Does Religion Matter?
A Study of Regional Variations in Sex Ratio at Birth in Korea[*]

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Abstract

The main objective of this study is to develop explanations for the causal mechanisms and regional variations in sex ratio at birth in Korea. This paper attempts to explore the effects of religion as well as residential and socioeconomic factors on the regional level of sex ratio at birth. It also conducts micro-level analyses on whether and to what extent religion influences the individual's values and attitudes toward son preference and abortion. Micro-data from vital statistics, household registration data, various regional statistics for years 1994 and 2000, and the 2000 National Fertility Survey data are utilized in this study.

Results of analysis at the regional level reveal that religious prevalence, rather than the socioeconomic factors of the region, is more strongly associated with sex ratio at birth. The prevalence of Protestant and Catholic churches turns out to be negatively related to sex ratio at birth, whereas that of Buddhist temples shows a positive relationship. Sex ratios at birth turn out to be higher in metropolitan and urban areas than in rural areas, and the socioeconomic level of the region shows a positive relationship to sex ratio at birth. At the individual level of analysis, Buddhism is found to be positively related to son preference. Both Protestants and Catholics are more likely than those who have no religion to oppose abortion. The theoretical implications of these findings are discussed.

Introduction

Korea is well known for having a tradition of son preference. This preference for sons is rooted in Confucian values. Based on a patriarchal and patrilineal system, only sons can pass on family lineage and perform the ancestor worship ceremony. In addition, sons, particularly the eldest son, have had primary responsibility for providing old age support for parents, although this tradition is becoming weaker.

Despite strong preference for sons, in Korea, rapid industrialization and urbanization have led to a rapid fertility transition way below the replacement level during the past several decades. The total fertility rate (TFR) decreased sharply from about 6.0 in the early 1960s to the replacement level (2.1 children per woman) in 1983 and has now dropped to 1.16 in 2004. With the decline in fertility to below the replacement level, however, serious distortions in sex ratio at birth began to emerge in the mid-1980s. The sex ratio at birth was estimated at 109.5 in 1985 and reached 115.2 in 1994. A downward trend in sex ratio at birth has been observed since the mid-1990s, and the sex ratio reached 108.2 in 2004 (KNSO, 2005).

In the literature, high sex ratio at birth in Asia has been attributed to three factors: under-registration of female births, sex-selective abortion, and excess female infant mortality (Roy, 1994; Das Gupta, 1999; Bélanger, 2003). Given that unregistered females and female infanticide are not common in Korea, distorted sex ratio at birth is mainly attributed to sex–selective abortion (Cho et al., 1994; Park and Cho, 1995; Goodkind, 1996; Kim, 2004a, 2004b). Kim (2004a, 2004b) conducted demographic simulations and argued that sex-selective abortion raises sex ratio at birth, and, at the same time, plays a role in lowering the level of fertility in Korea.

Sex ratios at birth vary from region to region in Korea. Distortions in sex ratio at birth have been most serious in the southeastern part (hereafter, Youngnam) of the Korean peninsula. In 1994, sex ratios reached 121.4 in Taegu city, and over 120 in the two provinces of Kyongbuk and Kyongnam. In contrast, sex ratios appeared to be relatively low in the southwestern part (hereafter, Honam) of the peninsula (Park and Cho, 1995; Kim, 2004a, 2004b).

Evidence indicates that Taegu city, and the two provinces of Kyongnam and

Kyongbuk in Youngnam do not have any abnormal characteristics with regard to the level of fertility, family and household structure, and practice of family planning. The only common factors are that Youngnam has relatively fewer Protestant and Catholic churches, and a long history of conservative cultural traditions (Kim, 1997, 2004a, 2004b).

Despite an enormous amount of research regarding high sex ratios at birth in Korea, there have only been a few studies covering the causal mechanisms (Kim, 1997, 2004a, 2004b). Mainly due to the lack of hard information, the nature and theoretical basis of the causal mechanisms and regional variations in sex ratio at birth have not yet been sufficiently explored.

