2,445	9.8 <u>a/</u>	3,805	13.0	5,433	17.3	8,307	22.3	9.31 <u>b/</u>	4.41	5.74 ^{b/}
Gyeonggi	2,758	11.0 <u>a/</u>	3,107	10.6	3,297	10.5	4,995	13.2	1.49 <u>b/</u>	4.12	3.45 ^{b/}

a/ These figures for Seoul and Gyeonggi are not directly comparable with other years. The Seoul area was more than doubled from 268 km² in 1963 by annexation of surrounding areas from Gyeonggi Province.

b/ Average growth rates from 1966 only.

Source: Economic Planning Board, Population and Housing Census, 1960, 1966, 1970, 1975, and 1980.

Table 2: SHARE OF POPULATION INCREASE IN KOREA, 1960-1980

<u>Region</u>	<u>1960-70</u>		<u>1970-80</u>	
	<u>Population Increase</u> (1,000's)	<u>%</u>	<u>Population Increase</u> (1,000's)	<u>%</u>
SMR	3,527	54.5	4,572	76.5
Busan	718	11.1	1,279	21.4
Rest of Korea	2,230	34.4	129	2.2
Total of Korea	6,475	100.0	5,980	100.0
SMR:				
Seoul	2,988	46.1	2,934	49.1
Gyeonggi	539	8.3	1,638	27.4

Source: Economic Planning Board, Population and Housing Census, 1960, 1970, and 1980.

population for Gyeonggi rose from 1.5 percent, a rate which was lower than the national average, to 4.1 percent comparable to that of Seoul.

2-2. Trends of Employment Concentration by Industry

The SMR's share of employment also increased during the last two decades as was that of population. The SMR's share of total employment of Korea increased from 18 percent in 1960 to 33 percent in 1980 (Table 3). Excluding the agriculture and mining sectors, the employment share of the SMR rose from one-third to almost a half of national total during the same period.

The concentration trends were, however, different among sectors over the period of 1960-80. As shown in Table 3, the SMR's share of Korea's manufacturing jobs rose from one third to almost a half during the last two decades while that of agriculture sector stayed constant at 10 percent. The service, trade, transportation and communication sectors also showed increasing shares over the period. The electricity, gas and water sector, and the construction sector showed declining shares in recent years; until the middle of 1970's the employment shares of these sectors were rising but in the late 1970's they declined.

2-3. Trends of Employment Concentration by Occupation

An examination of employment shares by major occupation also shows a heavy concentration trend in the SMR during the last two decades. All white-collar jobs, professional and technical, administrative, clerical, sales, and services, showed an increasing concentration (Table 4). Especially, the share of the administrative category which includes government administrators, legislative officials, and managers, doubled from 34 percent in 1960 to 67 percent

Table 3: SMR'S SHARE OF EMPLOYMENT IN KOREA
BY SECTOR, 1960-1980 (%)

<u>Sector</u>	<u>SMR</u>				<u>Seoul</u>				<u>Gyeonggi</u>			
	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>
Agriculture and Fisheries	10.0	10.5	11.4	10.4	0.3	0.6	0.7	0.5	9.8	9.9	10.7	9.9
Mining and Quarrying	9.9	14.7	12.2	8.8	5.6	6.6	6.2	4.4	4.3	8.1	6.0	4.4
Manufacturing	29.1	41.7	47.6	48.2	18.5	31.7	32.8	29.6	10.6	10.0	14.8	18.6
Electricity, Gas and Water	45.3	48.5	51.7	38.9	33.4	36.1	40.4	27.8	11.9	12.4	11.3	11.1
Construction	41.9	45.1	50.3	47.6	31.3	34.7	35.9	32.7	10.6	10.4	14.4	14.9
Trade and Banking	30.8	44.4	43.7	49.3	20.3	34.5	32.7	37.1	10.5	9.9	11.0	12.2
Transportation and Communication	32.7	41.2	41.9	42.6	18.7	28.1	30.2	29.8	14.0	13.1	11.7	12.9
Services	36.0	43.0	42.8	43.4	23.3	30.7	31.3	31.5	12.7	12.3	11.5	11.9
All	17.8	26.3	28.4	33.0	7.4	16.0	16.8	20.2	10.4	10.3	11.7	12.8

Note: The figures for 1960 are the result of complete census and those for 1970, 1975, and 1980, are the results of 10%, 5%, and 15% sample surveys, respectively. This table is derived from Appendix Tables A1 through A4.

Source: Economic Planning Board, Population and Housing Census of Korea, 1960 (Vol 1, 11-1), 1970 (Vol. 2, 4-1), 1975 (Vol. 2, 3-1), and 1980 (Vol. 2, 3-1).

Table 4: SMR'S SHARE OF EMPLOYMENT IN KOREA
BY OCCUPATION, 1960-1980 (%)

<u>Occupation</u>	<u>SMR</u>				<u>Seoul</u>				<u>Gyeonggi</u>			
	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>
Professional and Technical	29.7	39.0	41.4	44.6	19.9	30.3	31.8	34.1	9.8	8.7	9.5	10.5
Administrative	33.8	55.6	57.3	67.2	23.9	48.6	49.9	60.4	9.9	7.0	7.4	6.7
Clerical	38.8	48.8	50.8	53.2	22.8	39.9	40.7	40.3	10.0	8.9	10.1	12.9
Sales	30.0	42.5	43.9	47.7	19.1	32.5	32.5	35.4	10.9	10.0	11.3	12.3
Service	39.6	46.8	42.1	46.0	25.9	34.0	30.1	32.5	13.6	12.8	12.0	13.5
Farmers, Fisherman	10.0	10.6	11.4	10.3	0.2	0.6	0.7	0.5	9.8	10.0	10.7	9.8
Production Workers (including Trans. & Comm.)	30.6	39.4	44.4	43.6	19.0	28.3	29.9	26.3	11.6	11.1	14.5	17.4
All	17.8	26.3	28.4	33.0	7.4	16.0	16.8	20.2	10.4	10.3	11.7	12.8

Note: This Table is derived from Appendix Tables A5 through A8.

Source: Economic Planning Board, Population and Housing Census of Korea, 1960
(Vol. 1, 11-1), 1970 (Vol. 2, 4-1), 1975 (Vol. 2, 3-1), and 1980 (Vol. 2, 3-1).

in 1980. (Nevertheless, employment share of this category within the SMR continuously declined because the employment size of this category in the region is small. See Table A5.) The production workers (including those in transportation and communitaion), the largest job category in the SMR, was heavily concentrated in the SMR until the middle of 1970's, but since then the share showed a declining trend although their share within the SMR was increasing over the entire period of 1960-80.

There are clear differences in the trends of employment concentration between Seoul and Gyeonggi Province as was the case with the trends of population concentration. In the 1960's the SMR's increased share of non-agricultural jobs occurred mainly in Seoul while Gyeonggi's share declined slightly. In 1970's, however, the share increased for Gyeonggi as well as Seoul.

2-4. Relative Shares of Increases in Population and Employment

As indicated above, both population and employment increased their concentration in the SMR during the last two decades. As indicated earlier, the SMR's share of Korea's population increased from 21 percent in 1960 to 36 percent in 1980 while its share of employment rose from 18 percent to 33 percent during the same period. The last four columns of Table 5 show that the SMR's share of population increase in Korea rose much faster than its share of employment increase during the past two decades. The SMR had 55 percent of the total population increase in Korea during 1960-1970, but the share rose to 77 percent during 1970-1980; the SMR's share of the total employment increase rose from 46 percent to 60 percent. When looked at Seoul and Gyeonggi separately, Seoul's share of both population and employment increases

Table 5: SMR'S SHARE OF INCREASES IN POPULATION AND EMPLOYMENT IN KOREA, 1960-1980

Region	Population (P) (Thousand Persons)						Employment (E) (Thousand Persons)						Share of Increase (%) ^{a/}			
	1960		1970		1980		1960		1970		1980		1960-70		1970-80	
	1960	%	1970	%	1980	%	1960	%	1970	%	1980	%	P	E	P	E
SMR	5,203	20.8	8,730	27.78	13,302	35.5	1,251	17.8	2,670	26.4	4,183	33.0	54.5	45.5	76.5	59.8
Rest of Korea	19,791	79.2	22,739	72.3	24,147	64.5	5,785	82.2	7,483	73.7	8,499	67.0	45.5	54.5	23.5	40.2
Korea Total	24,994	100.0	31,469	100.0	37,449	100.0	7,036	100.0	10,153	100.0	12,682	100.0	100.0	100.0	100.0	100.0
SMR:																
Seoul	2,445	9.8	5,433	17.3	8,307	22.3	522	7.4	1,622	16.0	2,559	20.2	46.2	35.2	48.1	37.0
Gyeonggi	2,758	11.0	3,297	10.5	4,995	13.2	728	10.3	1,048	10.3	1,625	12.8	8.3	10.3	28.4	22.8

^{a/} Percentage shares of increases in population and employment in Korea during the specified period.

Source: Economic Planning Board, Population and Housing Census, 1960, 1970, and 1980.

changed only slightly during the two decades. Gyeonggi's share of population increase, however, rose more than three folds from 8 percent to 28 percent while that of the employment increase rose much less during the period.

3. Population Growth in SMR

In the preceding section the trends of population and employment concentration were analyzed. The aim of this section is to document the main sources of the population growth in the SMR and contrast and compare the observed differences in growth patterns between Seoul and Gyeonggi Province.

There are two sources of population growth: natural increase and migration. The population increase in a region for a given time period should be the sum of net migration and natural increase for that period unless there is a change of its boundary. Based on the available data, the trends of these two sources of changes are summarized for the SMR and its subareas.

3-1. Natural Population Growth

Table 6 shows the natural population growth rate of the SMR and subareas for 1975 and 1980. During the period the natural growth rate for Seoul stayed higher (about 1.8) than that of Gyeonggi (about 1.5). Within Gyeonggi all satellite cities except for Euijeongbu, however, experienced a remarkable surge in the rate of natural increase; in 1975, the rate for the satellite cities as a whole was 1.5, but it rose to 1.9 in 1980. On the other hand the rate for the rest of Gyeonggi, mostly rural areas, declined significantly from 1.5 in 1975 to 1.1 in 1980. These differences in the natural growth rate between satellite cities and the rest of Gyeonggi can be explained by the birth

Table 6: BIRTH AND DEATH RATES BY CITY IN THE SMR, 1975-1980

<u>Region</u>	<u>Birth Rate</u>		<u>Death Rate</u>		<u>Natural Population</u>	
	<u>(Per Thousand Persons)</u>		<u>(Per Thousand Persons)</u>		<u>Growth Rate (%) ^{a/}</u>	
	<u>1975</u>	<u>1980</u>	<u>1975</u>	<u>1980</u>	<u>1975</u>	<u>1980</u>
Seoul	22.0	22.2	3.6	3.5	1.84	1.87
Gyeonggi	21.3	20.8	6.3	5.5	1.50	1.53
SMR	21.7	21.7	4.6	4.3	1.71	1.74
Korea	24.3	21.9	6.9	6.7	1.74	1.52
Gyeonggi:						
Incheon	19.2	23.2	4.3	3.8	1.49	1.94
Suwon	18.8	22.9	4.3	4.2	1.45	1.87
Seongnam	20.6	25.5	4.6	4.7	1.60	2.08
Euijeongbu	18.8	18.1	3.9	4.6	1.49	1.35
Anyang	21.5	24.0	4.3	3.5	1.72	2.05
Bucheon	17.8	25.6	4.3	3.4	1.35	2.22
All Cities	19.4	23.5	4.3	4.1	1.51	1.94
Rest of Gyeonggi	22.5	18.3	7.6	6.9	1.49	1.14

a/ The number of births less the number of deaths per one hundred persons.

