COMPONENTS OF POPULATION GROWTH IN URBAN(SHI) AREAS OF KOREA : 1960—1970*

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Korea experienced an unparalled rate of urban growth in the last decade. At the time of the 1960 Census, there were 6,997,000 persons living in administratively defined Shi[1](urban) areas, constituting 28 percent of the total population in the Republic of Korea. The urban population increased to 9,795,000(34 percent of the total population) by the time of the 1966 Census, and to 12,955,000 persons(43 percent of the total population) by the time of the 1970 Census. The amount of urban population increase was 2,798,000 for the 6 year period of 1960—1966 and 3,160,000 persons during the 4 year period of 1966—1970.

The purpose of this paper is to identify the components of urban population growth and the relative contribution of each component part for the periods 1960—1966 and 1966—1970. The analysis is extended to the period of 1970—1972 for Seoul.

The size of urban population in a country for a specified time period can change through an interplay of four distinct processes: change in administrative status of places(acquiring urban status), boundary change in urban areas, net migration for urban areas, and the net balance of births and deaths in urban areas. All four factors contribut-ed significantly to the growth of urban population in Korea between 1960 and 1970. The relative contribution of these four processes to the increase in urban population will be examined separately for the intercensal periods of 1960—1966 and 1966—1970.

Urban Growth: 1960—1966

Between 1960 and 1966, five areas gained Shi status. They are Euijeongbu(Gyeonggi), Sogcho(Gangweon), Cheonan(Chungnam), Andong(Gyeongbug), and Ulsan(Gyeongnam). Table 1 shows dates when these areas gained urban status and the population at the time of the 1960 Census in each area before boundary adjustments.

The total population living in original areas of the five Eups that gained Shi status between 1960 and 1966 at the time of the 1960 Census was 224,000, which accounts for 8 percent of the total urban population increase of 2,798,000 persons.

The populations of 6,977,000 in the 27 Shi areas plus 224,000 in the five Eup areas yield 7,221,000 in 1960 boundaries of these areas at the time of the 1960 Census. The increase in the 32 Shis during the 1960—66 intercensal period was then 2,574,000. This increase must be accounted for by three components: annexation, net migration, and natural increase.

Ten of the 32 Shis experienced boundary changes between 1960 and 1966. Of these, 8 Shis gained population and 2 Shis lost population by the boundary adjustments. Table 2 shows the dates of boundary changes and population gain or loss due to the boundary adjustments for the 10 Shis; that is, the population living in the adjusted areas at the time of the 1960 Census.

Urban areas gained 333,000 persons and lost 73,000 persons by the boundary adjustments. The net gain for urban areas due to the boundary changes as of 1960 was 260,000. This increase of urban population due to annexation accounts for 9 percent of the total urban population increase of 2,798,000 persons between 1960 and 1966.

Table 1. Population in Five Eups in 1960 That Acquired
Shi Status between 1960 and 1966

Areas	Province	Date of Gaining Urban Status	Population in Original Eup Area in 1960
Euijeongbu	Gyeonggi	1963/1/1	51,336
Sogcho	Gangweon	1963/1/1	45,621
Cheonan	Chungnam	1963/1/1	43,809
Andong	Gyeongbug	1963/1/1	53,346
Ulsan	Gyeongnam	1962/5/10	29,664

Source: *Municipal Yearbook of Korea*, 1969, Ministry of Home Affairs, Table 3, pp.30—31.
The Population and Housing Census of Korea, 1960, Economic Planning Board.

'This increase also accounts for 10 percent of the total increase of 2,574,000 persons in 32 areas having Shi status at the time of the 1966 Census. Adding 260,000 persons gained by annexation to 7,221,000 persons in the 1960 boundaries of 32 Shis, we find 7,481,000 persons at the time of the 1960 Census within 1966 boundaries of the 32 Shis. The difference of population in the constant boundaries of Shi areas between 1960 and 1966 is 2,314,000, which increase must be accounted for by net migration and natural increase. Reliable vital statistics to make possible an accurate estimate of the natural increase rate for urban areas do not exist. Consequently, we proceed first to find the contribution made by migration, and then estimate the rate of natural increase as a residual, by subtracting the contribution made by net migration from the total increase of population in the constant boundaries of urban areas between 1960 and 1966.

There are two possible sources of migration that have contributed to the increase of urban population in Korea: internal migration and international migration. Statistics on how many people left to or came from other countries for urban areas are not available. However, indications are that the amount of net international migration to urban areas during the 1960—1966 period is negligible.[2] Therefore, the estimation of net migration proceeds on an assumption that the national population was closed for the period 1960—1966: that is, net migration gain for urban areas is entirely due to

Table 2. Population Gain or Loss for Shis Due to Boundary
Adjustment, 1960—1966

Shis	Province	Date of Boundary Adjustments	Population Living in Adjusted Areas in 1960
Seoul	Special City	1963/1/1	155,019
Busan	Special City	1963/1/1	43,528
Suweon	Gyeonggi	1963/1/1	17,638
Cheongju	Chungbug	1963/1/1	15,511
Daejeon	Chungnam	1963/1/1	23,170
Cheonan	Chungnam	1963/1/1	17,267
Gwangju	Jeonnam	1963/1/1	−26,165
Mogpo	Jeonnam	1963/1/1	9,589
Daegu	Gyeongbug	1963/1/1	−47,180
Ulsan	Gyeongnam	1962/5/10	51,768

Source: Same as Table 1.

2) Yu, Eui-Young, "Components of Population Growth in Seoul: 1960—1966," *Bulletin of the Population and Development Studies Center*, Vol. 1, No. 1, April, 1972, p. 2.

the exchange of population between rural and urban areas within Korea.