The main objective of this study is to develop explanations for the causal mechanisms and regional variations in sex ratio at birth in Korea. It is assumed in this study that sex ratio at birth is associated with social culture and regional characteristics, which, in turn, reflect an individual's values and attitudes toward son preference and sex-selective abortion. More specifically, this paper attempts to explore the effects of religion as well as residential and socioeconomic factors on the regional level of sex ratio at birth. In order to enhance our understanding of the causal mechanisms of sex ratio at birth, this paper also conducts micro-level analyses on whether or not and to what extent religion influences the individual's values and attitudes toward son preference and abortion. Micro-data from vital statistics, various reports on regional statistics for years 1994 and 2000, and the 2000 National Fertility Survey data are utilized in this study.

Religion and abortion in Korea

Korea does not have a state religion. Buddhism, Protestantism, and Catholicism are the three most prevalent religions in Korea. In 2003, among those who are 15 years old and above, 46.1% do not have a religion. Among those who claim to have a religion, Buddhists account for 47.0%, Protestants total 36.8%, and Catholics number 13.7%, while the remaining percentage is "other religions" (KNSO, 2005). Although Confucianism has exerted a great effect on the daily life and values of people, few

Figure 1.   Religious Prevalence by Region, 2000

| Protestant Church | Catholic Church | Buddhist Temple |
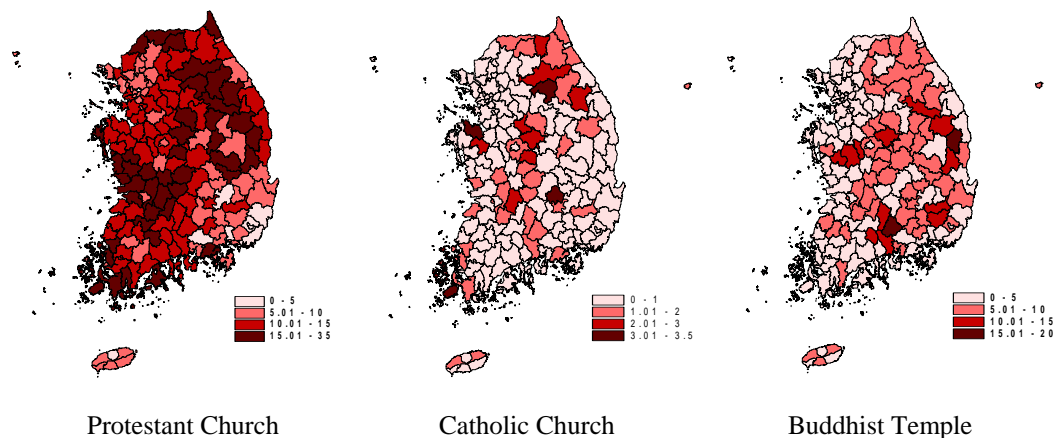
consider it as a religion. Rather, Confucianism is regarded to be part of the culture that is embedded in people's lives.

As each country mixes its native culture with religious beliefs and rituals, Korea combines diverse religions with Confucian values and Shamanism. For example, many Protestants still perform the ancestor worship ceremony and consult a traditional fortuneteller. Collective religious activities, such as group prayer meetings, particularly distinct in Protestantism, are common. Also, religion in Korea is often described as self–centered and worldly (Chung and Kim, 1993). The fact that each religion holds mass prayer meetings for parents before university entrance examinations represents a reliance on religion for achieving worldly desires.

As shown in Figure 1, religious prevalence differs substantially by region. The Youngnam and Honam regions reveal the greatest contrast by religion. Buddhism is most popular in Youngnam, while the majority of religious people in Honam are Protestants (Kim, 2004; KNSO, 2005). Catholicism is relatively less prevalent than the other two and does not show a dominant pattern in its distribution.

Buddhism has a long history and is compatible with Confucianism, which was the dominant culture in the Chosun Dynasty (1392-1910). In contrast, originating from western countries, Protestantism was introduced to Korea in the late 19th and early 20th centuries, and created conflict with Confucianism. Thus, Buddhism prevailed in regions where tradition and Confucianism were stabilized. Protestantism

diffused to regions where traditional values and Confucianism were weak and a strong innovative motivation emerged (Chung and Kim, 1993).

Historically, the Honam region has been poor in terms of economic prosperity and political power compared to Youngnam. Feeling exclusion and antipathy toward tradition, Honam people were more likely to accept new religions. The fact that the first peasant uprising (*Donghak*) began in Honam in the late 19th century implies that people in this region harbored resentment and challenged the political regime. Historical documents also show that most Confucian temples were concentrated in Youngnam. During the past few decades, not only political dominance but also the level of economic development in Youngnam has been much higher than that of Honam. In order to maintain their dominant power, the Youngnam people have been conservative and have strictly retained traditional Confucian values. As a result, Buddhism has dominated this region. In contrast, Honam has accepted more western values along with Protestantism.