Source: Economic Planning Board, Report on Vital Registration, 1982.

rate for satellite cities (except for Euijeongbu) which increased substantially while the opposite occurred for the rest of Gyeonggi. On the other hand, although the death rate dropped for both satellite cities and the rest of Gyeonggi, it stayed much higher for the latter.

Table 7 shows the actual figures of natural population increase by subareas of the SMR in 1971 and in 1981. The growth patterns are very consistent with those shown in Table 6. For the cities natural increase has been accelerating, while for other areas declining. Especially, the satellite cities have experienced remarkable growth of natural increase during the last decade.

3-2. Net Migrations

During 1970-80, the period in which the data are available, the SMR consistently recorded a positive net migration each year. The data in Table 8 imply that the SMR gained about 360 thousand people per year 2/ and the migration component contributed significantly to the population growth during the period. For the SMR as a whole its contribution to the population increase declined during the decade; for Gyeonggi alone, however, this share increased while the opposite occurred for Seoul.

Table 9 shows the net migration patterns between Seoul and Gyeonggi for selected years. It is significant to note that throughout the 1970's, the net migration to Seoul from Gyeonggi was negative while that from other regions was positive. This means that the positive net

2/ This figure seems overstated. SMR's total population increase of 4,572 thousands during 1970-1980 (Table 5) is smaller than the corresponding figure implied by the net migration of 3,579 thousands (Table 8) plus the annual natural increase of more than 200 thousands (Table 7). The data used in these tables are not directly comparable.

Table 7: NATURAL POPULATION CHANGE BY CITY IN THE SMR,
1971-1981

<u>Region</u>	<u>Natural Increase</u> <u>(In Thousand Persons)</u>		<u>1981/1971</u>
	<u>1971</u>	<u>1981</u>	
Seoul	133.1	165.2	1.24
Gyeonggi	77.4	78.6	1.02
SMR Total	210.5	243.8	1.16
Korea Total	785.9	486.0	0.62
Gyeonggi:			
Incheon	14.5	21.3	1.47
Suwon	2.2	6.1	2.77
Seongnam	3.4	6.0	1.76
Euijeongbu	1.4	1.7	1.21
Anyang	1.4	5.4	3.86
Bucheon	0.9	5.3	5.89
Subtotal	23.8	45.8	1.92
Rest of Gyeonggi	53.6	32.8	0.61

Source: Economic Planning Board, Report on Vital Registration, 1982.

Table 8: CONTRIBUTION OF NET MIGRATION TO POPULATION GROWTH, 1970-1980

<u>Region</u>	<u>Total Population Increase (A)</u>		<u>Net Migration (B)</u>		<u>Net Migration Share (B/A)</u>	
	<u>(In thousands)</u>		<u>(In thousands)</u>		<u>(%)</u>	
	<u>1970-75</u>	<u>1975-80</u>	<u>1970-75</u>	<u>1975-80</u>	<u>1970-75</u>	<u>1975-80</u>
Seoul	1,456	1,478	1,267	1,068	87.0	72.3
Gyeonggi	743	895	521	753	70.1	84.1
SMR	2,199	2,373	1,787 ^{a/}	1,792 ^{a/}	81.3	75.5

^{a/} These figures do not include the migratory exchange between Seoul and Gyeonggi. They include only net migrants from outside the SMR.

Note: The data used here are not directly comparable to those used in Tables 6 and 7.

Source: Economic Planning Board, Korea Statistical Yearbook, 1970, 1975, and 1980.

Table 9: NET MIGRATION IN THE SMR^{a/}, 1971-1981

<u>Region</u>	<u>1971</u> <u>Thousands</u> <u>of Persons</u>	<u>1976</u> <u>Thousands</u> <u>of Persons</u>	<u>1981</u> <u>Thousands</u> <u>of Persons</u>	<u>1971-81</u> <u>Annual Average</u> <u>Growth Rate (%)</u>
Seoul	229	312	148	-4.3
Gyeonggi	112	144	152	3.1
Seoul:				
from Gyeonggi	-31	-53	-90	11.2 ^{c/}
from Others	260	365	238	-0.9
Gyeonggi:				
from Seoul	31	53	90	11.2
from Others	81	91	62	-2.6
<hr/>				
Gyeonggi: Share of net migration				
Satellite Cities		84	113 ^{b/}	6.1 ^{d/}
Rest of Gyeonggi		60	39 ^{b/}	8.33 ^{d/}

a/ The migration figures are the three-year averages for the reported year and its previous and next year.

b/ Due to the absence of 1982 data for satellite cities, separately, the figure for 1982 needed in calculating three-year average was estimated by using the trend in the previous year.

c/ Growth rate of negative net migration.

d/ For 1976-1981.

Source: Economic Planning Board, Korea Statistical Yearbook, 1971, 1976, and 1981.

migration to Seoul was due solely to the people moving to Seoul from other areas than Gyeonggi. The trend of out-migration from Seoul to Gyeonggi became stronger during the period, while the growth of in-migration to Seoul from other areas than Gyeonggi declined in the latter half of the period, contributing to the slowdown in the growth of Seoul's population (See Table 9).

Within Gyeonggi Province, six satellite cities of Seoul have absorbed most of total net migration of Gyeonggi in the 1970's. This tendency became stronger in the recent years. In 1981 the satellite cities accounted for 74 percent of the total net migrants attracted to Gyeonggi (Table 9).

4. Changing Patterns of Population Distribution in SMR

This section documents the changing patterns of population distribution within the region by three different spatial groupings of subareas: (1) by city, (2) by "ring," and (3) by "radial sector."

4-1. Changing Patterns by City

Table 10 shows that in the 1960's, Seoul's population share in the region increased substantially from 47 percent in 1960 to 62 percent in 1970. In the 1970's Seoul's share relative to the rest of region stayed remarkably stable. Within Gyeonggi, however, the distribution changed dramatically; all satellite cities in Gyeonggi except Euijeongbu increased their shares in the region. Gyeonggi excluding the six cities lost its share to 19 percent in 1980 from 40 percent in 1960. In terms of growth rate, in the 1960's Seoul grew at an annual rate of 8.3 percent, much faster than Gyeonggi. In the 1970's, however, the growth rate was about 4 percent throughout the region. The satellite cities

Table 10: CHANGES IN POPULATION DISTRIBUTION BY CITY IN THE SMR, 1960-1980

Region	1960		1970		1980		Annual Average Growth Rate (%)		
	Thousand Persons	%	Thousand Persons	%	Thousand Persons	%	60-70	70-80	60-80
Seoul	2,445	47.0	5,433	62.2	8,367	62.9	8.31	4.41	6.34
Gyeonggi	2,750	53.0	3,297	37.8	4,935	37.1	1.83	4.12	2.97
SMR Total	5,203	100.0	8,730	100.0	13,302	100.0	5.31	4.30	4.81
Gyeonggi:									
Incheon	402	7.7	634	7.3	1,085	8.2	4.66	5.52	5.09
Suwon	91	1.7	107	1.9	311	2.3	1.63	6.42	6.34
Seongnam	(31)	0.6	61	0.7	376	2.8	7.00	19.95	13.29
Euijeongbu	(57)	1.1	93	1.1	133	1.0	5.01	3.84	4.33
Anyang	(32)	0.6	(91)	1.0	254	1.9	11.02	10.81	10.91
Bucheon	(62)	1.2	(72)	0.8	221	1.7	1.51	11.87	6.56
Subtotal	672	12.9	1,118	12.8	2,380	17.9	5.22	7.85	6.53
Rest of Gyeonggi	2,086	40.1	2,179	25.0	2,555	19.2	0.43	1.60	1.02

Note: The numbers in Parentheses are the population figures before promoted to the city status.

Source: Economic Planning Board, Population and Housing Census, 1966, 1970, and 1980.

had higher growth rates than that of Seoul with the exception of Euijeongbu; especially, it is striking that Seongnam grew at an annual rate of 20 percent while Bucheon and Anyang at more than 10 percent. This changing patterns in terms of growth and share of subareas in the region reflect the differential rates of net-migration and natural population growth discussed in the previous section.

4-2. Changing Patterns by Ring

The SMR is divided into 5 rings; three in Seoul and two in Gyeonggi (see Map 2). Ring 1 is the CBD; Ring 2 includes Gu's in old Seoul to the north of the Han river, except the northmost Gu which belongs to Ring 3 with all Gu's in South Seoul (south to the river). Ring 4 includes all six satellite cities and Banweol and Ring 5 has the outlying Gun's. Table 11 shows that Ring 1, the CBD, lost population during 1975-1980, in terms of both absolute numbers and share. The share of Rings 2 and 3, ^{3/} the rest of Seoul excluding the CBD, stayed almost constant in the 1970's after increasing sharply in the 1960's. Ring 4 increased its share rapidly throughout the entire period. Especially, its share increased by four folds in the 1960's. This was due to the dramatic growth of satellite cities. The outmost Ring 5 however experienced a loss of its share over the years. In the 1970's it lost population in absolute terms.

In sum, the decentralization trend prevailed in the 1970's, but largely from Seoul to satellite cities. Also it is apparent that

^{3/} Because of difficulties of disaggregating data due to the changes in the boundaries of administrative units over time, the combined figures of Rings 2 and 3 are reported here.

Table 11: CHANGES IN POPULATION BY RING IN THE SMR, 1966-1980

Ring	1966		1970		1975		1980		Annual Average Growth Rate (%) 1966-1980
	Thousand Persons	%	Thousand Persons	%	Thousand Persons	%	Thousand Persons	%	
Ring 1 (CBD)	386	5.6	346	4.0	619	5.7	535	4.0	2.36
Ring 2 & 3	3,419	49.5	5,088	58.3	6,270	57.4	7,833	58.9	6.10
Ring 4	1,500	4.7	1,813	20.8	2,464	22.5	3,386	25.5	5.99
Ring 5	1,607	23.2	1,485	17.0	1,575	14.4	1,550	11.7	-0.26
SMR Total	6,912	100.0	8,730	100.0	10,929	100.0	13,302	100.0	4.79
Ring 4:									
Cities			1,118	12.8	1,648	15.1	2,380	17.9	7.85
Rest of Ring 4			695	8.0	816	7.4	1,006	7.6	2.68

Source: Economic Planning Board, Population and Housing Census, 1966, 1970, 1975, and 1980.

there were movements of people from outer areas to the satellite cities forming subcenters in the region (See Table 9).

4-3. Changing Patterns by Radial sector

Seven radial sectors are defined for the region mainly based on the major transport routes stretched out from the center of Seoul (see Map 3). This approach is useful for describing land use specialization. Sector 1 is the CBD of Seoul; Sectors 2 and 3 lead to the DMZ; Sectors 4 and 5 are mountainous inlands and Sector 6 is the main transport corridor leading to Daejeon and Sector 7 is the industrial corridor leading to Incheon.

