
Sex Ratio at Birth in Korea

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Korea is a country in which son preference is strong owing to the patriarchal tradition. In spite of this strong son preference, the country has experienced a rapid decline in fertility since 1960, finally recording TFR 1.63 in 1990. Along with the fertility decline, there is, however a highly unbalanced sex ratio at birth in recent years. From 1981 on, sex ratio at birth has increased steadily and reached 113.6 in 1988. This is highly unbalanced compared with the normal range from 104 to 106. Birth registration does not appear to be incomplete in Korea, so imbalance may be concluded to be the result of social and cultural factors. In this context, the study tried to describe the current status of the sex ratio at birth in Korea, and some socio-demographic factors contributing to the unbalanced sex ratio at birth, and furthermore to predict the effects of this imbalance on the future population structure.

I. Introduction

A. Research Problem

Korea is a country which shows strong son preference, which is rooted in patriarchal tradition emphasizing the role and status of men in the family and in society. Son preference has a negative effect on ideal family size, constituting a major obstacle to fertility decline. If son preference is substantial, fertility increases even though contraceptive use is widely accepted. Several studies demonstrate a positive impact of

son preference on the fertility increase (Park, 1983 ; KIPH 1989 ; Lee, 1989).

In spite of strong son preference, Korea has experienced a rapid decline in fertility since 1960, recording a total fertility rate(TFR) of 1.63 in 1990. Economic development, changing social norms and attitudes, increasing higher education, and a well carried out family planning program are major contributors to this drastic decrease.

As fertility has declined in recent years, a strongly unbalanced sex ratio in favor of the male at birth can be observed. Usually the sex ratio at birth is above 100 for nearly all countries with

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relatively complete vital statistics, falling in the range of between 104 and 106(Shryock, et. al., 1976).

Since the regular Korean censuses and annual vital statistics are considered reliable with a high, undelayed registration rate, the sex ratio at birth does not seem to suffer from incomplete reporting. Assuming that vital registration is complete for the reporting of births, the highly unbalanced sex ratio can be attributed to other causes. It seems to be affected by social and cultural factors like medical advancement, legal permission for induced abortion and son preference. Various contraceptive methods are widely used, but when unwanted pregnancies are found, induced abortion has been practiced legally. Women with a strong desire for sons may resort to induced abortion to avoid birth of daughters when the sex of the fetus is revealed through a medical check.

This process can be regarded as the major cause of the unbalanced sex ratio at birth, and it is expected to affect the structure of the population in the near future. At the very least, the excess births of boys will directly affect the sex composition of the population, if the vital rates remain the same as in recent years. Consequently the current abnormal sex ratio at birth may have some impact on the population structure and such related socioeconomic variables as marriage patterns and labor force migration.

In this context, a careful examination of the current status of the sex ratio at birth in Korea, related sociodemographic factors and an analysis of the impact of a distorted sex ratio at birth on the population structure must be taken into account.

B. Objectives

The overall objective of the study is to examine some implications of the sex ratio at birth on population structure. Accordingly, the study will attempt to learn the following :

1. The past and current situation of the sex ratio at birth in Korea.
2. Some sociodemographic factors conducive to affecting the sex ratio at birth.
3. The implications of the sex ratio at birth on the population structure.

C. Data Sources

The examination of the sex ratio in the last several decades is mainly based on data from the annual Report on Vital Statistics from 1979 to 1988. The study also uses data from the population and housing censuses every fifth year from 1970 through 1990.

The Korean National Fertility and Family Health Survey in 1985 and in 1988 are used for analyzing sociodemographic factors affecting the sex ratio at birth, and the Population Projection : 1990~2021 will be used primarily for analysis of the implications of the sex ratio at birth on the future population structure.

II. Trends in Sex Ratio at Birth

A. Theoretical Background

In examining the sex ratio at birth, a few theoretic problems arise. The first is that it is very difficult to examine the sex ratio at birth exactly, when relatively complete vital registration is not

available. The ratio is a simple measure for evaluating the accuracy and reliability of vital statistics. For countries with incomplete reporting or overreporting of births, the observed sex ratio at birth may fall into an abnormal range.

Though data from vital statistics are indispensable for calculating the sex ratio at birth, census data can be substituted for vital statistics which are not complete due to an underregistration of births. A 0 age population reported in a census, which is used instead of reported births in vital statistics, does not mean the real number of births, but the number of surviving infants.

Moreover, as the infant mortality rate varies among countries and also census data suffer from similar undercoverage where vital statistics are not completely reported, it is risky to theorize by using census data for the calculation of the sex ratio at birth.

The second problem is that it is not easy to fix the normal range of the sex ratio at birth. It is also difficult to judge to what extent the sex ratio deviates from the normal range. As the ratio usually tends to fall between 104 and 106 for countries with relatively complete vital registration, this range is accepted as the normal one in the study, but even the severe deviations from the normal range can not be explained due to the inaccuracy of the data, since variations are observed among regions, races, and time periods (Shryock, et. al., 1976).