Assuming that religion exerts a great effect on people's values and attitudes, research has examined how and to what extent religion affects the individual's attitudes toward abortion (Sullins, 1999; Petersen, 2001; Strickler and Danigelis, 2002). Heated debates on abortion between pro–choice and pro–life advocates have also centered around religion. Both religious affiliation and frequency of attendance at religious activities are considered to be important factors of attitudes toward abortion, although these effects have decreased (Sullins, 1999).

Abortion has never been brought up as a social issue or evoked much controversy in Korea. Nor have religious groups in Korea strongly indicated their views on abortion, whereas Catholics and Protestants in many western countries have firmly held their positions against abortion and have been actively involved in heated discussions. Catholics and Protestants in Korea began to manifest their opposition toward abortion only recently, but not as strongly as in western countries (Yoo, 2003). However, Buddhist organizations do not have clear positions on this issue (Oh, 2003; Kim, 2004).

Although abortion is illegal in Korea, a government report estimated that 422,000 married women induced abortions in 1990 (Kim, 2004a, 2004b). Despite the

government's strong regulations and penalties, prenatal sex screening and sex–selective abortion have been widely performed since the mid-1980s. Abortion has become an open secret and most people tolerate it.

Drawing on the World Value Survey data conducted in 1995, Eun (2002) argued that religious affiliation does not show any significant effect on people's attitudes toward abortion in Korea. Based on a small survey, Oh (1993) also argued that religious affiliation in Korea does not exert any significant effect both on attitude toward abortion and on actual practice of it. In contrast, in Latin America, the United States, and other European countries, religious affiliation turns out to exert significant effects. It is found that importance of religion in life and frequency of attendance at religious activities have greater effects on people's attitudes toward abortion than religious affiliation itself.

Conceptual framework, hypotheses, and data

Given that an imbalanced sex ratio at birth in Korea is mostly due to sex–selective abortion, this study examines which factors influence sex–selective abortion, and how to understand imbalanced sex ratio at birth and regional differences of it in Korea. The causal mechanisms of sex–selective reproductive behavior and sex ratio at birth are presented in Figure 2.

It is hypothesized that residence, socioeconomic level, and religion of region are associated with sex-selective behavior in Korea. Residence and socioeconomic level of region are employed to measure accessibility and measure the likelihood of abortion. These two factors are also related to regional differences in religious prevalence. Religious prevalence is assumed to create an atmosphere and culture which may affect people's values and attitudes in the region.

Given that practicing abortion is accompanied with high costs, we hypothesize that the socioeconomic level of the region is positively associated with sex ratio at birth. Not only the economic level of the region but also the medical environment and level of education are assumed to be positively related. Region of residence may have contrasting effects. In terms of values, rural areas tend to hold more traditional values

Figure 2.   Causal Mechanisms of Sex-selective Reproductive Behavior in Korea
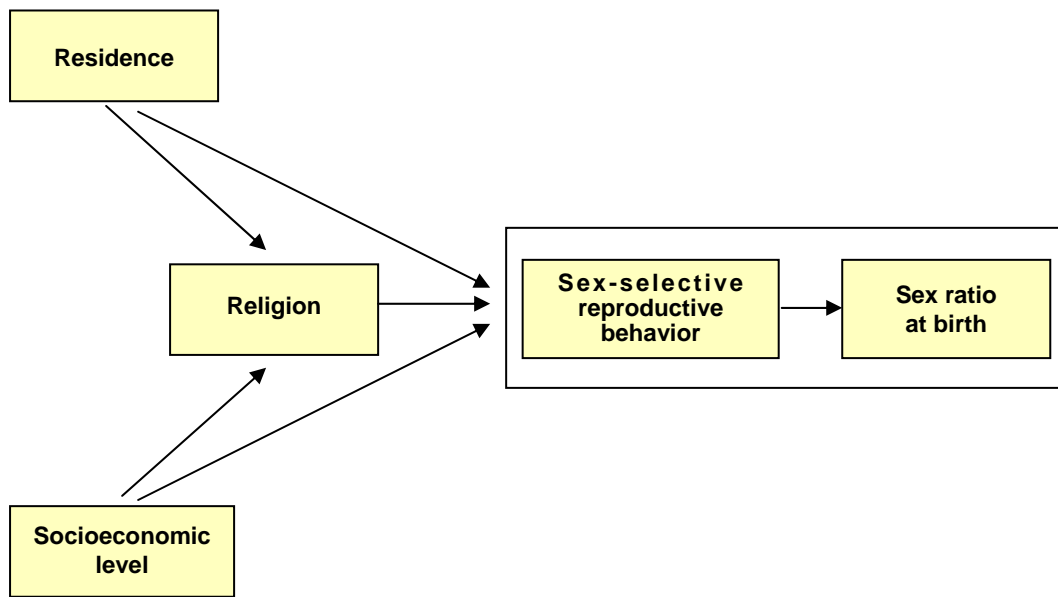
and son preference than metropolitan and urban areas. In terms of actual circumstances, practical resources can be more available in metropolitan and urban areas than in rural areas.