The census survival ratio method was employed to estimate net migration for urban areas for the period of 1960—1966. The volume of net migration for urban areas of each province is estimated by comparing the number of men and women in each age-group counted in the 1966 Census with the number which would be expected in each corresponding age group on the basis of the 1960 Census population adjusted for age-sex specific survival ratios. The census survival ratio is the ratio of the total population of the area or country at a particular age group in a given census to the corresponding age cohort of the previous census.

Three basic assumptions must be met in order to derive satisfactory estimates of net migration using the census survival ratio method. They are: 1) the national population is closed, 2) the age-sex specific mortality rates are the same for each spatial unit as for the nation, and 3) the ratio of the coverage of enumeration in a spatial unit to that of the nation is the same cohort in both censuses.[3]

As for the first assumption, Korea was virtually closed for international migration during the period of 1960—1966 as noted above. It is difficult to determine the validity of the second assumption with existing data. In the light of the small size of the country and strong homogeneity of population with respect to life style, sanitary conditions, and level of living, however, regional variations in mortality levels do not appear to be great. As for the third assumption, the degree of completeness does not appear to fluctuate very much for the corresponding age cohorts in the 1960 and 1966 Censuses. Furthermore, the built-in mechanism of the census survival ratio method tends to correct errors in age data to a considerable extent.[4] The census survival ratio, therefore, should produce a reasonably satisfactory estimate of net migration for Korean urban areas between 1960 and 1966.

Several adjustments were made to make age statistics comparable for the two censuses. The age date published in 1960 Census reports were derived on the basis of the Korean age-counting system. According to the Korean age-counting method, a person is one year of age at the time of birth and gains another year as the calendar year

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3) Zachariah, K.C., "A Note on the Census Survival Ratio Method of Estimating Net Migration," *Journal of American Statistical Association*, Vol. 57, 1962, p. 175.

4) The Committee on Internal Migration of the International Union for the Scientific Study of Population, *Measures of Internal Migration and Their Analytical Uses*, Parts I and II, Internal Migration, Provisional Text, 1968, p. 109.

changes. The age statistics in the 1966 Census reports, however, are based on completed western ages. To make the age statistics comparable between 1960 and 1966, the 1960 age statistics had to be converted to completed ages.

One simple way to convert the reported ages to completed ages is to deduct one year from the reported ages based on the Korean age-counting system. That is, if the reported age is 21, then the completed age would be 20. This method would be satisfactory for those other than very young children. The method should not be applied, however, to infants. The method would also produce significant distortion for those younger than 5 years of age. Since the 1960 Census was taken as of December 1, only those who were born between January 1 and December 1 are one year of age according to the Korean age-counting method. Those who were born in December 1959 would be two years old(Korean): thus, 1/2th of the infants at the time of the census would be lost from the age group less than one year according to the method described above.

A more satisfactory method is to convert the Korean ages into completed ages according to the following formula taking into account the date of the 1960 Census.[5]

$$Y = 1/12(X+2) + 11/12(X+1)$$

where, Y is age at last birth date(completed western age) and X is Korean age reported in the census.

This method would be perfect if everyone reported his age on the basis of the Korean age-counting system. However, there are some indications that a significant portion of the population reported their completed western ages instead of traditional Korean ages.

The method developed by Jae Soo Park is probably the best one to use for age conversion of the 1960 census age statistics. Comparing the completed western ages obtained from the 1960 Post Enumeration Survey with the ordinary ages obtained from the main census, Park developed equations for the age conversion and produced conversion multipliers for each age group for males and females.[6] Park's age conversion multipliers are employed to convert the ages reported in the 1960 Census into completed western ages.

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5) This method was suggested by Dr. Jae Bin Park, University of Hawaii, at an informal conversation with the author at the Population and Development Studies Center, Seoul National University. Dr. Park was a staff member at the Bureau of Statistics when the 1960 Census was taken.

6) Park, Jae Soo, *An Evaluation Study for the Accuracy of the* 1960 *Population and Housing Census of Korea*, Bureau of Statistics, Economic Planning Board, Korea, 1966, p. 39, Table M. Also see Eui-Young Yu, *op. cit.*, p. 4.

Another problem in estimating the volume of net migration for an area during a specified time period is consistency in geographic boundaries between the beginning and the end of the period. As noted above, many Shis were affected by boundary changes during the 1960—66 intercensal period. Detailed age statistics for population in the annexed areas(or areas lost for some Shis) are not available in the 1960 Census publications. Therefore, the age-sex structure of the population who were living in the affected areas at the time of the 1960 Census had to be reconstructed indirectly.

The annexed areas(or lost areas) of the Shis by boundary adjustments normally have a mixed pattern of agricultural, industrial, and residential land use. This suggests that these areas would exhibit an age-sex structure having partly urban and partly rural characteristics. The Eup(town) is an ideal place representing the mixed pattern of urban and rural population structure. An Eup is an administrative unit supposedly containing a population between 20,000 and 50,000 and normally possessing characteristics of both rural and urban areas in significant proportion. For areas annexed to Seoul, the age-sex composition of Eup areas in Gyeonggi province was applied, under the assumption that both the annexed areas and Eups and Gyeonggi province would contain more urban characteristics than other annexed areas or Eups in other provinces. For the annexed (or lost) areas of other provinces, the age-sex composition of the total Eup population in Korea was applied.

One additional operation had to be undertaken with age statistics of the 1966 Census. The 1960 Census was taken as of December 1, and the 1966 Census was taken as of October 1, leaving an intercensal period of 5 and 5/6 years. Since the age data in the census publications were not broken down by months, the re-grouping of the 1966 population for the corresponding age cohort of the 1960 Census population was made by interpolation.