Third, it is difficult to identify the socioeconomic impact on the sex ratio at birth which is considered to be less affected by external factors than the sex ratio at death or that of migrants because it is determined largely by the biological process rather than a sociobehavioural one.

A notable variation in the sex ratio at birth is observed according to the demographic characteristics such as the age of the mother, and the order of birth. There is found to be a close relationship between the ratio and the age of the mother and the order of birth (see the section C).

Another factor that may affect the sex ratio at birth is the socioeconomic status of the parents. A predominance of male births has been observed among higher socioeconomic groups in Western countries (Shryock, et. al., 1976). Even though there are some severe negative effects on sex ratio at birth, it is not easy to distinguish the external effects from native demographic characteristics.

Therefore, the highly unbalanced sex ratio at birth may be due to initially incomplete data. When complete data are available, the aggravated ratio will be attributed to demographic variations and social factors, as well.

B. General Trend in Sex Ratio at Birth

From 1981 on, the sex ratio at birth in favor of the male increased steadily and reached 113.6 in 1988. Assuming a relatively complete vital registration, the high ratios may be due to nonbiological factors. In Korea, the registration rate of births without delay was estimated at 91 percent in 1989 (NBOS, 1989).

C. Differentials in Sex Ratio at Birth

Korean data show a pronounced positive relationship between the sex ratio and the order of birth, that is, there is an increasing excess of

Table 1. Sex Ratio at Birth by Year : 1979~1988

Year	Total	Male Births	Female Births	Sex Ratio
1979	913386	467978	445408	105.1
1980	889104	453037	436067	103.9
1981	867826	448958	418868	107.2
1982	846553	437494	409159	106.9
1983	763058	395610	367448	107.7
1984	665670	346776	318894	108.7
1985	643266	336946	306320	110.0
1986	621992	329048	292944	112.3
1987	606634	316993	289644	109.4
1988	602500	320464	282036	113.6

Source : NBOS/EPB, Annual Report on Vital Statistics, 1989

Table 2. Sex Ratio at Birth by Birth Order : 1979~1988

Year	Total	Birth Order							
		1st	(%)	2nd	(%)	3rd	(%)	4th	(%)
1979	105.1	103.8	38.5	104.9	33.3	106.6	17.1	107.5	11.2
1980	103.9	105.7	39.4	104.2	31.6	102.7	16.8	99.1	12.3
1981	107.2	106.3	40.9	106.9	33.8	107.2	16.5	113.1	8.9
1982	106.9	105.5	41.8	106.1	35.7	109.3	14.8	114.2	7.6
1983	107.7	106.0	44.8	106.3	38.5	112.5	11.1	122.1	5.6
1984	108.7	106.4	49.5	107.5	38.1	118.5	8.4	131.7	4.0
1985	110.0	106.3	51.5	108.2	37.8	131.7	7.5	153.8	3.2
1986	112.3	107.6	53.1	111.7	37.3	141.4	6.9	157.4	2.1
1987	109.4	105.2	54.2	109.5	37.6	131.6	6.1	157.2	2.1
1988	113.6	107.2	(53.1)	113.5	(28.7)	170.5	(5.7)	199.1	(1.7)

Source : Same as Table 1

male births as the parity becomes high. Table 2 shows severely distorted sex ratios on higher parities, particularly at the third and fourth orders of birth, since 1985.

As the total sex ratio at birth increases, the extent of the imbalance is also expanding at the high orders of birth. In 1988, the sex ratio was 170.5 at the third birth and 199.1 at the fourth birth, which means that male births are almost double the female births.

The data in the above Table is simplified into graph with Figure 1 revealing the drastic imbalance of sex ratios at birth by order during the decade.

Considering the proportion of births by order, more than half of total births have occurred in the first order in recent years, so the highly unbalanced sex ratio at birth for parity 3 and over does not seem to have much impact on the total sex ratio at birth. Nevertheless, the severe imba-