Among the seven sectors, Sector 1, the CBD, and the three northern sectors (2, 3, and 4) experienced the decline of population share in the 1970's (Table 12). For all these four sectors the average annual growth rate for 1966-80 was lower than the region's average. The declining shares of northern sectors reflect people's preference to stay away from the North Korean border. Two southern sectors (5 and 6) however increased their shares and their growth rates were greater than the region's average. For Sector 7, the main "industrial corridor" leading to Incheon, however, the annual growth rate was slightly lower than the region's average. The fastest growing areas are Sectors 5 and 6. Sector 6 also experienced the development of an industrial corridor along the Seoul-Busan transport access existed throughout the Korean history. Sector 5 contains part of Seoul-Busan expressway built in 1973. This sector's share jumped from 15 to 19 percent in the latter half of the 1970's.

Table 12: CHANGES IN POPULATION BY RADIAL SECTOR IN THE SMR, 1966-1980

Sector	1966		1970		1975		1980		Annual Average Growth Rate (%) 1966-1980
	Thousand Persons	%	Thousand Persons	%	Thousand Persons	%	Thousand Persons	%	
Sector 1 (CBD)	386	5.6	341	4.0	619	5.7	533	4.0	2.33
2	822	11.9	1090	12.5	1,105	10.1	1,124	8.4	2.26
3	1,031	14.9	1,486	17.0	1,804	16.5	1,977	14.9	4.76
4	826	12.0	997	11.4	1,020	9.3	1,101	8.3	2.07
5	1,027	14.9	1,272	14.6	1,683	15.4	2,533	19.0	6.66
6	825	11.9	855	9.8	1,862	17.0	2,276	17.1	7.52
7	1,995	28.9	2,686	30.8	2,835	25.9	3,758	28.3	4.63
SMR Total	6,912	100.0	8,730	100.0	10,929	100.0	13,302	100.0	4.79

Source: Economic Planning Board, Population and Housing Census, 1966, 1970, 1975, and 1980.

5. Changing Patterns of Employment Distribution in SMR

5-1. Changes in Composition of Employment

During the past two decades of rapid industrialization in Korea the employment composition changed markedly. The changing composition of employment by sector in the SMR was similar to that of the country as a whole (Table 13). The share of agricultural employment in the SMR has rapidly fallen from 37 percent in 1960 to 12 percent in 1980, owing largely to the changes occurred in Gyeonggi. This declining trend of agricultural employment share for SMR was much faster than the whole country. The share of manufacturing employment was the same for both Seoul ^{4/} and Gyeonggi in 1980, but Gyeonggi's share increased more than four folds while Seoul gained moderately. In fact, Seoul's share declined in the latter half of the 1970's indicating the decentralization of manufacturing employment. It should be noted that the service sector's employment share declined while that of the trade and banking increased in the SMR as well as for the country. This shift in employment composition was sharpest for Seoul.

In sum, the overall trends of employment composition were similar between Seoul and Gyeonggi. However, the speed of changes were quite different between them depending on sectors. Gyeonggi's shares increased faster than Seoul for manufacturing, construction, and trade and banking. At the same time, the share of service employment declined faster in Seoul than Gyeonggi.

^{4/} Seoul's manufacturing employment share of 32 percent based on the population census data seems to be overstated. This figure needs to be verified by establishment-based data sources. Manufacturing employment share in large cities of the world is typically about 25 percent.

Table 13: CHANGES IN COMPOSITION OF EMPLOYMENT BY SECTOR, 1960-1980 (%)

Industry	Whole Country				Seoul				Gyeonggi				SMR			
	1960	1970	1975	1980	1960	1970	1975	1980	1960	1970	1975	1980	1960	1970	1975	1980
Agriculture	65.7	50.8	49.0	37.8	2.2	2.0	2.0	0.9	62.1	48.9	44.8	29.1	37.1	20.4	19.6	11.9
Mining & Quarrying	0.7	1.0	0.7	0.7	0.5	0.4	0.3	0.2	0.3	0.8	0.4	0.3	0.4	0.5	0.3	0.2
Manufacturing	6.9	14.3	17.4	22.1	17.1	28.3	34.1	32.4	7.0	13.8	22.1	32.0	11.2	22.6	29.2	32.2
Electricity, Gas and water	0.2	0.3	0.3	0.3	1.0	0.7	0.7	0.4	0.2	0.4	0.3	0.3	0.5	0.6	0.5	0.4
Construction	1.7	4.6	3.8	5.2	7.3	9.9	8.2	8.5	1.8	4.6	4.7	6.1	4.1	7.8	6.8	7.6
Trade & Banking ^{a/}	8.4	13.6	14.5	18.5	22.9	29.3	28.4	33.9	8.5	13.0	13.7	17.6	14.5	22.9	22.4	27.6
Transportation and Communication	2.1	3.2	3.4	4.3	5.3	5.7	6.1	6.4	2.9	4.1	3.4	4.4	3.9	5.1	5.0	5.6
Service ^{b/}	13.5	12.0	10.8	11.1	42.3	23.1	20.3	17.3	16.5	14.4	10.6	10.3	27.3	19.7	16.3	14.6
Unknown	0.9	0.3	0.1	0.0	1.3	0.7	0.0	0.0	0.8	0.1	0.0	0.0	1.1	0.5	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

^{a/} The trade and Banking sector includes part of the personal services sector i.e., restaurant and hotel services.

^{b/} The service sector is mainly consisted of domestic and personal services, social and community services, sanitary, public administration and defense service.

Source: Economic Planning Board, Population and Housing Census of Korea, 1960, 1970, 1975, and 1980.

The changing composition of employment by occupation is consistent with that observed by sector as described above. The shares of professional and technical, clerical, and production workers, all rose in the region, while those of administrative and service workers declined. Within the region, however, Seoul's share of professional and technical workers increased only slightly while its share of service workers decreased substantially (Table 14).

5-2. Decentralization trends

Table 15 shows employment shares between Seoul and Gyeonggi by sector for 1960-1980. In the absence of small area data for all sectors, the trends of spatial distribution can be observed at this aggregated level. In the 1960's, Seoul's share of employment rose for all sectors indicating the centralization trend. For all non-agricultural employment, Seoul's share increased from 65 percent to 75 percent in that decade. This trend was reversed in the 1970's. Seoul lost employment shares in all sectors except for transportation and communication, and services. It should be noted that manufacturing employment decentralized most rapidly from 76 percent in 1970 to 61 percent in 1980. The employment in all decentralizing sectors together accounted for about 77 percent of the total employment in the region in 1980.

5-3. Changing Location Patterns of Employment: Selected Sectors

This subsection presents the changing location patterns for four selected sectors for which various spatially disaggregated data are available.

Manufacturing: Table 16 shows the changing location patterns of manufacturing employment by ring. Based on the establishment-based

Table 14: CHANGES IN COMPOSITION OF EMPLOYMENT BY OCCUPATION, 1960-1980 (%)

Occupation	Whole Country				Seoul				Gyeonggi				SMR			
	1960	1970	1975	1980	1960	1970	1975	1980	1960	1970	1975	1980	1960	1970	1975	1980
Professional & Technical	2.4	3.2	3.3	4.6	6.3	6.0	6.3	7.8	2.2	2.7	2.7	3.8	3.9	4.7	4.8	6.2
Administrative	1.3	0.9	0.8	1.1	4.1	2.9	2.4	3.2	1.2	0.6	0.5	0.5	2.4	2.0	1.6	2.1
Clerical	2.6	5.8	6.7	9.5	10.3	14.6	16.2	19.0	2.5	5.1	5.8	9.6	5.8	10.9	11.9	15.3
Sales	8.3	10.1	10.4	12.1	21.3	20.6	20.2	21.2	8.7	9.8	10.1	11.6	13.9	16.4	16.0	17.5
Service	6.0	6.7	6.4	7.1	21.0	14.2	11.6	11.4	7.9	8.3	6.6	7.5	13.4	11.9	9.5	9.9
Farmers & Fisherman	65.4	50.7	48.8	37.6	2.1	1.9	2.0	0.9	61.9	49.0	44.7	28.9	36.9	20.4	19.5	11.7
Production	13.2	21.6	22.8	28.1	33.8	38.3	40.7	36.7	14.8	23.3	28.2	38.2	22.7	32.4	35.6	37.3
Unclassified	0.8	0.9	0.8	0.0	1.1	1.5	0.8	0.0	0.7	1.3	1.4	0.0	0.9	1.4	1.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Economic Planning Board, Population and Housing Census of Korea, 1960, 1970, 1975, and 1980.

Table 15: CHANGES IN SPATIAL DISTRIBUTION OF EMPLOYMENT
BY SECTOR IN THE SMR, 1960-1980 (%)

<u>Sector</u>	1960			1970			1980		
	<u>Seoul</u>	<u>Gyeonggi</u>	<u>SMR</u>	<u>Seoul</u>	<u>Gyeonggi</u>	<u>SMR</u>	<u>Seoul</u>	<u>Gyeonggi</u>	<u>SMR</u>
Manufacturing	63.6	36.4	100.0	76.0	24.0	100.0	61.4	38.6	100.0
Electricity & Water	71.4	28.6	100.0	73.3	26.7	100.0	71.4	28.6	100.0
Construction	74.5	25.5	100.0	76.9	23.1	100.0	68.7	31.3	100.0
Trade & Banking ^{a/}	65.9	34.1	100.0	77.8	22.2	100.0	75.2	24.8	100.0
Transportation & Communication	57.1	42.9	100.0	68.1	31.9	100.0	69.8	30.2	100.0
Services	64.8	35.2	100.0	71.3	28.7	100.0	72.6	27.4	100.0
Total (Non- agricultural)	65.0	35.0	100.0	75.0	25.0	100.0	68.8	31.2	100.0

^{a/} A part of jobs in personal services, hotels and restaurants, was included.

Sources: Economic Planning Board, Population and Housing Census of Korea, 1960, 1970, 1975, and 1980.

Table 16: CHANGES IN DISTRIBUTION OF MANUFACTURING EMPLOYMENT
BY RING IN THE SMR, 1966-1980

<u>Ring</u>	<u>1966</u>		<u>1970</u>		<u>1975</u>		<u>1980</u>		<u>Annual Average Growth Rate (%) 1970-1980</u>
	<u>Thousand Persons</u>	<u>%</u>	<u>Thousand Persons</u>	<u>%</u>	<u>Thousand Persons</u>	<u>%</u>	<u>Thousand Persons</u>	<u>%</u>	
Ring 1	31.3	13.5	49.1	12.4	44.0	6.1	28.2	3.1	-5.4
2 & 3	148.9	64.2	242.6	61.2	410.2	57.1	405.3	45.1	5.3
4	47.8	20.6	96.6	24.4	239.5	33.3	389.9	43.4	15.0
5	3.8	1.6	7.9	2.0	25.1	3.5	74.4	8.3	25.1
Total	231.8	100.0	396.2	100.0	718.8	100.0	897.8	100.0	8.5

Source: Economic Planning Board, Mining and Manufacturing Survey, 1966, 1970, 1975, and 1980.

data it becomes clear that manufacturing employment was decentralizing during the entire period in contrast to the picture shown in Table 15 above. The three rings of Seoul lost their shares during the entire period; the levels of employment also declined in the latter half of the 1970's. On the other hand, the two rings in Gyeonggi gained their shares rapidly. Ring 4, where the six satellite cities are located, with an annual growth rate of 15 percent more than doubled its manufacturing employment share during the period. Ring 5, the outmost area, experienced more dramatic increase of manufacturing employment which grew at 25 percent annually. It should be noted here that this area lost population share during the same period (Table 11).^{5/}

Retail, Wholesale and Personal Services: The changing location patterns of employment for the retail, wholesale, and personal services sectors can be observed using the trade census data prepared by the National Bureau of Statistics every three years since 1968. (The data are available for 1968, 1971, 1976, and 1979.)