After making necessary adjustments for age statistics and boundary changes, the volume of age-sex specific net migration for urban areas of each province was estimated as follows:[7]

$$NM_i = P_i^{1966} - Sp_i^{1960}$$

Where,

$S = P_c^{1966} \div P_c^{1960}$, the survival ratio for the particular age group,

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7) For the details of age and boundary adjustments for the use of the census survival ratio method, see Eui-Young Yu, *op. cit.*, pp. 4—9.

P_i^{1966} refers to the population in urban areas of the ith province in a particular age group at the 1966 Census,

P_i^{1960} refers to the corresponding population 5 5/6 years younger at the 1960 Census,

P_c^{1966} and P_c^{1960} refer to the corresponding national populations,

NM_i refers to the net migration of population for the corresponding age group to urban areas of the ith province between 1960 and 1966.

The census survival ratio method cannot give estimates of net migration at ages below 5 5/6 years at the time of the 1966 Census. Therefore, an indirect estimate was made for this age group using the following formula:

$$NM_i(m,\ 0-5\ 5/6) = 1/2 \times \frac{P_i(m, 0-5\ 5/6)}{P_i(f,\ 20-49)} \times NM_i(f,\ 20-49)$$

$$NM_i(f,\ 0-5\ 5/6) = 1/2 \times \frac{P_i(f,\ 0-5\ 5/6)}{P_i(f,\ 20-49)} \times NM_i(f,\ 20-49)$$

Where,

$NM_i(m,\ 0-5\ 5/6)$ refers to the net migration for males at ages 5 5/6 and below for urban areas of the ith province, 1960--1966.

$NM_i(f,\ 0-5\ 5/6)$ refers to the corresponding net migration for females.

$P_i(m,\ 0-5\ 5/6)$ refers to the observed number of males at ages 5 5/6 and below in 1966 for urban areas of ith province.

$P_i(f,\ 0-5\ 5/6)$ refers to the corresponding females at ages 5 5/6 and below.

$P_i(f,\ 20-49)$ refers to the observed number of females between ages $20-49$ in urban areas of ith province in 1966.

$NM_i(f,\ 20-49)$ refers to the net migration for corresponding females at ages $20-49$.

This method assumes that children in this age group follow the migration pattern of their mothers and were born evenly over the 1960—1966 intercensal period.

The total net migration gain for urban areas between 1960 and 1966 was estimated as 530,000 males and 538,000 females by the census survival ratio. This number refers to the net migration of those whose ages are 5 5/6 years and older at the time of the 1966 Census. The indirect method produced net migration gain of 35,000 males and 33,000 females for urban areas for those younger than 5 5/6 years. Adding these together, we have an estimate of the total net migration gain of 1,136,000 persons for urban areas between 1960 and 1966. The net migration gain then accounts for 41 percent of the total increase of urban population between 1960 and 1966 and 44 percent of the increase in the 32 areas having Shi status in 1966.

The residual of the total growth of urban population is 1,178,000 which must be accounted for by natural increase. The natural increase accounts for 42 percent of the total increase of urban population and 46 percent of the increase in the 32 Shis between 1960 and 1966. The amount of natural increase in urban areas estimated in this analysis implied an annual rate of natural increase of 0.0251 for urban areas between 1960 and 1966, which is significantly lower than the corresponding rate of 0.0267 for the nation.

Table 3 presents details of the components of population increase for each province in areas having Shi status as of 1966. Urban areas of Seoul, Gyeonggi, Chungbug, Chungnam, and Gyeongnam (including Busan) gained a large number of population by annexation. More than one-third of the total increase of urban population in Chungbug and Chungnam is accounted for by annexation. A quarter of the total increase in Gyeongnam urban areas is due to annexation. In Seoul, the annexation accounted for

Table 3. Components of Urban Population Increase in Korea by Province, 1960—1966

Province		Total Increase in Urban Population 1960—1966	Amount of Contribution by		
			Annexation	Net Migration	Natural Increase
Seoul	No.	1,357,958	155,019	784,203	418,736
	%	100.0	11.4	57.7	30.8
Gyeonggi	No.	184,592	17,638	72,439	94,515
	%	100.0	9.6	39.2	51.2
Gangweon	No.	68,278	—	22,498	45,780
	%	100.0	—	33.0	67.0
Chungbug	No.	42,886	15,511	297	27,078
	%	100.0	36.2	0.7	63.1
Chungnam	No.	113,377	40,437	22,444	50,496
	%	100.0	35.7	19.8	44.5
Jeonbug	No.	56,530	—	3,877	52,653
	%	100.0	—	6.9	93.1
Jeonnam	No.	146,065	−16,576	67,112	95,529
	%	100.0	−11.3	45.9	65.4
Gyeongbug	No.	200,537	−47,180	115,092	132,625
	%	100.0	−23.5	57.4	66.1
Gyeongnam*	No.	384,392	95,296	40,992	248,104
	%	100.0	24.8	10.7	64.5
Jeju	No.	19,378	—	7,114	12,264
	%	100.0	—	36.7	63.3
Total	No.	2,573,993	260,145	1,136,068	1,177,780
	%	100.0	10.1	44.1	45.8

* Busan included.

11 percent of the population increase between 1960 and 1966. On the other hand, Jeonnam and Gyeongbug lost population by boundary adjustments. The population lost by annexation amounts to 11 percent of the total increase of urban population in Jeonnam and 24 percent in Gyeongbug.

The contribution made by net migration varies greatly from province to province. Seoul is the only area where net migration made a greater contribution than all other components. In Seoul, net migration accounted for 58 percent of the population increase between 1960 and 1966. For urban areas of other provinces, natural increase was the greatest contributor to population increase. In nearly all other urban areas, the natural increase accounted for more than half of the total population increase between 1960 and 1966. Urban areas where the net migration made large contributions are those in the provinces of Gyeonggi, Gangweon, Jeonnam, Gyeonbug, and Jeju. Urban areas in which net migration contributed least are those of Chungbug and Jeonbug. It is interesting to note that Gyeongnam, which includes the second largest Shi of Busan, gained a comparatively small population by net migration.