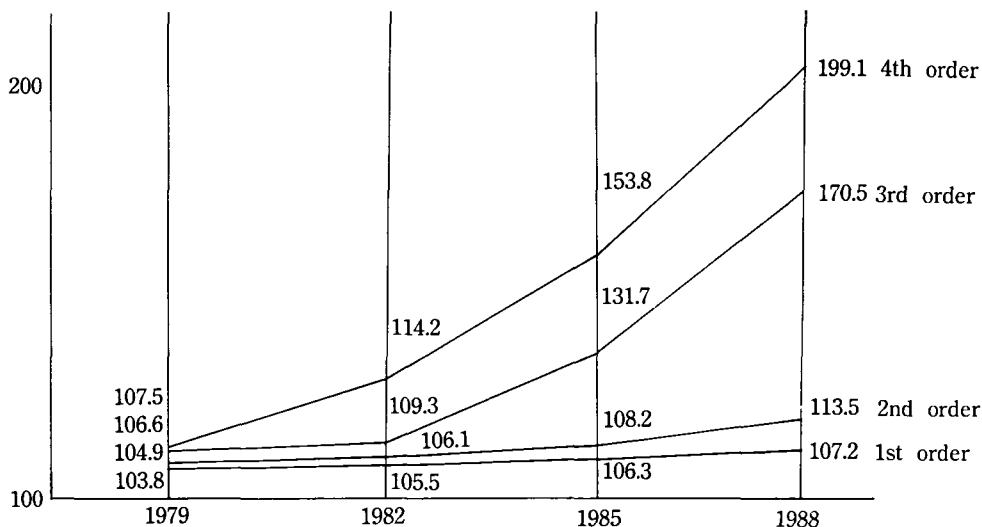


Fig. 1. Sex Ratio at Birth by Birth Order : 1979~1988

lance in ratios as in 1988 can not be regarded simply as a biological variation. Some strong external factors seem to affect them. Sex ratios at birth by birth order show a large fluctuation during the period from 1972 to 1980 (NBOS, 1982). During this period, even a reverse trend is apparent.

Table 3 presents the sex ratio at birth by the

age of the mother and indicates a positive relationship between sex ratio at birth and the age of the mother, which is obvious for mothers aged 20 to 39, but it can not be concluded that the advancing age of the mother in itself has a serious, direct effect on the sex ratio at birth.

The major proportion of births occurs among mothers aged 20 to 29 while mothers aged 30

Table 3. Sex Ratio at Birth by Age of Mother : 1979~1988

Year	Age of Mother					
	15~19	20~24	25~29	30~34	35~39	40~44
1979	107.1	105.3	104.9	105.1	104.6	102.5
1980	108.3	105.8	104.6	102.9	99.4	91.3
1981	109.7	106.5	106.5	109.0	112.1	113.6
1982	108.2	105.7	106.7	110.2	113.3	114.1
1983	108.2	106.2	107.2	113.6	117.2	111.9
1984	110.4	107.3	108.3	115.2	120.7	116.7
1985	106.3	107.1	109.8	121.4	130.4	120.0
1986	111.1	109.2	111.6	125.3	132.5	119.9
1987	112.4	106.2	109.2	118.1	121.7	140.1
1988	107.8	108.9	113.3	125.9	136.0	129.5

Source : Same as Table 1.

to 39 have shown a decrease in fertility in recent years (KIPH, 1989). As the age of the mother increases, higher parities usually are given to the older mothers. Thus, as revealed in Table 2 above, a considerable imbalance in the sex ratio is observed in higher parities, which corresponds with the increased ages of the mothers.

In the young age group of 15 to 19 and the older age group of 40 and over, inconsistency and fluctuation are noticed in the data. The proportion as well as the absolute number of birth in these age groups are as trivial that it can not be considered to affect the sex ratio much. Besides, a great proportion of births outside marriage seems to occur in the young age group, who do not care about the sex of the child.

As seen in Table 4, the sex ratio at birth is increasing in all areas with some slight fluctua-

tions. The scale of the fluctuations differs. In general, it is a little larger in cities than elsewhere. Daegu City and Gyongbuk Province showed extremely high sex ratios in 1985 and 1988. These two areas are known to be more conservative and traditional with a stronger son preference than other areas.

III. Factors Contributing to the High Sex Ratio at Birth

In this section, some sociodemographic factors which are believed to have an increasing effect on the sex ratio at birth will be examined.

There are many such important factors which have indirect effects on the sex ratio at birth as the improved educational level of parents, ur-

Table 4. Sex Ratio at Birth by Residence

Residence	1979	1982	1985	1988
Total	105.1	106.9	110.0	113.6
Municipal Cities				
Seoul	105.8	107.9	108.7	110.9
Busan	104.6	106.8	109.6	112.3
Daegu	—	106.6	122.0	135.4
Inchon	—	104.5	108.7	107.4
Gwangju	—	—	—	107.4
Provinces				
Gyonggi	105.6	105.9	107.0	109.5
Gangwon	106.2	106.3	109.0	109.1
Chungbuk	108.9	105.9	110.6	113.5
Chungnam	104.0	107.2	109.5	114.5
Jeonbuk	105.1	107.2	108.7	109.3
Jeonnam	102.3	107.7	106.4	112.3
Gyongbuk	106.3	107.2	120.7	126.1
Gyongnam	104.6	105.7	110.3	119.5
Cheju	105.9	107.2	111.1	112.4

Source : Same as Table 1.

banization, women's participation in economic and social activities, infant mortality, contraceptive prevalence, and nuptiality pattern. Besides, some other factors like fertility decline, son preference, and induced abortion can be selected here as the most critical factors having an impact on the sex ratio at birth.

A. Fertility Decline

It is apparent that Korea has experienced a sharp decrease in fertility during the past decades. The total fertility rate(TFR) has declined continuously from 4.7 in 1971 to 2.7 in 1982, and 1.63 in 1990 (KIPH, 1989 ; NSO, 1991).