Table 17 shows the share of retail employment by several spatial categories for 1968-79. Between Seoul and Gyeonggi, Seoul lost the relative share during the ten-year period. Retail employment has been growing much faster in Gyeonggi than Seoul. Within Seoul, the CBD experienced a loss of share during this period. Within Gyeonggi, the satellite cities gained retail employment considerably with at an annual growth rate of 9 percent. The rest of Gyeonggi however experienced a continuous decline of its retail employment share with a low growth of less than 2 percent per year. The overall changing patterns of retail employment are consistent with those of population as shown in Table 10. This implies that retail activities follow the population

^{5/} See Lee (1985) for more details.

Table 17: DISTRIBUTION OF RETAIL EMPLOYMENT IN THE SMR, 1968-1979

Region	1968	1971	1976	1979	Annual Average Growth Rate of Retail Employment (%), 1971-79
Seoul	70.7	70.0	66.7	67.8	3.7
Gyeonggi	29.3	30.0	33.3	32.2	5.1
SMR	100.0	100.0	100.0	100.0	4.1
	(165,588)	(217,262)	(284,965)	(300,117)	
Seoul:					
CBD	22.4	15.7	21.0	17.3	5.3
Rest of Seoul	48.3	54.3	45.7	50.5	3.2
Gyeonggi:					
Cities		11.6	17.7	16.9	9.1
Rest of Gyeonggi		18.4	15.6	15.4	1.8

Note: Parentheses are the actual number of employees.

Source: Economic Planning Board, Report on Wholesale and Retail Trade Census, 1968, 1971, 1976, and 1979.

movement 6/, i.e., the decentralization of population induces the outward movement of population-serving retail activities.

The wholesale employment in the region grew rapidly at an annual growth rate of 10 percent (Table 18). Unlike the retail employment, wholesale employment is more heavily concentrated in Seoul than Gyeonggi. Within Seoul the CBD has more than half of the wholesale employment but the share was declining over time indicating the decentralization of wholesale trade within Seoul. Within Gyeonggi however wholesale trade was growing in satellite cities at an annual rate of 10 percent. For the region as a whole, the evidence of decentralization is not so clear. The data seem to suggest a mild trend of concentration toward Seoul in the 1970's.

Over the same period of 1968-79 the relative share of personal service employment between Seoul and Gyeonggi did not change much (Table 19). However, within Seoul the share of the CBD declined considerably losing employment to outer areas in the city. Within Gyeonggi the share by satellite cities remained almost constant.

6. Comparisons of Changing Location Patterns of Population and Employment

In the preceding sections we analyzed the changing location patterns of population and employment. The comparisons of the movements of jobs with those of people are important for understanding the overall changes of the spatial structure of the region. Such information can

6/ See Hoover and Vernon (1959) for empirical evidence for New York City and White (1976) for a theoretical support.

Table 18: DISTRIBUTION OF WHOLESALE EMPLOYMENT IN THE SMR, 1968-1979

Region	1968	1971	1976	1979	Annual Average Growth Rate of Wholesale Employment (%), 1971-79
Seoul	88.9	83.4	83.7	85.9	10.4
Gyeonggi	11.1	16.6	16.3	14.1	7.8
SMR	100.0	100.0	100.0	100.0	10.0
	(37,506)	(27,339)	(45,777)	(58,729)	
Seoul:					
CBD	65.4	46.4	50.5	53.4	12.0
Rest of Seoul	23.5	37.0	33.2	32.5	8.2
Gyeonggi:					
Cities		9.6	10.6	9.5	9.9
Rest of Gyeonggi		7.0	5.7	4.6	4.3

Note: Parentheses are the actual number of employees.

Source: Economic Planning Board, Report on Wholesale and Retail Trade Census, 1968, 1971, 1976, and 1979.

Table 19: DISTRIBUTION OF SELECTED PERSONAL SERVICE EMPLOYMENT:
RESTAURANTS AND HOTELS, 1968-1979

Region	1968	1971	1976	1979	Annual Average Growth Rate of Service Employment (%), 1968-71
Seoul	72.7	73.3	74.2	74.0	8.7
Gyeonggi	27.3	26.7	25.8	26.0	8.0
SMR	100.0	100.0	100.0	100.0	8.5
	(87,508)	(124,922)	(145,828)	(214,325)	
Seoul:					
CBD		30.5	41.2	27.6	-0.6 <u>a/</u>
Rest of Seoul		42.8	33.8	46.5	27.4 <u>a/</u>
Gyeonggi:					
Cities			14.6	14.6	13.7 <u>a/</u>
Rest of Gyeonggi			11.1	11.3	14.3 <u>a/</u>

a/ The average rate for the period of 1976-1979 only.

Source: Economic Planning Board, Report on Wholesale and Retail Trade Census, 1968, 1971, 1976, and 1979.

provide policy implications, for example, regarding housing demand and changes in commuting patterns.

Table 20 shows the relative changes of population and employment shares between Seoul and Gyeonggi over the period of 1960-80. In the 1960's both population and employment had been rapidly concentrating in Seoul. In the 1970's however, while the population shares remained remarkably stable, Seoul's employment share declined reflecting decentralization of non-agricultural employment in the region (See Figure 1).

For a more disaggregated comparison, the changing spatial distribution of population is plotted against that of manufacturing employment in Figure 2 using the information from Tables 11 and 16. During the 1970's the manufacturing employment share of both the CBD (Ring 1) and the rest of Seoul (Ring 2 and 3) continuously declined while the population share of the latter increased slightly. Both Ring 4 and Ring 5 in Gyeonggi however experienced sharp increases of manufacturing employment share. On the other hand, the population share of Ring 4 increased while that of Ring 5 declined. Ring 5, where manufacturing employment growth was fastest, was continuously losing population.

We can conclude that in the 1970's, jobs were moving outward in the region without corresponding movements of the population. The contrast was much sharper in the case of manufacturing employment.

7. Gradient Measures for the Decentralization Trend of Manufacturing Employment

The extent of decentralization of manufacturing employment can be measured by estimating the employment density gradient over a time

Table 20: CHANGES IN THE SHARE OF EMPLOYMENT AND POPULATION
IN THE SMR, 1960-1980

<u>Region</u>	<u>Population (P)</u>				<u>Non-Agricultural Employment (E)</u>				<u>Average Annual Change of Share</u>					
	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1960-70</u>		<u>1970-75</u>		<u>1975-80</u>	
									<u>P</u>	<u>E</u>	<u>P</u>	<u>E</u>	<u>P</u>	<u>E</u>
Seoul	47.0	62.2	63.0	62.9	65.0	75.0	71.9	68.8	1.52	1.00	0.16	0.62	-0.02	-0.62
Gyeonggi	53.0	37.8	37.0	37.1	35.0	25.0	28.1	31.2	-1.52	-1.00	-0.16	0.62	0.02	0.62
SMR	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0						

Source: Economic Planning Board, Population and Housing Census of Korea, 1960, 1966, 1970, 1975, and 1980.