Table 4 presents population increase, net migration, natural increase, and the respective national share of these components in urban areas of each province between 1960

Table 4. Korean Population Increase in the 1966 Boundaries of Urban Areas
And Component Parts by Province, 1960—1966

(Number in 1,000)

Province	Urban Population Increase		Net Migration		Natural Increase	
	No.	%	No.	%	No.	Annual Rate
Seoul	1,203	52.0	784	69.0	419	2.56
Gyeonggi	167	7.2	72	6.4	94	2.67
Gangweon	68	2.9	22	2.0	46	2.74
Chungbug	27	1.2	—	—	27	2.45
Chungnam	73	3.2	22	2.0	50	2.56
Jeonbug	56	2.4	4	0.3	53	2.44
Jeonnam	163	7.0	67	5.9	96	2.60
Gyeongbug	248	10.7	115	10.1	133	2.43
Gyeongnam**	289	12.5	41	3.6	248	2.34
Jeju	19	0.8	7	0.6	12	2.84
Total	2,314	100.0	1,136	100.0	1,178	2.51

* The annual rate of natural increase was estimated by the exponential function, $P_1 = P_0 e^{rt}$. The rate is expressed in percentage form.
** Busan included.

and 1966. The table shows that Seoul absorbed 52 percent of the total urban population increase in the constant boundaries of 1966 during the same period. Other urban areas shared relatively small proportions of the increase, Gyeongnam having the largest, 12 percent.

Seoul absorbed the greatest share of the net 1960—66 intercensal rural-urban migration, nearly 70 percent of the total net urban migration gain. Urban areas of Gyeonggi, Jeonnam, and Gyeongbug each drew more than five percent but not more than 10 percent of the total net rural-urban migration for the same period. All other urban areas had small shares of the total net urban migration. The implication is that urbanization in Korea between 1960 and 1966 was almost completely dominated by the very heavy rural to Seoul migration. Other urban areas probably drew a large number of migrants from rural areas. However, heavy out-migration from these urban areas to Seoul counter-balanced the in-migration that they attracted from rural areas. As a result, urban areas outside of Seoul gained less by migration than by natural increase.

One interesting feature stands out from the estimates of the annual natural increase rates for urban areas. For all urban areas, the annual natural increase rate was estimated as 2.51 percent during the 1960—66 period. This rate is significantly lower than the corresponding rate of 2.67 percent for the nation for the same period, which conforms with the findings of other studies showing generally lower fertility rates in urban areas than those in rural areas.[8]

The implied natural increase rate varies significantly among urban areas of different provinces. Even though the validity of these rates cannot be taken too seriously, the observed variations among different urban areas deserve attention. The natural increase rates in urban areas of Jeju and Gangweon were even higher than the corresponding rate for the nation. Both Jeju and Gangweon are ecologically most distant provinces from major industrial-urban centers of Korea. Jeju is an island province located far from the mainland. Gangweon is the most mountaineous province in Korea and a large portion of populated areas of the province is cut by steep mountain chains. It may be speculated, therefore, that the population in these two provinces still maintain the traditionally high fertility rate, or that the fertility in these provinces is declining at

8) Moon, Hyun-Sang et al.,*Fertility and Family Planning—An Interim Report on* 1971 *Fertility-Abortion Survey.* The Korean Institute for Family Planning, September, 1972, Appendix Tables, pp. 107—122. Also Lee-Jay Cho, "Preliminary Estimates of Fertility for Korea", *Population Index*, Jan.—March, 1971, pp. 3—8.

a much lower rate than those in other parts of the nation. There are other indications that the urban areas of these two provinces are qualitatively different from other urban areas. The 1966 Census revealed that farm households constituted 47 percent of the total urban households in Jeju, extremely high compared with the corresponding national percentage of 8. Urban areas of Gangweon province contain a significant portion of mining and fishing population, and persons engaged in these industries are known to have higher fertility rates than others. A large proportion of rural, fishing, and mining elements in urban areas and the ecologically distant location of these two provinces from major urban-industrial centers of the nation probably caused high fertility rates in these areas and produced high natural increase rates between 1960—1966.

It is also interesting to note that the urban areas of low natural increase rate are those which absorbed the least amount of net migration gain. The natural increase rates in urban areas of Chungbug(2.45), Jeonbug(2.44), and Gyeongnam(2.34) are lower than those of other urban areas, and the proportions of net migration gain (Table 3) are least in these areas. Thus, the proportion of rural in-migrants to these urban areas is relatively small, and their populations could be considered as indigenous or long term urban populations experiencing relatively lower fertility rates.

The lowest annual natural increase was 2.34 percent for urban areas of Gyeongnam province. This is probably due in large measure to the low fertility rate in Busan.[9] Busan is the second largest city in Korea and considered to have metropolitan characteristics in many respects. Even though Busan appeared to have absorbed some net migration gain between 1960 and 1966, the level was relatively low. The annual increase rate in the constant boundary of Busan between 1960 and 1966 was only slightly higher than that of the nation. The absolute size of Masan declined between 1960 and 1966. Chungmu and Samcheonpo also appeared to have experienced a heavy migration loss during the period. Annual rates of increase for these two cities were 1.0 percent and 1.3 percent for the 1960—1966 period. Therefore, the observed rate of low natural increase in urban areas of Gyeongnam province seems to reflect a relatively low fertility rate of indigenous urban population.