The major reason for this decline is socioeconomic development. In the first place, the high educational level of women affected knowledge and attitudes about contraception and family planning, and an orientation toward fertility decline. The contraceptive prevalence rate was 77.1 percent in 1988(KIPH, 1989). Women's participation in economic activities is another significant reason for the fertility decline. As the socioeconomic status of parents improves, they invest more in the education of children. Parents attempt to keep the number of children down, because of increasing educational costs.

The decrease in TFR gives basic grounds for understanding the upward trend of the sex ratio at birth. TFR 1.63 in 1990 corresponds to the ideal number of children for currently married women, which was 2.0 in 1988(KIPH, 1989). Couples increasingly do not want to have many children, and expect only one or two children. Nowadays the number of couples who accept the one child norm is increasing.

If son preference is substantial, fertility increases even with widespread contraceptive practice. Some positive impact on fertility increase of son preference is demonstrated by several studies.(Park, 1983 ; KIPH, 1989 ; Lee, 1989) Table 5 shows the responses of currently married women aged 15~44 on whether they will have additional child or stop pregnancy taking into consideration the existing number of children.

If they have only one son, a considerable proportion, 61.2 percent stated that they would not have an additional child, while more than half of the women who had one daughter still wanted to have another child.

Almost 100 percent of the women who had at least one son would stop a pregnancy. A small proportion of women who did not have a son still wanted to have another child, and 12.8 percent of the women who had two daughters, and 8.0 percent of women who had three daughters wanted another child, hoping for a son. That is, son preference positively affects an increase in family size.

When sex preference influences family size strongly, couples have more than the ideal number of children, or they resort to an artificial means of having the ideal number of children as well as the expected sex composition of children.

In other words, a decrease in the ideal number of children and strong son preference drive couples to use available techniques to have the wanted sex. Here, the fertility decline lays a foundation for a change in the sex ratio at birth.

B. Son Preference

Even though Korean society has gone through

Table 5. Percent Distribution of Currently Married Women Aged 15~44 by Attitudes toward Having Additional Child : 1988

Sex Composition of Current Child(ren)	Don't want child	Want child	Don't know	Total (Number)
1 Child				
1 son	61.2	34.2	4.6	100.0(696)
1 daughter	39.4	56.0	4.6	100.0(456)
Total	52.5	42.9	4.6	100.0(1,152)
2 Children				
1 son and 1 daughter	99.2	0.7	0.1	100.0(1,504)
2 sons	99.1	0.7	0.2	100.0(865)
2 daughters	80.9	12.8	6.3	100.0(375)
Total	96.6	2.3	1.1	100.0(2,744)
3 Children				
2 sons and 1 daughter	99.8	0.2	—	100.0(518)
1 son and 2 daughters	99.3	0.6	0.1	100.0(506)
3 boys	100.0	—	—	100.0(139)
3 daughters	90.4	8.0	1.6	100.0(120)
Total	98.7	1.0	0.2	100.0(1,283)

Source : KIPH, 1988 National Fertility and Family Health Survey, 1989

changes in several aspects, son preference is still strong. Table 6 presents a proportional distribution of currently married women aged 15 to 44 concerning their attitudes toward son preference in 1988.

The proportion of women who responded that a son is essential made up 29.8 percent of the

Table 6. Percentage Distribution of Currently Married Women aged 15 to 44 according to their Attitudes toward Son Preference

Extent	Percent
Son is indispensable	29.8
To have son is better	20.3
It does not matter	49.4
Don't know	0.5
Total	100.0(N=6,511)

Source : Same as Table 5.

total and women who responded that having a son is better covered 18.9 percent, which means that 50.1 percent of the women responded that a son is essential or having a son is better, which indicates that half of the women definitely wanted at least one son.

In addition, the same survey showed that son preference is high in all age groups and in all educational categories, but is stronger among older and less educated women than the younger and better educated. (KIPH, 1989).

Table 7 presents the responses of women aged 15 to 49, who are or have been married, to the hypothetical questions, "If you could have one child or two children, what do you think the desirable sex composition should be ?"

Referring to the first question and its result, only one-quarter of the women indicated no sex

Table 7. Percentage Distribution of Ever-married Women aged 15 to 49 by Son Preference with Hypothetical Questions : 1985

Hypothetical Condition	Total (Number)	Son Preference	Both Sexes	Daughter Preference	No Sex Discrimination
One Child	100.0(4998)	67.4	—	7.2	25.4
Two Children	100.0(4998)	28.3	3.8	1.4	66.5

Source : S.S.Lee, "Determinants of Son Preference in the Case of Republic of Korea ; 1985", CDC Research Monograph, Series No. 19, Cairo Demographic Center, 1989

discrimination proving that women do not mind which sex for the first birth, but a considerable proportion, 67.4 percent, stated that they would want a son, if they could have only one child. Only a small proportion, 7.2 percent, would prefer a daughter.

Considering the declining fertility and the expanding one child norm, 67.4 percent who stated a preference for a son proves the stronghold of son preference has on Korean women.