Figure 1: CHANGING PATTERNS OF POPULATION AND NON-AGRICULTURAL EMPLOYMENT IN THE SMR, 1960-1980

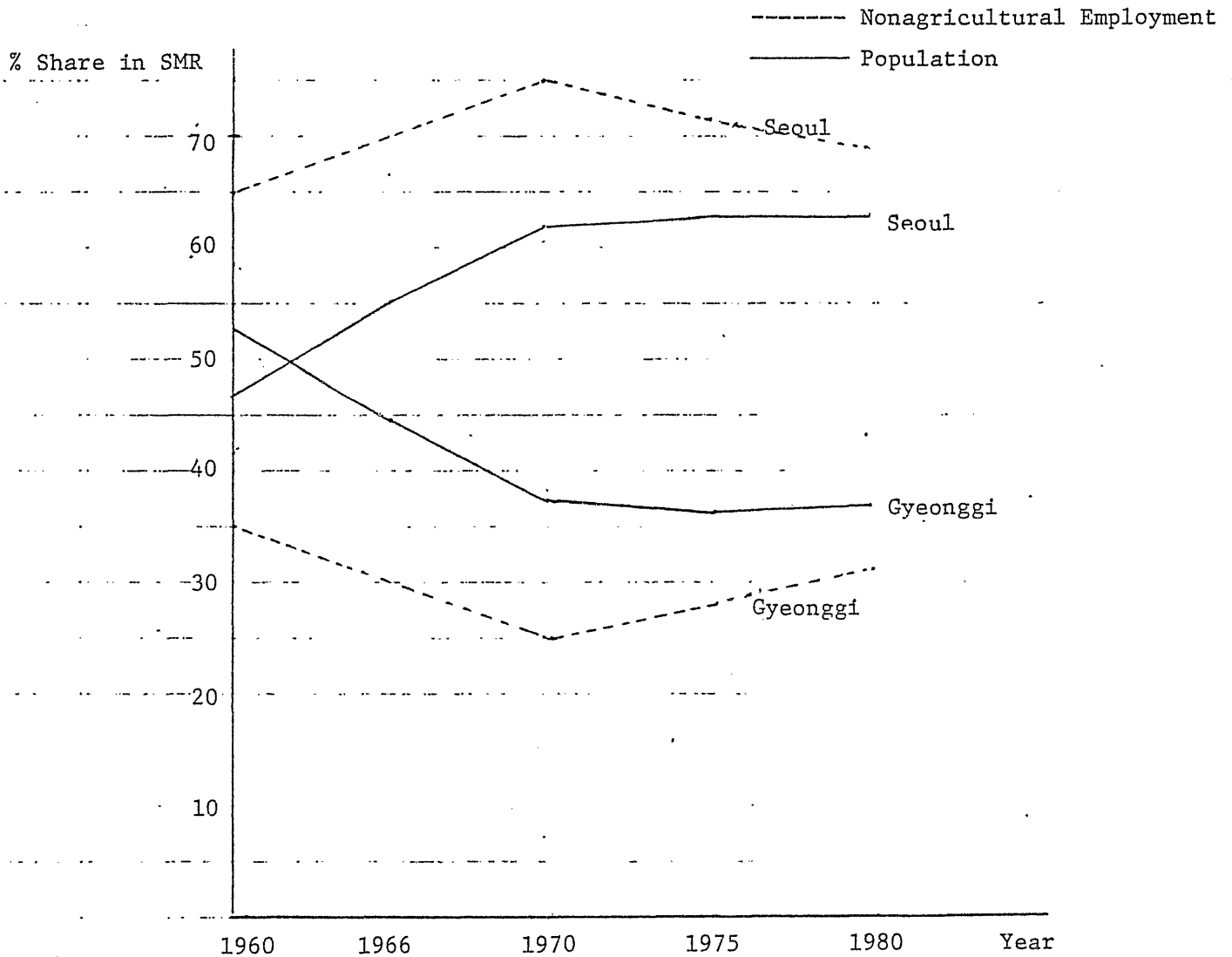
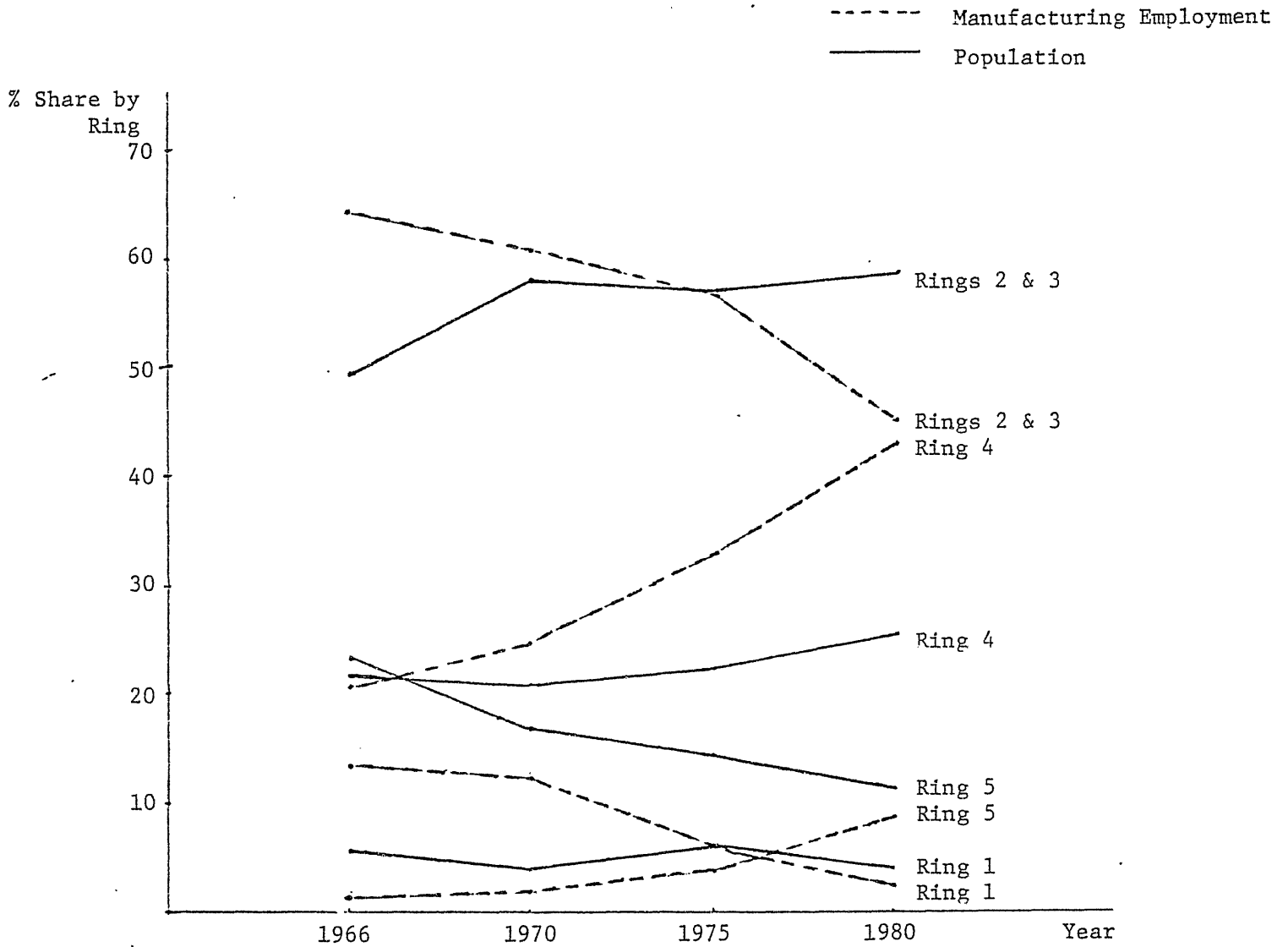


Figure 2: CHANGING PATTERNS OF POPULATION AND MANUFACTURING EMPLOYMENT BY RING, 1966-1980



period. The following exponentially declining density function was fitted using our data:

$$D(x) = D_0 e^{-bx}$$

where $D(x)$ is the employment density at x , where x is the distance from the city center to the centroid of the subarea. Parameter D_0 represents the density at the center and b is the slope of the function showing how rapidly the density falls off with distance.

Table 21 reports the estimates of employment density functions for all 9 two-digit manufacturing industries as well as the total manufacturing in Seoul for 1977 and 1981. For the total manufacturing, both D_0 and b decreased during the period. Even for the short time period covered, this indicates clear evidence of decentralization. The function rotated with the center density becoming lower and the slope flatter in 1981 than in 1977.

The results for individual industries also show decentralization trends for all industries although the shape of the density function varies widely. Figure 3 summarizes the results for all 9 industries. For the paper and publishing, and the textile and leather industries, the density is very high at the center and decreases rapidly. The slope became much flatter during the period indicating a sharp decentralization. The food and beverage, the metal, and the fabricated metal industries have positive slopes for both years, but the slope is steeper and the center density lower for 1981 than for 1977. This implies that the employment density of the metal industries have been declining throughout the city, but the decrease for the outer areas was less than that for the center. In case of the chemical, and the wood product industries, the sign of the slope changed. This implies a rapid decentralization of employment.

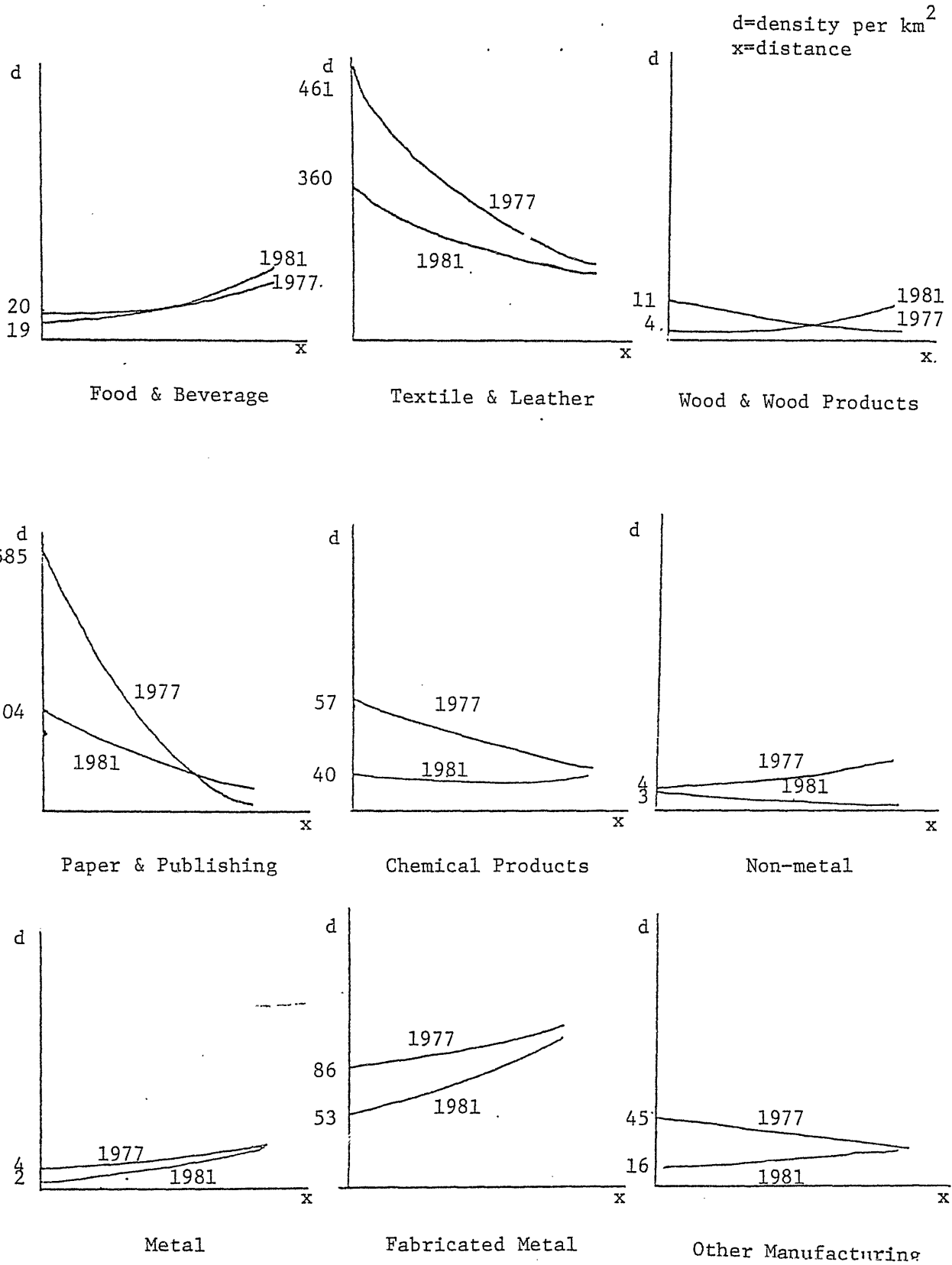
Table 21: MANUFACTURING EMPLOYMENT DENSITY GRADIENTS BY INDUSTRY FOR SEOUL, 1977 AND 1981

<u>Year</u>		<u>Food & Beverage</u>	<u>Textitle & Leather</u>	<u>Wood</u>	<u>Paper & Publishing</u>	<u>Chemical</u>	<u>Non-Metal</u>	<u>Metal</u>	<u>Fabri- cated Metal</u>	<u>Other Mfg.</u>	<u>Total</u>
1977.	Do	20.5	461.3	11.0	585.6	57.1	4.0	3.9	86.2	44.9	1173.0
	b	-0.021	0.093	0.040	0.366*	0.037	-0.087	-0.027	-0.026	0.007	0.078
1981	Do	19.1	330.2	3.7	304.2	40.3	2.6	1.5	52.9	15.7	854.4
	b	-0.032	0.064	-0.081	0.262*	-0.045	0.146	-0.096	-0.040	-0.077	0.061

* Significant at .05 level.

Data Source: National Bureau of Statistics, Mining and Manufacturing Survey, 1977 and 1981.

Figure 3: DECENTRALIZATION PATTERNS OF MANUFACTURING EMPLOYMENT BY INDUSTRY, 1977-1981: SEOUL



In sum, the decentralization trends of individual manufacturing industries can be summarized as follows: For all industries the CBD density (D_0) was lower in 1977 than 1981; regardless of the sign of the slope (b) every industry decentralized in Seoul, although the speed varied across industries.

We also estimated the density gradient measures for the SMR with the same functional form. ^{7/} The results (Table 25) show the significant decentralization trend of employment in the SMR for individual industries as well as total manufacturing. For the region as a whole every industry consistently had a negative slope and these slopes have flattened over time with the exception of the metal industry. It should be noted here that all slope coefficients became statistically significant when the function was fitted for the region including Gyeonggi.