Urban areas of Gyeongbug province had a very low natural increase rate(2.43 percent per year) for the period despite the fact that these areas showed a large amount of

9) Cho, Lee-Jay, *op. cit.*, p.6.

net migration gain. A careful examination, however, shows that Daegu, the largest city in the province and the third largest city in the nation, lost a significant population by boundary adjustment during the 1960—1966 period. The adjusted area is essentially rural in character and the boundary adjustment seems to have left only the core urbanized portion within the administrative boundary of Daegu. There are indications that other urban areas of Gyeongbug lost population by migration during the 1960—1966 period. The low natural increase rate in Gyeongbug urban areas again seems to reflect low urban fertility.

The annual natural increase rate of Seoul during the 1960—1966 period (2. 56 percent) is slightly higher than the corresponding rate for all urban areas (2. 51) but significantly lower than the national rate (2. 67). This is contrary to the expectation that Seoul would show the lowest rate of natural increase in the light of its dominant metropolitan character. The slightly higher than total urban rate in Seoul is perhaps due to (1) the high fertility level of the recent in-migrants from rural areas and (2) the age structure of in-migrants favoring a high natural increase. As noted previously, Seoul, absorbed a large share of rural-urban migration during the period of 1960—1966. The net migrant population between 1960 and 1966 constituted 21 percent of the total population of Seoul in 1966. This means that the percentage of in-migrants in the total city population is even higher, since net migration is the balance of in-and out-migration. In-migrants from rural areas are generally thought to maintain rural high fertility patterns. The age structure of in-migrants to Seoul is also favorable for a high natural increase. The volume and rate of net migration for Seoul between 1960 and 1966 were exceptionally high for females between 16—30 years of age.[10] The high fertility level and the fertile age structure of the recent in-migrants probably inflated the natural increase rate of Seoul above the average rate for all urban areas.[11]

In short, the population increase in urban areas of Korea during the intercensal period of 1960—1966 was accounted for by the four components: acquiring urban status, annexation, migration, and natural increase. The change in administrative status of places accounts for 8 percent of the total urban population increase between 1960 and 1966. Annexation contributed 9 percent of the increase. Net migration and natural

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10) Yu, Eui-Young, *op. cit.*, p. 8.

11) According to the 1971 Fertility Survey Data (The Korean Institute for Family Planning) the Crude Birth Rate for Seoul was 32. 2 and that for other urban areas was 30. 4 during the January 1970—October 1971 period.

increase contributed 41 percent and 42 percent of the total urban population increase respectively. The increase of population in 32 places having Shi status at the time of the 1966 Census was accounted for by three components: 10 percent by annexation, 44 percent by migration, and 46 percent by natural increase.

The contribution by each component part to the increase of urban population varies greatly from province to province. Seoul is only area where net migration played the major role, contributing 58 percents of the population increase between 1960 and 1966. Seoul dominated urbanization in Korea during the period, absorbing 70 percent of the total net migration gain to urban areas. Even though net migration contributed significantly to population increase in a number of areas, natural increase was the major contributor to total population increase in all urban areas outside of Seoul. Urban areas that gained least by net migration were those of Chungbug, Jeonbug, and Gyeongnam and these areas show relatively lower natural increase rates than other areas.

Urban Growth: 1966—1970

No comparable data on age and sex structure of the population from the 1970 Census have yet been published. We must, therefore, take a different approach to identify the components of urban population growth for the intercensal period of October, 1, 1966—October 1, 1970. *The Preliminary Count of Population and Housing Census* published by the Bureau of Statistics gives the population in each administrative unit as small as urban Dongs and rural Myuns counted in the 1970 Census. Utilizing the published statistics from the 1970 Census and findings from other surveys covering the same period, we first proceed to identify the natural increase rate for Shi areas of each province for the intercensal period of 1966—1970. The difference between the observed population in an urban area and the expected population derived on the basis of the estimated natural increase rate for the same area is taken as the amount of net migration between 1966 and 1970. This approach is possible because there were no boundary changes for urban areas during the 1966—70 intercensal period, and the volume of international migration was not large enough to affect population change in Korea to any significant extent. The increase of urban population between 1966 and 1970 must be accounted for by natural increase and migration.

The annual rate of population increase in Korea during the 1966—70 intercensal period is estimated as 0.0189 on the basis of the unadjusted census count, The estimated rate is, however, considered to be significantly lower than actual rate because the completion rate of the 1970 Census is believed to be relatively lower than that of the 1966 Census.[12] According to a national fertility survey conducted in 1971 the average crude birth rate of the Korean population for the intercensal period of 1966—1970 was 31.0 and the corresponding crude death rate was 9.1. These rates give an estimate of the average annual growth rate of 2.19 percent for the 1966—70 intercensal period.[13] The Economic Planning Board of the Korean government estimated the crude birth rate in1970 as 29.3 and the corresponding crude death rate as 8.5 for the same year based on data from the 1970 Special Demographic Survey. The rate of natural increase for the year of 1970 is then 2.08 percent according to the SDS data.[14] The annual rate of natural increase for the 1966—1970 period should be a little higher than this 2.08 percent since Korean fertility fell during the same period. Thus, a plausible estimate of the annual rate of natural increase for the period appears to be somewhere between 2.0 and 2.2 percent per year, probably closer to the higher figure.

I, therefore, use four different estimates of natural increase rate for the nation as criteria for the estimation of urban natural increase rates for the provinces between 1966 and 1970: the census preliminary natural increase rate of 1.9 percent and revised estimates of 2.0, 2.1, and 2.2 percent. As an expedient in the absence of 1970 Census age data, the ratio of the natural increase rate for urban areas of a province to the corresponding national rate for the 1960—66 period is applied to the national increase rate for the period of 1966—1970 in order to estimate the natural increase rate for urban areas of the same province between 1966 and 1970. Accuracy of the results of this analysis will depend upon the validity of the assumption that the ratio of the urban natural increase rate for each province to that for the nation is the same for both intercensal periods, 1960—1966 and 1966—1970. The estimated rates for urban areas of each province are presented in Table 5.