When they are asked about the sex combination of children if they could have two children 28.3 percent responded that they would prefer a son while 66.5 percent approved no sex discrimination. A minimal proportion, only 1.4 percent, would prefer daughters. The 66.5 percent of women responding with no sex discrimination can be misunderstood as meaning that they do not mind even though they have two daughters. To have two children gives a chance to think over harmony in the sex composition of children. No sex discrimination means the combination of one son and one daughter, in which case women must have at least one son.

Women in 67.4 percent of the cases indicated son preference if they were to have one child and only 1.4 percent indicated daughters if they

were to have two children, but most women would not have two daughters, as clearly shown by the data.

If their first child is a son, then they would not have any more children and would stop any pregnancy. If their first child is a daughter, they would have one more child in an attempt to have a son. In the same study, son preference is increasingly high as family size increases (Lee, 1989). Thus women who have two daughters or more try to manipulate the sex artificially at high parity to have a male.

C. Ultrasonic Test and Induced Abortion

Even though women want more male births than female births, they have little control over the children's sex since it is biologically decided during the prenatal period, but medical advances in obstetrics and gynecology have made it possible to learn the sex of a child in the prenatal period. The ultrasonic testing of the amniotic fluid is frequently done to check pregnancy status to improve maternal and prenatal health.

By the ultrasonic test, if women find themselves pregnant with daughters and still have a strong preference for a son, they may look to ano-

ther solution. Induced abortion has contributed as a direct tool for avoiding unwanted birth when contraceptive methods fail. It is apparent that the ultrasonic test and induced abortion are abused intentionally by women who want to have sons. Table 8 gives ultrasonic testing and then the induced abortion rate following the results of the test by currently married women aged 20 to 44.

The proportion of women who have and ultrasonic test during pregnancy before the survey covered 3.9 percent of the total respondents (KIPH, 1989). Among the 22,094 latest pregnancies surveyed, 275 cases, 1.2 percent were reported to have had an ultrasonic test.

As shown in the above data, most cases when the test indicated a male fetus and those in which doctors did not inform the woman of the sex resulted in live births, but 31 percent of the cases found to be carrying a daughter ended in induced abortions. It seems that most women who are found by the test to be pregnant with a son will have live births and a high proportion of the women who are pregnant with a daughter will resort to induced abortion. Furthermore, the

some survey revealed the ultrasonic testing during pregnancy increased at high parities and with the advancing age of the mothers.

Women who had an ultrasonic test during pregnancy at the third birth order or more made up 18.7 percent of the total cases. The higher rate of induced abortion following the results indicating a daughter rather than a son shows clearly the strong son preference among Korean women. The increase in induced abortions among younger women is explained by the change in the reason for abortions. In the past, married women had abortions to terminate unwanted births, but nowadays younger married women have abortions after the failure of contraception (KIPH, 1989). Most births are to mothers aged 20 to 29, and among whom the abortion rate is increasing.

As young women aged 20 to 29 are considered to have higher educations and a wide knowledge of family planning and contraception, and believe in birth control, it is doubtful that they would terminate unwanted births only after the failure of contraception. The high abortion rate among

Table 8. Experience of Ultrasonic Test and Induced Abortion following the Result of the Test in the Latest Pregnancy by Currently Married Women aged 20 to 44.

Resolution of pregnancy	Total pregnancy	Ultrasonic tested pregnancy				
		Subtotal	Result of the test			
			Son	Daughter	Twin (s+d)	Not informed
Live birth	13,650	227	154	56	1	16
Induced abortion	6,494	31	3	27	—	1
Still birth	157	1	1	—	—	—
Spontaneous abortion	1,416	3	—	2	—	1
Currently pregnant	377	13	11	2	—	—
Total	22,094	275	169	87	1	18

Source : KIPH, 1988 National Fertility and Family Health Survey, 1989

women aged 20 to 29 in recent years may be interpreted partly as voluntary birth termination, influenced by other social factors.

When the sex of the child is revealed to be a daughter through the ultrasonic test in the prenatal period, a considerable number of women who have strong son preference have abortions. This abnormal way of choosing the sex of a child seems to have effected the sex ratio at birth and can change it.

Some women have a stronger son preference as they get older and record the high sex ratio at birth (see the Section II-C). Older mothers who are not highly educated and do not have enough knowledge of advanced medical checks, and have only two or three daughters still wait for a son, thus increasing the fertility.

Summing up, women who want only one child or two children and who desire a son rather than a daughter, have induced abortions to avoid a birth when the unborn child is found to be

a daughter through ultrasonic testing. This has a dampening effect on the normal sex ratio at birth.

IV. Some Effects of Sex Ratio at Birth on Population Structure

A. Changes in Sex Ratio by Age

Table 9 shows the level and trend of the sex ratio by age from 1970 to 1990. The study arbitrarily regarded the population aged 5 to 9 as school age population and population aged 10 to 29 as marriageable population.