8. Summary of Findings

This paper documented the trends of population and employment concentration in Korea and their changing location patterns within the Seoul region. Our findings can be summarized as follows:

(1) During the past two decades of rapid industrialization and urbanization in Korea, the increasing concentration of Korea's population and employment in the SMR was remarkable. The SMR's population share increased from one-fifth to more than one-third and its employment share from less than one-fifth to one-third during 1960-

^{7/} A quadratic equation might fit better for the SMR because the greenbelt surrounding Seoul and the satellite cities may generate a U-shaped density curve.

Table 22: MANUFACTURING EMPLOYMENT DENSITY GRADIENTS BY INDUSTRY FOR THE SMR, 1977 AND 1981

<u>Year</u>		<u>Food & Beverage</u>	<u>Texttile & Leather</u>	<u>Wood</u>	<u>Paper & Publishing</u>	<u>Chemical</u>	<u>Non-Metal</u>	<u>Metal</u>	<u>Fabri- cated Metal</u>	<u>Other Mfg.</u>	<u>Total</u>
1977	Do	64.9	549.4	22.5	74.7	76.2	19.6	6.4	293.4	73.6	1658
	b	0.083	0.113	0.098	0.113	0.086	0.079	0.043	0.115	0.103	0.112
1981	Do	48.3	480.1	20.0	76.7	65.1	18.1	6.5	177.1	52.1	1254
	b	0.080	0.106	0.087	0.106	0.085	0.064	0.052	0.083	0.093	0.095

Note: All entries are statistically significant at .05 level.

Data Source: National Bureau of Statistics, Mining and Manufacturing Survey, 1977 and 1981.

1980. (For non-agricultural employment alone the region's share rose from one-third to nearly half.) In the 1970's the SMR absorbed more than three-quarters of net population increase in Korea. The manufacturing, and the trade and banking sectors were the two largest employers.

(2) The extent of net migration and natural population growth explained differences in population changes among subareas. In the 1970's the number of out-migrants from Seoul to Gyeonggi was larger than the number of in-migrants from Gyeonggi to Seoul even though Seoul had positive net migration due to the inflow from outside the SMR. Within Gyeonggi the six satellite cities absorbed most of total net migration into Gyeonggi. The differences in the natural population growth rate also contributed to these differential growth patterns among subareas.

(3) The decentralization of population which continued in the 1970's did not occur uniformly throughout the region. The trend was stronger along the major transport routes to the south, particularly to the satellite cities in the southern part of the region. The outlying areas lost population during the period.

(4) The sectoral composition of employment changed markedly in the SMR during 1960-80. While the employment shares of the agriculture and the service sectors declined, the manufacturing and the trade and banking, the construction, and the transportation and communication sectors all increased their shares. The manufacturing share increased most rapidly.

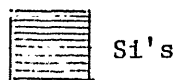
(5) The data revealed strong evidence of decentralization of employment in the SMR since early 1970's. Even though employment in all sectors showed a trend of concentration in the 1960's, this trend

reversed in the 1970's. The employment in all sectors except for the transportation and communication was rapidly decentralizing in the 1970's. The manufacturing and the construction sectors experienced the sharpest decentralization. The retail activities decentralized in a way that was similar to the changes in the population distribution, while the wholesale activities tended to centralize somewhat.

(6) On the whole, employment decentralized more rapidly than population. The population share between Seoul and Gyeonggi stayed stable in the latter part of the 1970's.

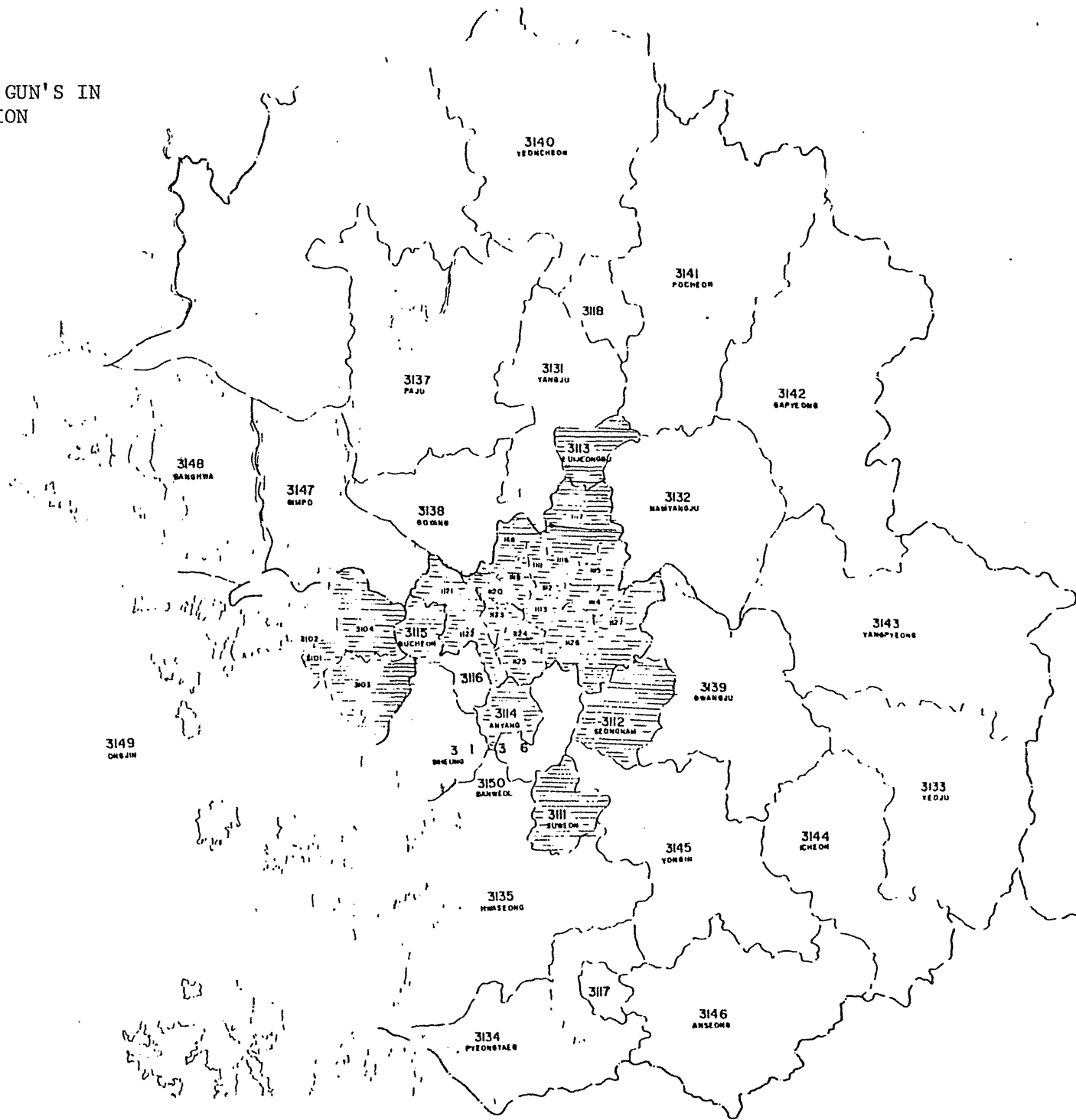
(7) The density gradient measures for manufacturing employment also support the decentralization trends at the two-digit industry level. The shape of the density function and the speed of decentralization varied across the industries, but such variations were significantly reduced when the functions were estimated for the whole region including both Seoul and Gyeonggi.

Map 1: FORTY-NINE GU'S AND GUN'S IN THE SEOUL REGION

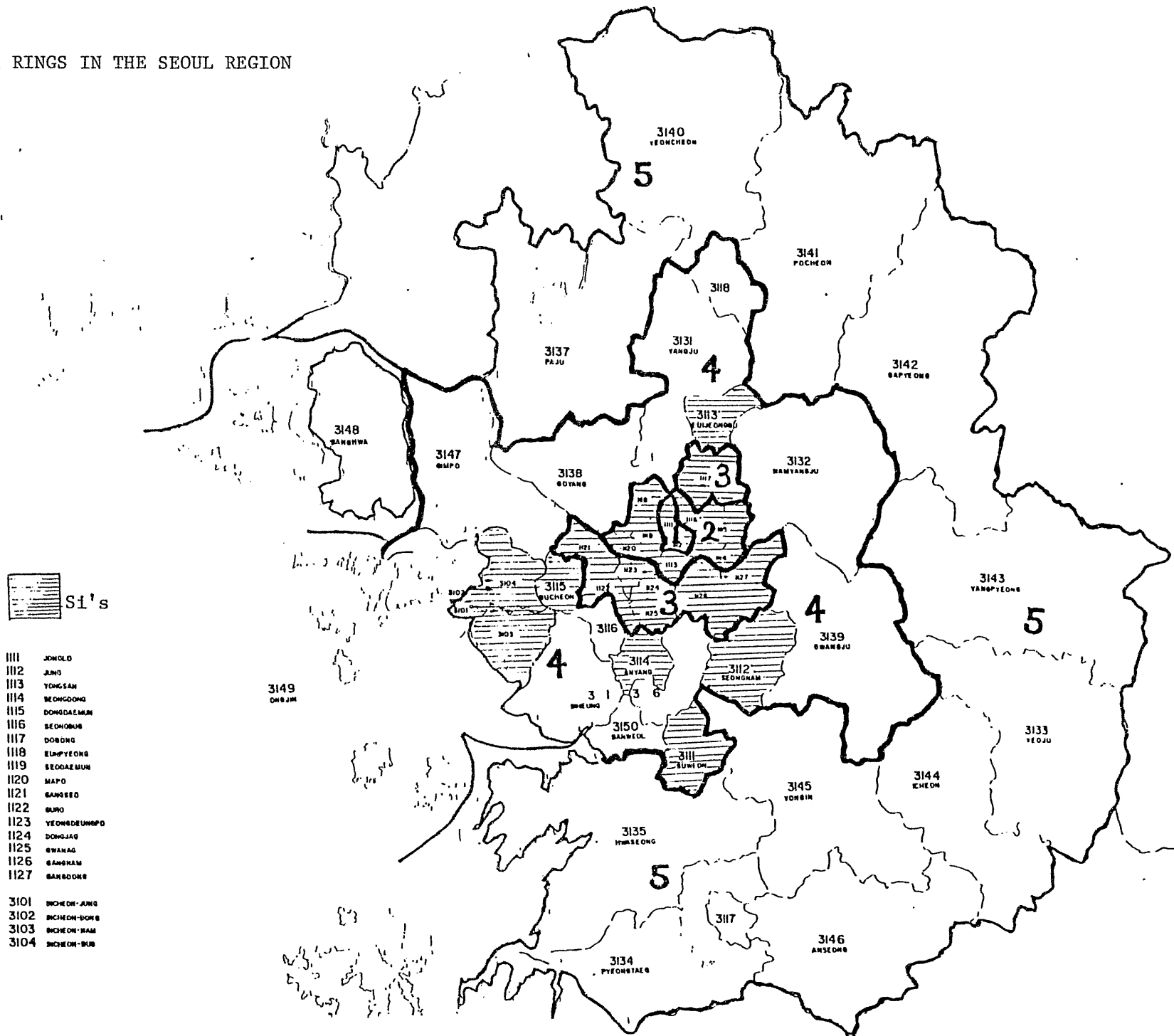


- 1111 JONGLO
- 1112 JUNG
- 1113 YONGSAH
- 1114 SEONGDOHNG
- 1115 DONGDAEMUN
- 1116 SEONGDONG
- 1117 DOBONG
- 1118 EUMPYEONG
- 1119 SEODAEUMUN
- 1120 MAPO
- 1121 GANGDO
- 1122 GUNGO
- 1123 YEONGDEUNGPO
- 1124 DONGLIANG
- 1125 GWANAK
- 1126 SANGNAM
- 1127 BANSOONG