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12) The age-sex adjusted population figures with the 1970 PES and unpublished census data led some scholars to believe the annual rate derived from the census totals is underestimated by 0.1 to 0.3 point percent; see *Country Statement*, 1972, prepared for the Second Asian Population Conference, November 1—13, 1972, Tokyo, Japan, by the Republic of Korea, p.2.

13) This information was obtained from an internal Office Memorandum of the Population Council, Seoul, Korea, from Walter Watson to George Worth dated October 13, 1972, pp.1—2.

14) *Country Statement* 1972, *op. cit.*, pp.6—7.

In order to derive accurate estimates of intercensal net migration by subtracting the amount of natural increase from the total increase, the two census populations have to be corrected for their respective undercounts. If the level 4 estimate of 2. 2 percent annual increase rate is correct for the period of 1966—1970, then the undercount rate for the 1970 Census total must be nearly 3 percent. The total census population of 1970 can be corrected for the undercount accordingly. However, the undercount rate of the 1966 Census population has not been determined, even though there are, of course, indications that the 1966 Census was also undercounted, although to a lesser degree. Applying the revised natural increase rates to uncorrected census totals, therefore, would produce a net migration substantially lower than the actual amount. There are also additional problems related to the variation in census undercount rates among differ- ent places. The geographic variation in Census enumeration rates derived from the PES or from other analyses has not been published. The major limitation of this analysis is that the geographic variation in census enumeration rates and necessary adjustment of the totals for the two censuses have not been properly taken care of. The purpose of

Table 5. Estimates of Urban Natural Increase Rates by Province, 1966—1970

Province	Natural Increase Rate, 1960—66	Ratio to the National Rate	Estimated Natural Increase Rate 1966—1970			
			Level 1	Level 2	Level 3	Level 4
Seoul	0. 0256	0. 9583	0. 0182	0. 0192	0. 0201	0. 0211
Gyeonggi	0. 0267	1. 0000	0. 0190	0. 0200	0. 0210	0. 0220
Gangweon	0. 0274	1. 0262	0. 0195	0. 0205	0. 0216	0. 0226
Chungbug	0. 0245	0. 9176	0. 0174	0. 0184	0. 0193	0. 0202
Chungnam	0. 0256	0. 9588	0. 0182	0. 0192	0. 0201	0. 0211
Jeonbug	0. 0244	0. 9138	0. 0174	0. 0183	0. 0192	0. 0201
Jeonnam	0. 0260	0. 9738	0. 0185	0. 0195	0. 0204	0. 0214
Gyeongbug	0. 0243	0. 9101	0. 0173	0. 0182	0. 0191	0. 0200
Gyeongnam*	0. 0234	0. 8764	0. 0167	0. 0175	0. 0184	0. 0193
Jeju	0. 0284	1. 0637	0. 0202	0. 0213	0. 0223	0. 0234
Total Urban	0. 0251	0. 9401	0. 0179	0. 0188	0. 0197	0. 0207
Total Korea	0. 0267	1. 0000	0. 0190	0. 0200	0. 0210	0. 0220

* Busan included.

this analysis is, however, to identify the relative contribution of natural increase and migration for the growth of urban population in each province, and the results of this analysis may serve well for many practical purposes. The differences in the relative contribution of these two components for the urban population increase for the inter-

censal period of 1966—1970 are not great between the lowest and highest estimates of the natural increase rates as shown below.

Table 6 presents the contribution by natural increase and net migration to the growth of urban population by province for two different estimated levels of natural increase rates for the 1966—70 intercensal period. The estimates employing level 1 and level 4 growth rates are presented in Table 6. The natural increase rates for the nation and for urban areas of each province for the corresponding levels are listed in Table 5.

The contributions by net migration to the growth of urban population in Korea increased greatly during the period of 1966—1970. The contribution by migration was a little less than that by natural increase to the growth of urban population between 1960 and 1966. However, between 1966 and 1970, net migration contributed

Table 6. Components of Urban Population Increase in Korea by Province, 1966—1970, Assuming Level 1 and 4 National Annual Increase Rates

(Number in 1,000)

Province		Level 1 (r=0.019)			Level 4 (r=0.022)		
		Total Increase	Natural Increase	Net Migration	Total Increase	Natural Increase	Net Migration
Seoul	No.	1,733	287	1,446	1,733	335	1,398
	%	100.0	16.6	83.4	100.0	19.3	80.7
Gyeonggi	No.	183	57	125	183	67	116
	%	100.0	31.4	68.6	100.0	36.6	63.4
Gangweon	No.	50	27	23	50	31	19
	%	100.0	53.8	46.2	100.0	62.5	37.4
Chungbug	No.	28	15	13	28	17	11
	%	100.0	52.5	47.5	100.0	61.1	38.9
Chungnam	No.	107	29	78	107	34	73
	%	100.0	27.4	72.6	100.0	31.8	68.2
Jeonbug	No.	61	29	32	61	34	27
	%	100.0	47.2	52.8	100.0	55.0	45.0
Jeonnam	No.	138	57	81	138	67	71
	%	100.0	41.5	58.5	100.0	48.3	51.7
Gyeongbug	No.	276	80	196	276	93	182
	%	100.0	29.0	71.0	100.0	33.8	66.2
Gyeongnam*	No.	566	137	429	566	159	406
	%	100.0	24.2	75.8	100.0	28.2	71.8
Jeju	No.	19	7	12	19	9	10
	%	100.0	38.5	61.5	100.0	44.9	55.1
Total Urban	No.	3,161	726	2,434	3,161	846	2,315
	%	100.0	23.0	77.0	100.0	26.8	73.2

* Busan included.

nearly three-quarters of the total increase of urban population in Korea according to our estimates.