According to census data, the sex ratio of the population aged 0 increased significantly from 106.5 in 1970 to 114.7 in 1990. The high sex ratios of the population aged 0 to 4 in 1990 proves that the sex ratio at birth has been recording a considerable excess of male births during the past five years. This finding supports the results

Table 9. Sex Ratio by Ages : 1970~1990

Age	Sex Ratio				
	1970	1975	1980	1985	1990
Total ages	100.8	101.2	100.5	100.2	101.3
0	106.5	108.1	108.3	110.5	114.7
1	106.9	108.2	106.8	108.0	113.5
2	105.8	106.3	106.7	107.6	111.8
3	106.7	107.5	107.5	107.6	111.8
4	108.0	107.3	107.1	107.2	112.7
5~9	107.6	107.0	106.8	107.1	107.1
10~14	107.3	107.8	106.8	106.7	106.6
15~19	103.8	105.0	106.5	106.6	106.0
20~24	106.1	106.6	104.1	106.1	105.8
25~29	99.0	102.9	100.0	99.2	146.1

Source : 1) NBOS/EPB, Population and Housing Census, 1970, 1975, 1980, 1985

2) NSO, Future Population Projection : 1990~2021, 1991

of the previous Table 1.

B. Demographic Implications of Sex Ratio at Birth

It seems useful to analyze demographic implications for other variables of the sex ratio at birth, but, as the sex ratio at birth is calculated from the number of registered births without considering infant mortality, it becomes more skewed when projected under the assumption of the present skewed ratio.

According to the population projection of the National Statistical Office, the population growth rate in Korea will gradually decrease reaching 0 percent in 2021 from which time the absolute number of people will start to decrease owing to a decline in fertility (NSO, 1991).

The present study used the population aged 0 in the projection based on the census data obtained by NSO for the calculation of the sex ratio at birth. Table 10 presents a projection from the 1990 population and Housing Census. The base year is 1990 for the projection using the component method with the 1.4 percent under-registration rate of the Post-Enumeration Survey(NSO, 1991). The Projection assumed 107 as the hypo-

thetical sex ratio at birth, and used the standard Life Table of Koreans to calculate the surviving population in each age group and also used an age specific fertility rate to calculate the population aged 0. Thus, when a projection of population aged 0 assumed 107 as the hypothetical sex ratio at birth, the sex ratio remained at a uniform level until 2020.

1. Sex ratio of school-age population

School-age population means the population at the age of entrance into primary school, generally six and over in Korea. The present study also included the five year old population in the school-age population for convenience's sake, since the population aged five usually goes to kindergartens with similar curricula to those in primary schools and wait for entrance into a primary school the next year.

Table 11 examined the sex ratio of the school-age population from 5 to 9 until 2020. The higher sex ratios of the school-age population in 1995 and 2000 might result from a high sex ratio in previous years, which seems affected by the high sex ratio at birth. The sex ratio of the school-age population remained at the normal level, however, without change from 1995, probably due

Table 10. Sex Ratio of Population aged 0 in Projection 1990~2020

Year	Total	Male	Female	Sex Ratio
1990	665068	355241	309827	114.7
1995	672545	347603	324942	107.0
2000	669027	345785	323242	107.0
2005	620049	320472	299577	107.0
2010	574538	296951	277587	107.0
2015	509440	263307	245133	107.0
2020	501847	259384	242464	107.0

Source : NSO, New Population Projection : 1990~2021, 1991

Table 11. Sex Ratio of School-Age Population(5~9) in Projection : 1990~2020

Age	1990	1995	2000	2005	2010	2015	2020
5~9	107.1	112.1	109.7	107.1	107.1	107.1	107.1
5	108.4	114.7	107.0	107.0	107.0	107.0	107.0
6	107.7	113.6	107.0	107.0	107.0	107.0	107.0
7	106.4	111.9	108.8	107.1	107.1	107.1	107.1
8	106.9	107.6	120.0	107.1	107.1	107.1	107.1
9	106.7	112.8	114.1	107.1	107.1	107.1	107.1

Source : Same as Table 10.

to the assumption of a hypothetical sex ratio of 107 at birth in the projection.

Table 12 presents the strongly related figures of the sex ratio of the population aged 0 and of the school-age population. It indicates that the high sex ratio of the school-age population was significantly affected by the high sex ratio at birth.

2. Sex ratio of marriageable population

It is necessary to clarify two points before estimating the sex ratio of the marriageable population and analyzing the impact of the sex ratio at birth on the marriageable population.

First, it is necessary to define the marriageable

population. Since the nuptiality pattern is different from society to society, and ages at which marriage occurs frequently for male and female are also different, it is proper to take into account several condition of marriage in a specific society.

In Korea, the legal minimum age for marriage without consent of parents is 22 for males and 20 for females. According to vital statistics, the highest frequency of marriage occurs among males aged 25 to 29 and among females aged 20 to 24. The proportion of the married population was 64.8 percent for males aged 25 to 29 and 50.6 percent for females aged 20 to 24 in 1988 (NBOS, 1989).