- 3101 ICHEON-JUNG
- 3102 ICHEON-DONG
- 3103 ICHEON-NAM
- 3104 ICHEON-BUK



Map 2: FIVE RINGS IN THE SEOUL REGION




Si's

- 111 JONGNO
- 112 JANG
- 113 YONGSAN
- 114 BEONGGONG
- 115 DONGDAEMUN
- 116 SEOHORUS
- 117 DORDONG
- 118 EUMPYEONG
- 119 SEOGAE MUN
- 120 MAPO
- 121 GANSEO
- 122 GURO
- 123 YEONGDEUNGPO
- 124 DONGJAG
- 125 GWANAG
- 126 GANAM
- 127 GANSONG

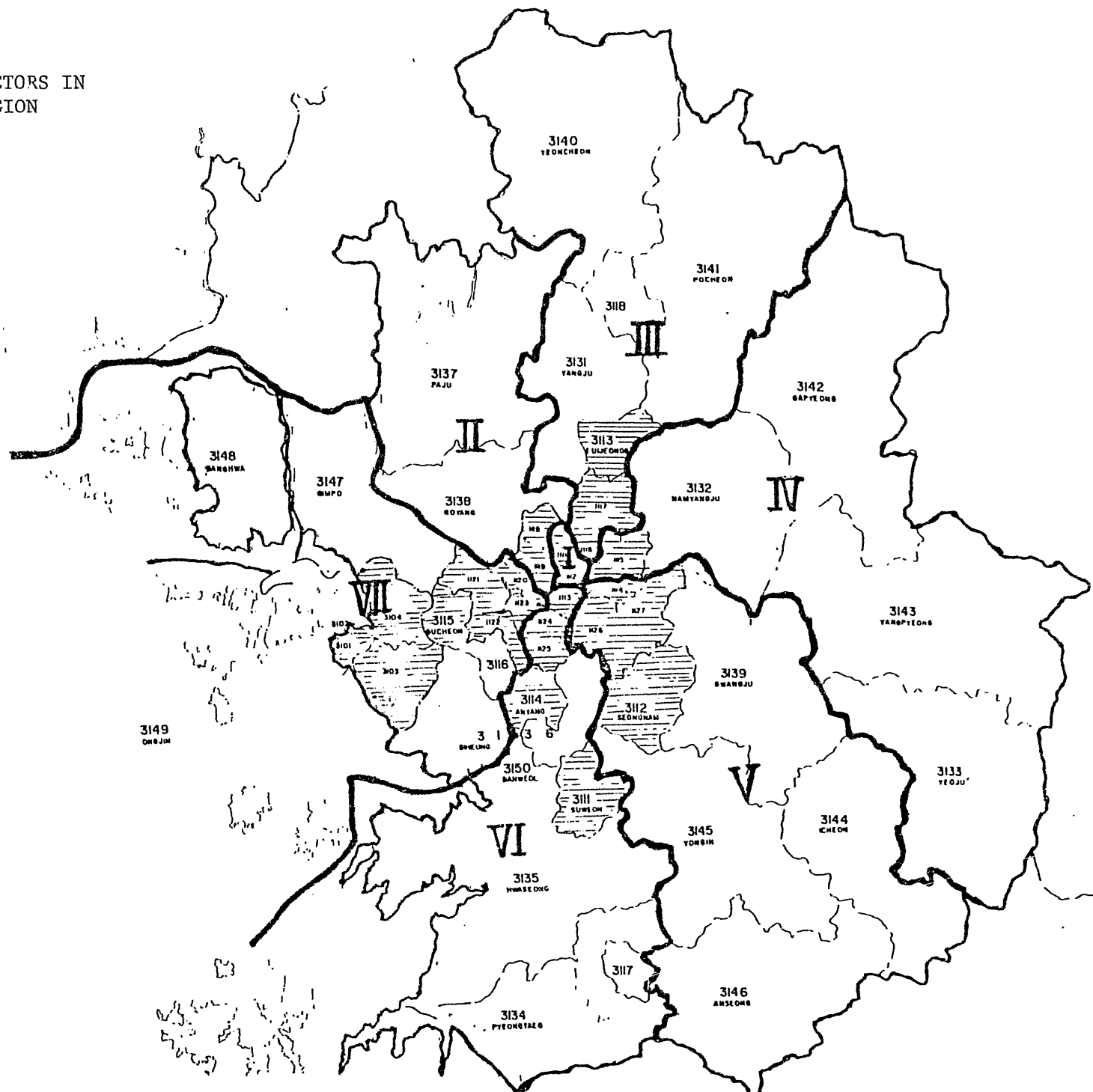
- 3101 BICHEON-JANG
- 3102 BICHEON-DONG
- 3103 BICHEON-NAM
- 3104 BICHEON-BUB

Map 3: SEVEN RADIAL SECTORS IN THE SEOUL REGION

 Si's

- III JONGLO
- III2 JUNG
- III3 YONGSAM
- III4 SEONGGONG
- III5 DONGDAEMUN
- III6 SEONGGUS
- III7 DOBONG
- III8 EUMPYEONG
- III9 SEODAEUMUN
- II20 MAPO
- II21 GANGSEED
- II22 BUKO
- II23 YEONGDEUNPO
- II24 DONGJAG
- II25 BWANAG
- II26 GANGNAM
- II27 BANGSOONG

- 3101 BICHEON-JUNG
- 3102 BICHEON-DONG
- 3103 BICHEON-NAM
- 3104 BICHEON-BUK



Appendix Tables

- Table A1. Growth of Employment by Sector in the SMR
- Table A2. Growth of Employment by Sector in Seoul
- Table A3. Growth of Employment by Sector in Gyeonggi
- Table A4. Growth of Employment by Sector in Korea
- Table A5. Growth of Employment by Occupation in the SMR
- Table A6. Growth of Employment by Occupation in Seoul
- Table A7. Growth of Employment by Occupation in Gyeonggi
- Table A8. Growth of Employment by Occupation in Korea
- Table A9. Changes in Composition of Manufacturing Employment by Industry in the SMR, 1973-1981
- Table A10. Distribution of Manufacturing Employment by Ring and Industry in Seoul, 1973-1981
- Table A11. Distribution of Manufacturing Employment by Ring and Industry in the SMR, 1973 and 1981

Table A1: GROWTH OF EMPLOYMENT BY SECTOR IN THE SMR

Sector	Employment (Thousand Persons)						Annual Average Growth Rate (%)	
	1960	%	1970	%	1980	%	1960-70	1970-80
Agriculture and Fisheries	464	37.1	544	20.4	497	11.9	1.6	-0.9
Mining and Quarrying	5.0	0.4	15	0.5	11	0.3	11.6	-6.1
Manufacturing 140	11.2	603	22.6	1,348	32.2	15.7	8.4	
Electricity, Gas and Water	7	0.5	15	0.6	15	0.4	7.9	0.0
Construction 51	4.1	209	7.8	316	7.6	15.2	4.2	
Trade and Banking	182	14.5	610	22.9	1,155	27.6	12.9	6.6
Transportation and Communication	49	3.9	135	5.1	234	5.6	10.7	5.7
Services 341	27.3	526	19.7	609	14.6	4.4	1.5	
Unknown 13	1.1	12	0.5	0	0.0	-	-	
All 1,251	100.0	2,670	100.0	4,183	100.0	7.9	4.6	

Source: Economic Planning Board, Population and Housing Census, 1960, 1970, and 1980.

Table A2: GROWTH OF EMPLOYMENT BY SECTOR IN SEOUL

Sector	Employment (Thousand Persons)						Annual Average Growth Rate (%)	
	1960	%	1970	%	1980	%	1960-70	1970-80
Agriculture and Fisheries	12	2.2	32	2.0	24	0.9	10.3	-2.8
Mining and Quarrying	3	0.5	7	0.4	4	0.2	8.8	-5.4
Manufacturing 89	17.1	458	28.3	828	32.4	17.8	6.1	
Electricity, Gas and Water	5	1.0	11	0.7	10	0.4	8.2	-1.0
Construction 38	7.3	160	9.9	217	8.5	15.5	3.1	
Trade and Banking	120	22.9	475	29.3	868	33.9	14.8	6.2
Transportation and Communication	28	5.3	92	5.7	164	6.4	12.6	6.0
Services 221	42.3	375	23.1	442	17.3	5.4	1.7	
Unknown 7	1.3	11	0.7	0	0.0	-	-	
All 523	100.0	1,622	100.0	2,559	100.0	12.0	4.7	

Source: Economic Planning Board, Population and Housing Census, 1960, 1970, and 1980.

Table A3: GROWTH OF EMPLOYMENT BY SECTOR IN GYEONGGI

Sector	Employment (Thousand Persons)						Annual Average Growth Rate (%)	
	1960	%	1970	%	1980	%	1960-70	1970-80
Agriculture and Fisheries	452	62.1	512	48.9	473	29.1	1.3	-0.8
Mining and Quarrying	2	0.3	8	0.8	4	0.2	14.9	-6.7
Manufacturing 51	7.0	145	13.8	520	32.0	11.0	13.6	
Electricity, Gas and Water	2	0.2	4	0.4	4	0.2	7.2	0.0
Construction 13	1.8	48	4.6	99	6.1	14.0	7.5	
Trade and Banking	62	8.5	136	13.0	286	17.6	8.2	7.7
Transportation and Communication	21	2.9	43	4.1	71	4.4	7.4	5.1
Services 120	16.5	151	14.4	167	10.3	2.3	1.0	
Unknown 6	0.8	1	0.1	0	0.0	-	-	
All 728	100.0	1,048	100.0	1,625	100.0	3.7	4.5	

Source: Economic Planning Board, Population and Housing Census, 1960, 1970, and 1980.

Table A4: GROWTH OF EMPLOYMENT BY SECTOR IN KOREA

Sector	Employment (Thousand Persons)						Annual Average Growth Rate (%)	
	1960	%	1970	%	1980	%	1960-70	1970-80
Agriculture and Fisheries	4,620	65.7	5,157	50.8	4,795	37.8	1.11	-0.73
Mining and Quarrying	49	0.7	100	1.0	91	0.7	7.39	-0.94
Manufacturing 482	6.9	1,448	14.3	2,797	22.1	11.63	6.81	
Electricity, Gas and Water	15	0.2	31	0.3	36	0.3	7.53	1.51
Construction 122	1.7	462	4.6	664	5.2	14.23	3.69	
Trade and Banking	149	8.4	1,377	13.6	2,345	16.2	8.85	5.47
Transportation and Communication	149	2.1	329	3.2	551	4.3	8.24	5.29
Services 948	13.5	1,222	12.0	1,403	11.1	2.57	1.39	
Unknown 61	0.9	28	0.3	0	0.0	-	-	
All 7,036	100.0	10,153	100.0	12,682	100.0	3.74	2.25	

Source: Economic Planning Board, Population and Housing Census, 1960, 1970, and 1980.