During the previous period, natural increase contributed a higher percentage than net migration for all urban areas except Seoul. During the period of 1966—1970, however, net migration was a more important contributor than natural increase to the growth of urban population in all provinces except for Gangweon and Chungbug. In Seoul, net migration contributed more than 80 percent of the increase between 1966 and 1970, much more than the corresponding 58 percent for the previous intercensal period. In urban areas of Chungnam, Gyeonbug, and Gyeongnam, net migration contributed about 70 percent of the population increase between 1966—1970. During the previous intercensal period, the contribution by net migration to the urban population increase was only 20 percent in Chungnam, 57 percent in Gyeongbug, and 11 percent in Gyeongnam. The large jump in the contribution by net migration in these provinces is due mainly to the growth of economic activities and population in Daejeon, Daegu, and Busan. Other urban areas also showed a significant increase in the percentage contribution by migration between 1966 and 1970 over the previous period, implying an active growth of activities in urban areas of all sizes throughout the country.

Even though the contribution by migration to the growth of population in Seoul was greater for the 1966—70 period than for the previous one, the dominance of Seoul in the overall rural to urban migration process in Korea lessened slightly. Between 1960 and 1966, Seoul absorbed 69 percent of the total net rural-urban migration. During the period of 1966—1970, however, Seoul absorbed "only" 60 percent of the total net rural-urban migration. Urban areas of Gyeongnam, largely due to the expansion of industrial activities in the Busan-Ulsan region, also absorbed a significant share of the total net urban migration during the same period, 18 persent. The corresponding share for urban areas of Gyeongnam was merely 4 percent in the previous intercensal period.

Summing up, the pace of rural-urban migration was greatly intensified during the 1966—1970 period as the economy of Korea grew at an unprecedented rate. Seoul still played a dominant role in the urbanization process of Korea by absorbing the majority of the total volume of net rural-urban migration. As the regional industrial activities expanded, however, urban areas of other provinces also began to attract significant numbers of rural migrants. Net migration was the major contributor to urban population increase in most of the provinces.

1970—1972: Seoul

No comparable data are available for the period of 1970—1972. It is possible, however, to identify the components of population increase in Seoul for the period by using data from the 1971 Seoul Special Census and the population estimate as of October 1 of each year. The Seoul City censuses are believed to be less complete than the national census. However, the 1970 national Census was incomplete, and nearly 3 percent of the total population was probably missed from the census as noted previously. The undercount rate for Seoul in the 1970 Census should have been larger than the national rate in the light of a large number of recent in-migrants and persons of no fixed residence. The extent of completion rate for Seoul in the 1970 national Census and in the Seoul City 1971 Census has not been determined. Neverterless, it may be a plausible assumption that the data from the special census of Seoul is less complete than those from the national Census of 1970. Since there is no base for the correction of these possible differentials in completion rates between the regular census and special censuses of Seoul, we proceed to use the uncorrected numbers from the censuses to estimate the net migration for the 1970—1972 period.

It is difficult to estimate the natural rate of population increase for the nation or for Seoul for the period of 1970—1972 without having reliable vital statistics. A survey conducted by the Korean Institute for Family Planning produced a natural increase rate for the Korean population of 2.2 percent between October 1, 1970 to October 1, 1971, which is in close agreement with a rate computed from the 1970 Special Demographic Survey conducted by the Bureau of Statistics.[15] This would indicate that the fertility level of the Korean population has not declined in the past two years as rapidly as one might expect from the experience of the early and middle 1960's. The death rate of the Korean population appears to have reached somewhere around 8—9 per 1,000 population in the past couple of years. A reasonable contention, then, is that the annual increase rate of the Korean population in the past two years is somewhere close to 2.2 percent per year and not much below it.

The natural increase rate for Seoul for the past two years period is more difficult

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15) The Population Council, Seoul, Office Memorandum, *op. cit.*, p. 2 and *Country Statement, op. cit.*,

-to estimate. The national fertility survey noted above shows that age specific fertility rates for Seoul were much less than those of rural areas and a little higher than the rates for other urban areas in 1970. In 1971, however, the age specific rates in Seoul were much lower than the corresponding rates for both other urban areas and rural areas. These rates are subject to sampling error as well as to their own natural changes. The more stable two year rates for 1970—71 show fertility in Seoul well below that in other urban areas. The Seoul rates are thought to be significantly inflated by a heavy influx of fertile rural migrants in the recent past years. An age structure favorable for high fertility in Seoul as a result of the heavy influx of young migrants from other areas probably inflated the natural increase rate of Seoul above that for other urban areas rate but not as high as the national rate. Applying the ratio of the natural increase rate of Seoul to that of the nation for the period of 1960—1966 to the estimated 2.2 percent increase rate of the nation for the 1970—1972 period yields an annual natural increase rate of Seoul of 2.1 percent. If we apply the same ratio to a conservative estimate of 2.0 percent annual increase rate for the nation, we have an estimate of the corresponding rate for Seoul as 1.9 percent for the 1970—1972 period. Using these two estimates of natural increase rate for Seoul, we first derive the expected natural increase, and then the difference between the observed increase and the estimated natural increase is taken as the amount of net migration.

Table 7 shows components of population growth in Seoul for the 1970—1972 period.

Table 7. Components of Population Growth in Seoul 1970—1972

(Number in 1,000)

Increase Due to	Estimate 1*		Estimate 2*	
	Number	Percent	Number	Percent
1970/10/1—1971/10/1				
Natural Increase	107	34.52	123	39.68
Net Migration	203	65.48	187	60.32
Total Increase	310	100.00	310	100.00
1971/10/1—1972/10/1				
Natural Increase	113	59.47	130	68.42
Net Migration	77	40.50	60	31.58
Total Increase	190	100.00	190	100.00

* The natural increase rate for Seoul for the estimate 1 is 0.019 and that for the estimate 2 is 0.021.