The mean age at first marriage (MAFM) is

Table 12. Sex Ratios of Population aged 0 and School-Age Population(5~9)

Year	Sex Ratio of Population aged 0	Year (5 years after)	Sex Ratio of School-age Population(5~9)
1980	108.3	1985	107.1
1985	110.5	1990	107.1
1990	114.7	1995	112.1
1995	107.0	2000	109.7
2000	107.0	2005	107.1
2005	107.0	2010	107.1

Source : Same as Table 10.

going up. The MAFM was 27.9 for males and 24.3 for females in 1980, and increased to 28.4 for males and 25.3 for females in 1988 (NBOS, 1989). Considering the above conditions, it seems appropriate to regard the population aged 20 to 29 for both sexes as the marriageable population.

Second, it is not easy to examine the impact of the sex ratio at birth on the marriageable population compared with the short term between birth and school entry. The gap in years between birth and marriage is too long to be related, because different mortality rates are operating for males and females during so considerable a period.

In addition, since birth is a biological process while marriage is social and cultural behavior, it would not be appropriate to relate the sex ratios of the two populations. The study tried, however, to investigate any relationship between the sex ratio at birth and the sex ratio of the marriageable population. The size of the marria-

geable population will ultimately decide the level and pattern of fertility, namely births.

Table 13 gives the sex ratio of the marriageable population from 1970 to 2020. On the whole, the excess of males in the population of the marriageable is noticeable over all the years. The sex ratio of the marriageable population increased steadily and will reach a peak of 111.4 in 2015.

Taking into account that most marriages occur among males aged 25 to 29 and females aged 20 to 24, and that the mean age at first marriage will increase from the current level, the marriageable ages might be confined to from 25 to 29 for males and 20 to 24 for females.

In that situation, the ratio of the male population aged 25 to 29 compared with the female population aged 20 to 24 shows quite high figures, for example 119.4 in 2000, 110.2 in 2005, and 128.6 in 2020 (NSO, 1991). When comparing the sex ratios of the population aged 0 with the sex

Table 13. Sex Ratio of Marriageable Population : 1970~2020

(Unit : 1,000)

Year	Male Pop. aged 20~29	Female Pop. aged 20~29	Sex Ratio
1970	2396	2332	102.7
1975	2884	2747	150.0
1980	3609	3527	102.3
1985	4353	4184	104.0
1990	4386	4179	105.0
1995	4465	4225	105.7
2000	4486	4039	106.1
2005	2968	3708	107.0
2010	3651	3326	109.8
2015	3402	3054	111.4
2020	3413	3135	108.9

Source : 1) NBOS/EPB, Population and Housing Census, 1970, 1975, 1980, 1985

2) NSO, New Population Projection : 1990~2021, 1991

ratios of the marriageable population, a clear positive relationship can be seen between the two ratios in Table 14.

With the increasing the sex ratio of the population aged 0, the sex ratio of the marriageable age population also reveals an increasing trend. The excess of male population at age 0 still continues in the population at age 20 to 29, which might lead us to conclude that the sex ratio at birth will have a significant effect on the sex composition of the population in the future.

On this basis, the study attempted a projection of the marriageable population using the current distorted sex ratio at birth. Table 15 estimated

the male and female population of marriageable ages after 20 years from 1980 and 1990 using the survival ratio in the Life Table in Korea.

Compared with the previous table, the sex ratio of the marriageable population using the survival ratio method is higher than that in the projection using the National Statistical Office information. The sex ratio of the marriageable population is 107.3 during the years 2000 to 2009 and 113.7 from 2010 to 2019. It is apparent that there will be an excess of males in the marriageable population from 2000.

The excess of males of marriageable age is certainly expected to bring some changes in the

Table 14. Sex Ratios of Population aged 0 and Marriageable Population(20~29)

(Unit : 1,000)

Year	Sex Ratio of Population aged 0	Year (25 years after)	Sex Ratio of Marriageable Population(20~29)
1970	106.5	1995	105.7
1975	108.1	2000	106.1
1980	108.3	2005	107.0
1985	110.5	2010	109.8
1990	114.7	2015	111.4
1995	107.0	2020	108.9

Table 15. Projection of Marriageable Population

Base Year	Sex Ratio of Pop. 0	Population aged 0	LTSR	Population aged 20~29	Sex Ratio of Pop. 20~29	Covering Years
1980	108.3	M : 392305 F : 362255	0.94962 0.95822	M : 372541 F : 347120	107.3	2000~2009
1990	114.7	M : 355241 F : 309827	0.96605 0.97413	M : 343181 F : 301812	113.7	2010~2019

Source : 1) NBOS/EPB, Population and Housing Census, 1980

2) NSO, Standard Life Table of Koreans, 1990

3) NSO, New Population Projection, 1991

Note : Life Table Survival Ratio(LTSR) was obtained as $10 L_{20}/10 \cdot l_0$.

marriage pattern. As the mean age at first marriage is increasing steadily, late marriage will become prevalent thus extending the marriageable age. The direct result expected is an over-abundance of males who do not marry. Nowadays, the increase in the number of never-married males in rural areas is an obvious example of this situation.

V. Conclusions and Recommendations

The highly unbalanced sex ratio at birth in Korea is a relatively recent phenomenon. From the early 1980s, the sex ratio at birth began to rise and finally reached 113.6 in 1988. Compared with other countries, the ratio seems to be highly skewed.