Table A5: GROWTH OF EMPLOYMENT BY OCCUPATION IN THE SMR

Occupation	Employment (Thousand Persons)						Annual Average Growth Rate (%)	
	1960	%	1970	%	1980	%	1960-70	1970-80
Professional and Technical	49	3.9	126	4.7	259	6.2	9.9	7.5
Administrative 31	2.4	54	2.0	90	2.1	5.7	5.2	
Clerical 73	5.8	290	10.9	640	15.3	14.8	8.2	
Sales 175	13.9	437	16.4	731	17.5	9.6	5.3	
Service 168	13.4	318	11.9	413	9.9	6.6	2.7	
Farmers and Fishermen	462	36.9	544	20.4	491	11.7	1.7	-1.0
Production Process Workers (Including Transportaion & Communication)	285	22.7	865	32.4	1,558	37.3	11.7	6.1
Unknown 11	0.9	36	1.4	0	0.0	-	-	
All 1,251	100.0	2,670	100.0	4,183	100.0	7.9	4.6	

Source: Economic Planning Board, Population and Housing Census of Korea, 1960, 1970, and 1980.

Table A6: GROWTH OF EMPLOYMENT BY OCCUPATION IN SEOUL

Occupation	Employment (Thousand Persons)						Annual Average Growth Rate (%)	
	1960	%	1970	%	1980	%	1960-70	1970-80
Professional and Technical	33	6.3	98	6.0	198	7.8	11.5	7.3
Administrative	22	4.1	47	2.9	81	3.2	7.9	5.6
Clerical	54	10.3	237	14.6	485	19.0	15.9	7.4
Sales	111	21.3	334	20.6	542	21.2	11.7	5.0
Service	110	21.0	231	14.2	291	11.4	7.7	2.3
Farmers and Fishermen	11	2.1	31	1.9	23	0.9	10.9	-2.9
Production Process Workers (Including Transportaion & Communication)	177	33.8	621	38.3	938	36.7	13.4	4.2
Unknown	6	1.1	23	1.5	0	0.0	-	-
All	523	100.0	1,622	100.0	2,559	100.0	12.0	4.7

Source: Economic Planning Board, Population and Housing Census of Korea, 1960, 1970, and 1980.

Table A7: GROWTH OF EMPLOYMENT BY OCCUPATION IN GYEONGGI

Occupation	Employment (Thousand Persons)						Annual Average Growth Rate (%)	
	1960	%	1970	%	1980	%	1960-70	1970-80
Professional and Technical	16	2.2	28	2.7	61	3.8	5.8	8.1
Administrative	9	1.2	0.6	0.9	0.5	-2.5	2.6	
Clerical	19	2.5	5.1	15.5	9.6	10.8	11.3	
Sales	63	3.7	10.3	9.8	18.9	11.6	5.0	6.3
Service	58	7.9	8.7	8.3	12.1	7.5	4.1	3.4
Farmers and Fishermen	451	61.9	51.3	49.0	46.9	28.9	1.3	-0.9
Production Process Workers (Including Transportaion & Communication)	108	14.8	24.4	23.3	62.0	38.2	8.5	9.8
Unknown	5	0.7	1.3	0	0.0	-	-	-
All	728	100.0	1,048	100.0	1,625	100.0	3.7	4.5

Source: Economic Planning Board, Population and Housing Census of Korea, 1960, 1970, and 1980.

Table A8: GROWTH OF EMPLOYMENT BY OCCUPATION IN KOREA

Occupation		Employment (Thousand Persons)						Annual Average Growth Rate (%)	
		1960	%	1970	%	1980	%	1960-70	1970-80
Professional and Technical		166	2.4	323	3.2	581	4.6	6.88	6.05
Administrative	90	1.3	96	0.9	134	1.1	0.65	3.39	
Clerical	186	2.6	593	5.8	1,203	9.5	12.29	7.33	
Sales	582	8.3	1,028	10.1	1,531	12.1	5.85	4.06	
Service	424	6.0	679	6.7	895	7.1	4.82	2.80	
Farmers and Fishermen		4,601	65.4	5,148	50.7	4,768	37.6	1.13	-0.76
Production Process Workers (Including Transportaion & Communication)		929	13.2	2,198	21.6	3,570	28.1	8.99	4.97
Unknown	59	0.8	88	0.9	1	0.0	-	-	
All	7,036	100.0	10,153	100.0	12,682	100.0	3.74	2.25	

Source: Economic Planning Board, Population and Housing Census of Korea, 1960, 1970, and 1980.

Table A9: CHANGES IN COMPOSITION OF MANUFACTURING EMPLOYMENT ^{a/}
BY INDUSTRY IN THE SMR, 1973-1981

		<u>Food & Beverage</u>	<u>Textile & Leather</u>	<u>Wood</u>	<u>Paper & Publishing</u>	<u>Chemical</u>	<u>Non-Metal</u>	<u>Metal</u>	<u>Fabri- cated Metal</u>	<u>Other Mfg.</u>	<u>Total</u>	<u>(Numbers)</u>
Seoul	1973	8.9	30.7	1.0	8.1	11.2	2.5	2.4	26.5	8.8	100.0	(409,916)
	1977	7.8	33.3	1.4	7.5	10.0	2.5	2.5	28.0	7.0	100.0	(541,827)
	1981	7.9	35.4	1.6	9.7	9.3	2.5	2.0	25.3	6.4	100.0	(433,493)
Gyeonggi	1973	8.2	31.8	9.3	5.4	7.5	5.9	4.6	21.2	6.2	100.0	(170,928)
	1977	5.5	29.3	6.1	3.7	9.5	5.8	3.6	30.9	5.6	100.0	(403,935)
	1981	6.3	26.0	5.6	3.5	9.4	5.7	3.5	34.1	5.9	100.0	(486,526)
Total	1973	8.7	31.0	3.5	7.3	10.1	3.5	3.0	24.9	8.0	100.0	(580,844)
	1977	6.8	31.6	3.4	5.9	9.8	3.9	3.0	29.3	6.4	100.0	(945,762)
	1981	7.0	30.5	3.7	6.4	9.3	4.2	2.8	29.9	6.1	100.0	(920,019)

a/ Establishments with 5 or more employees.

Source: Economic Planning Board, Mining and Manufacturing Survey, 1973, 1977, and 1981.

Table A10: DISTRIBUTION OF MANUFACTURING EMPLOYMENT ^{a/}
BY RING AND INDUSTRY IN SEOUL, 1973-1981

<u>1973</u>	<u>Food & Beverage</u>	<u>Textile & Leather</u>	<u>Wood</u>	<u>Paper & Publishing</u>	<u>Chemical</u>	<u>Non-Metal</u>	<u>Metal</u>	<u>Fabri- cated Metal</u>	<u>Other Mfg.</u>	<u>Total</u>	<u>(Numbers)</u>
Ring 1	6.8	10.9	1.7	45.0	11.2	13.8	3.4	3.4	9.9	11.0	(45,224)
2	26.1	44.5	65.4	38.0	42.6	40.9	19.9	36.2	43.1	39.7	(162,403)
3	67.1	44.6	32.9	17.0	46.2	45.3	76.7	60.4	44.0	49.3	(202,289)
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	(409,916)
<u>1977</u>											
Ring 1	1.4	7.3	2.2	43.8	1.7	0.4	0.7	1.4	2.3	6.6	(35,967)
2	22.5	40.1	55.8	32.6	36.2	28.5	16.8	29.1	36.4	33.8	(182,879)
3	76.1	52.6	42.0	23.6	62.1	71.1	82.5	69.5	61.3	59.6	(322,981)
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	(541,827)
<u>1981</u>											
Ring 1	1.2	5.4	0.9	40.6	1.5	3.5	0.3	1.9	1.1	6.7	(28,895)
2	28.8	40.4	45.3	26.6	36.5	37.4	15.1	28.2	35.2	33.8	(146,719)
3	70.0	54.2	53.8	32.8	62.0	62.1	84.6	69.9	63.7	59.5	(257,879)
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	(433,493)

^{a/} Establishments with 5 or more employees.

Source: Economic Planning Board, Mining and Manufacturing Survey, 1973, 1977, and 1981.

Table A11: DISRIBUTION OF MANUFACTURING EMPLOYMENT^{a/} BY RING AND INDUSTRY
IN THE SMR, 1973 AND 1981

<u>1973</u>	<u>Food & Beverage</u>	<u>Textitle & Leather</u>	<u>Wood</u>	<u>Paper & Publishing</u>	<u>Chemical</u>	<u>Non-Metal</u>	<u>Metal</u>	<u>Fabri- cated Metal</u>	<u>Other Mfg.</u>	<u>Total</u>
Ring 1	4.9	7.6	0.4	35.2	8.7	7.0	1.9	2.6	7.7	7.8
Ring 2	18.9	31.1	14.3	29.7	33.3	20.7	11.0	27.1	35.6	28.0
Ring 3	48.5	31.2	7.2	13.2	36.1	22.9	42.5	45.3	34.0	34.8
Ring 4	23.2	26.3	76.4	18.0	19.7	43.6	44.4	24.3	21.2	26.8
Ring 5	4.5	3.9	1.7	3.9	2.2	5.9	0.2	0.8	1.6	2.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<u>1981</u>										
Ring 1	0.7	3.0	0.2	29.0	0.7	0.1	0.1	0.8	0.5	3.1
Ring 2	15.2	22.1	9.0	19.0	17.1	10.5	5.1	11.2	17.2	16.0
Ring 3	37.0	29.7	10.7	23.4	29.1	17.4	28.8	17.8	31.1	44.1
Ring 4	37.5	36.4	77.5	21.8	43.9	49.8	61.3	52.3	41.8	44.1
Ring 5	9.6	8.8	2.7	6.9	9.2	22.2	4.7	7.9	9.3	8.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

^{a/} Establishments with 5 or more employees.

Source: Economic Planning Board, Mining and Manufacturing Survey, 1973 and 1981.

References

- Hoover, E.M. and R. Vernon (1959), Anatomy of a Metropolis, Harvard University Press.
- Kemper, P. and R. Schmenner (1974), "The Density Gradient for Manufacturing Industry," Journal of Urban Economics 1, 410-427.
- Kwon, W-Y (1981), "A Study of the Economic Impact of Industrial Relocation: The Case of Seoul," Urban Studies, 18, 73-90.
- Lee, K.S. (1981), "Intra-urban Location of Manufacturing Employment in Colombia," Journal of Urban Economics, March.
- Lee, K.S. (1985), "An Evaluation of Decentralization Policies in Light of Changing Location Patterns of Employment in the Seoul Region," Urban Development Discussion Paper No.60, The World Bank.
- Mills, E.S. (1972), Studies in the Structure of the Urban Economy, Johns Hopkins Press.
- Mills, E.S. and B.N. Song (1979), Urbanization and Urban Problems, Harvard University Press.
- Renaud, B (1981), National Urbanization Policy in Developing countries, Oxford Press.
- Spence, N. et al (1982), British Cities: An Analysis of Urban Change, Pergamon Press.
- White, L. J. (1976), "A Study of Retail Location in the German Federal Republic," mimeo, Princeton University.
- Wilson, J.Q., edited (1968), The Metropolitan Enigma, Anchor Books.