Source: *Preliminary Count of Population and Housing Census*, 1970. Special Censuses taken for City of Seoul, 1971 and an estimate of population of Seoul as of October 1, 1972.

The 1970 Census counted 5,540,000 persons in Seoul as of October 1. The 1971 Special Census shows 5,850,000 persons in Seoul exactly one year later, indicating an increase of 310,000 persons in Seoul over the one year period. An estimate by Seoul Special City reveals 6,040,000 persons in Seoul as of October 1, 1972[16] showing an increase of 190,000 persons between October 1, 1971 and October 1, 1972. The overall population increase rate in Seoul has declined substantially over the last two years, largely due to a decrease in the volume of net migration gain. Whichever estimate we take, the percentage contribution of net migration to the population increase in Seoul was a little over 60 percent between October 1, 1970 and October1, 1971. The relative contribution of net migration for the October 1, 1971—October 1, 1972 period was only somewhere between 30 to 40 percent of the total increase. It appears as if the pace of net migration gain that reached its peak in the late 1960s began to decline about 1970. By 1971, the rate of net migration gain declined to the 1960—1966 level and during 1972, the rate fell to the pre—1960 level. This assessment is based on the premise of no greater undercounting in the 1971 Seoul Special Census and in the 1972 estimate than in the national census. If that premise is faulty, then the recent contribution of net migration may have been greater than the present preliminary estimate.

Summary and Conclusion

Korea has experienced a tremendous redistribution of population between rural and urban areas since 1960. The population living in administratively defined urban areas constituted 28 percent of the total population in 1960. By 1970, 43 percent of the total population was living in urban areas. Another dominant feature of Korean urbanization is rapid population concentration into Seoul. The population of Seoul more than doubled during the decade of 1960—1970, from 2.6 million in 1960 to 5.5 million in 1970. There were more than 6 million people in Seoul by October, 1972. The population of Seoul constituted 34 percent of the total urban population in 1960, and in 1970 the corresponding figure rose to 43 percent.

This paper attempts to identify the components of urban population increase and the

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16) *Kyung Hyang Shinmoon*, Oct. 6, 1972. p.7. and informal talking with city officials. The estimate was based on the 1971 Special Census of Seoul and resident registration data.

relative contribution of each component part for the period of 1960—1970 by using data from the 1960, 1966, and 1970 Censuses. The analysis was extended to October, 1972 for Seoul, since the data from the special census of Seoul in 1971 and the 1972 estimate by Seoul Special City made preliminary component analysis possible. The causes and broad implications of the major findings of this analysis were not dealt with in this paper. They will be treated in subsquent publications.

Migration has played an important role in the growth of urban population during the decade. In the first half of the decade, the contribution by migration to the total urban population growth nearly equaled that by natural increase. This was largely due to the heavy influx of migrants to Seoul. In all other urban areas, however, natural increase was the major contributor of their respective population increases. Seoul dominated the process of internal migration in Korea by absorbing 69 percent of the total net migration gain to urban areas during the 1960—66 intercensal period.

The pace of urbanization accelerated markedly in the second half of the 1960s. Net migration accounted for nearly three-quarters of the total population increase in urban areas during the 1966—70 intercensal period. In Seoul, net migration accounted for more than 80 percent of the intercensal population increase. Unlike in the previous period, net migration played the dominant role in the growth of urban population in nearly all other provinces, implying a beginning of the spread of the course of rural-urban migration to regional cities. Seoul, however, still maintained a predominant position by absorbing 60 percent of the total net rural-urban migration in the 1966—70 intercental period.

Source data do not permit a component analysis of urban population increase in Korea since 1970. A component analysis for Seoul for the last two year period of 1970—1972 suggests a drastic change in the rate and course of internal migration in Korea. The rate of in-migration into Seoul appears to have slowed down substantially. A significant number of recent in-migrants to Seoul may have returned to rural areas or to other cities. Between October 1, 1970 and October 1, 1971, net migration accounted for a little over 60 percent of population increase in Seoul, which was about 20 percentage point lower than for the 1966—1970 period. The relative contribution of net migration still further declined between October 1, 1971 and October 1, 1972. During this time, natural increase contributed a higher percentage than net migration. The percentage contribution by net migration was estimated to be somewhere between 30

to 40 percent, about half the 1960—1966 level.

Several factors seemed to be related to the recent slowdown in net inmigration rate into Seoul. The national economic growth rate, which had reached its peak in the late 1960s, declined considerable in recent years. The economic boom in Seoul also subsidized drastically. Jobs in general, and construction jobs in particular, which had been major sources of attraction for a large number of unskilled workers, were reduced substantially. Furthermore, the city government has launched a strong campaign to prohibit new construction of squatter settlement units since 1970. Some units have been destroyed. Air photo surveillance of illegal housing was started in 1970 by the city government, and seems to be having an effect. New arriving migrants to Seoul can no longer except to build a hut on public land. On the other hand, the recent heavy out-migration of young people from rural areas has created agricultural labor shortage in some areas. As a result, farm wage rates have risen. Disparity in wage rates and work opportunity between Seoul and the rest of the country may have narrowed in the past two years. The suggestion is that Seoul is no longer as unique and attractive a magnet as it was in the late 1960s.

It is not known whether regional cities are experiencing the same trend of a decreasing rate of net migration influx as Seoul for the past two years. It appears, however, that the regional cities have begun to play a heavier role in the process of overall urbanization in Korea. They may well be absorbing significant portions of the rural-urban migration stream which changing economic coditions and government policies are diverting from Seoul. The government is taking steps to decentralize the industrial and other activities from Seoul to other regions. Even when Korean economy recovers from the current recession, Seoul may never reach the explosive net in-migration rate that it experienced in the late 1960s.