1. The general sex ratio at birth in Korea has increased from 1981 on and reached the highest 113.6 in 1988.

2. The sex ratio at birth shows a variation from place to place, but the ratio has increased considerably in the higher parities with the general sex ratio at birth increasing. There is a positive relationship between the sex ratio at birth and the age of the mother.

3. Among the sociodemographic factors which have skewed the sex ratio at birth in Korea, the fertility decline, son preference, and induced abortion with the medical check of the fetus are the most critical ones. The highly unbalanced sex ratios at birth at parity 3 and over might be explained by the fact that women with a strong desire to have a son resort to induced abortion to avoid birth when the sex of unborn child is female.

4. The sex ratio at birth is expected to increase slightly, or at least will remain at the current high level for a considerable period, but it is difficult to project the sex ratio at birth itself directly, because it is based on data from vital statistics.

5. It seems that the sex ratio at birth will have some impact on the population structure. A positive relationship between the sex ratio at birth and the sex ratio of the marriageable population can be gleaned from the data. The high sex ratio at birth will result in a high sex ratio for the marriageable population, and the excess male population of marriageable age in the forthcoming years may influence the socioeconomic and demographic aspects of society, particularly the marriageable pattern.

The study attempted to examine the current situation of the sex ratio at birth in Korea, and to examine the impact on population structure and other social aspects of Korean society, but a deeper and more precise examination of the sex ratio at birth using differentials is recommended for analysis of the causes for the current unbalanced sex ratio at birth.

In addition, further research is needed to identify the effects of the sex ratio at birth on the socioeconomic aspects of Korean society.

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한국의 출산성비에 관한 연구

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한국은 강한 남아선호사상을 보이는 나라중의 하나이다. 이러한 남아선호사상은 가정과 사회에서 전통적으로 남성의 역할을 강조하였던 가부장제에서 유래하고 있다. 남아선호사상은 출산력 저하의 장애가 되며 이상적인 가족수 유지를 어렵게 만든다. 한국은 남아선호사상이 만연함에도 불구하고 급격한 출산력 감소를 보였다. 출산력 저하와 더불어 최근에 와서 비정상적인 출산성비가 나타나고 있다. 출산동태통계가 비교적 정확한 나라들의 경우 전체 출산성비는 104에서 106의 범위인데 한국은 1988년에 113.6을 기록하였다. 한국에서는 출산통계가 비교적 정확하므로(출산후 등록규정일 준수율이 91.3퍼센트임) 상기의 비정상적인 출산성비는 다른 원인으로 해석될 수 있다. 따라서 본 논문은 한국의 출산성비의 현재추세, 비정상적인 출산성비의 주요 요인, 이러한 현상이 장래인구구조에 미치는 영향을 분석하고자 하였다.

1980년대 이후로 출산성비는 꾸준히 증가하여 1988년 113.6에 도달하였는데 이는 정상범위로 간주되는 104~106범위에 비하면 상당히 비정상적인 수치이다. 또한 출산순위가 올라갈수록 상당히 높은 이상수치를 보인다. 1988년에 셋째 출생아와 넷째 출생아 이상의 성비는 170.5와 199.1이었다. 20세~39세 연령집단에서 모의 연령이 증가함에 따라 출생성비가 증가하는 정관계를

보이고 있다. 지역별로 볼때 경상북도와 대구직할시에 가장 높은 이상성비를 보이고 있는데 1988년 각각 135.4와 126.1을 기록하였다.

1988년 합계출산력 1.64는 평균적으로 첫번째 가정이 한자녀, 두번째 가정이 두자녀를 가진다는 뜻으로 선진국과 비슷한 저출산율을 보이는데 강한 남아선호사상과 소자녀가치관의 결합은 결과적으로 비정상적인 출산성비의 산출을 초래하였다. 1988년의 전국 출산력과 가족보건 실태조사에서 '아들이 반드시 있어야 한다'와 '아들이 있는 것이 낫다'라는 응답이 도합 전체의 50.1퍼센트를 차지하고 있고 한자녀의 자녀를 둔다고 가정할때 남아선호율이 67.4퍼센트를 차지하였다

즉 자녀를 한 명, 혹은 두 명밖에 두고 싶지 않으나 이처럼 제한된 자녀수로 남아선호를 충족시키고자 할 때 양수검사를 거쳐 태아의 성별을 판단한 후 인공임신중절술로 원하지 않는 여아출산을 방해하는 경로가 이상출산성비의 직접적인 원인으로 이해할 수 있다.

비정상적인 출산성비는 단기적으로 확령인구의 성구조를, 장기적으로는 결혼적령인구의 성구조를 편중화시켜 결혼연령의 연장과 함께 결혼행태의 변화도 예측가능하다. 따라서 비정상적인 출산성비가 장래 인구구조에 미치는 영향과 인구·사회요인과 상관관계에 대한 분석을 위하여 더 많은 연구가 필요하다.

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