Sex-selective abortion can be performed when an individual's desire meets practical circumstances. Likewise, at the regional level, a distorted sex ratio at birth can occur when the regional culture and environment influence people's values and influence whether they will make use of resources that provide abortions. As mentioned above, son preference is rooted in Confucianism, and Buddhism is relatively more compatible with Confucianism than Protestantism or Catholicism. Therefore, we expect that the prevalence of Buddhism is positively associated with sex ratio at birth.

For the purpose of testing the causal mechanisms, this study utilizes micro-data from vital statistics, household registration data, and various reports on regional statistics for years 1994 and 2000. Vital statistics are originally included for about 239 "Si" (cities), "Gun" (counties), and "Gu" (districts) in 1994. Without dividing the seven metropolitan cities into districts, however, we calculated sex ratios at birth for 165 "Si" and "Gun".

In order to measure the socioeconomic level of the region, the percentage of high school graduates, the average amount of local taxes paid per person and the number of medical institutions per 10,000 people were calculated for 165 cities and counties. Due to the lack of specific information on the number of obstetrics and gynecologists by region, the overall number of medical institutions was used as an alternative measure. Regarding region of residence, we divided it into three categories: metropolitan, urban, and rural areas. Metropolitan areas include seven major cities, while urban areas include small and medium size cities. Rural areas include 84 counties.

As for religious prevalence, we used the number of Protestant churches, Catholic churches, and Buddhist temples per 10,000 people in the region. Number of churches and temples per 10,000 people may not be the best indicator of religious prevalence of the region, however. No specific information on the size and scale of churches and temples may also hamper an accurate understanding of regional prevalence of religion. In addition, for years 1994 and 2000, data on the proportion of people by religion in each region are not available either. Furthermore, it should be noted that available information on the proportion of people by religion relies on a respondent's subjective opinion, regardless of level of attendance at religious activities.

Although the main focus of this paper is an aggregate level of analysis, an individual level of analysis was also carried out. Drawing on the 2000 National Fertility Survey data, we examined whether or not and to what extent religion influences an individual's values and attitudes regarding son preference and abortion. In addition to religion, age, marital status, residence, educational attainment, and occupation were employed as independent variables at the individual level of analysis.

Methodology and results

In order to provide a general idea on the pattern of regional variations, this paper presents maps of sex ratios at birth by region and parity for 1994 and 2000. In Figure 3, the Youngnam region, composed of Pusan city, Taegu city, and the two provinces of Kyongnam and Kyongbuk, is indicated by dark colors, revealing high sex ratios at birth ranging from 106 to 147. In contrast, the Honam region, including

Figure 3.   Total Sex Ratio at Birth by Region, 1994

Figure 4.   Sex Ratio at Birth by Region and Parity, 1994

| Parity 1 | Parity 2 | Parity 3 and above |
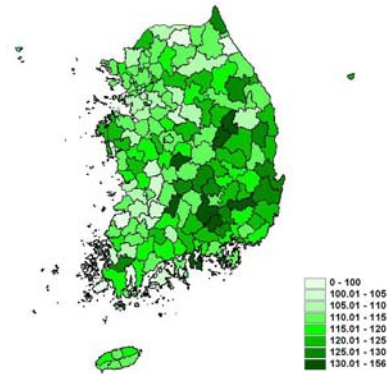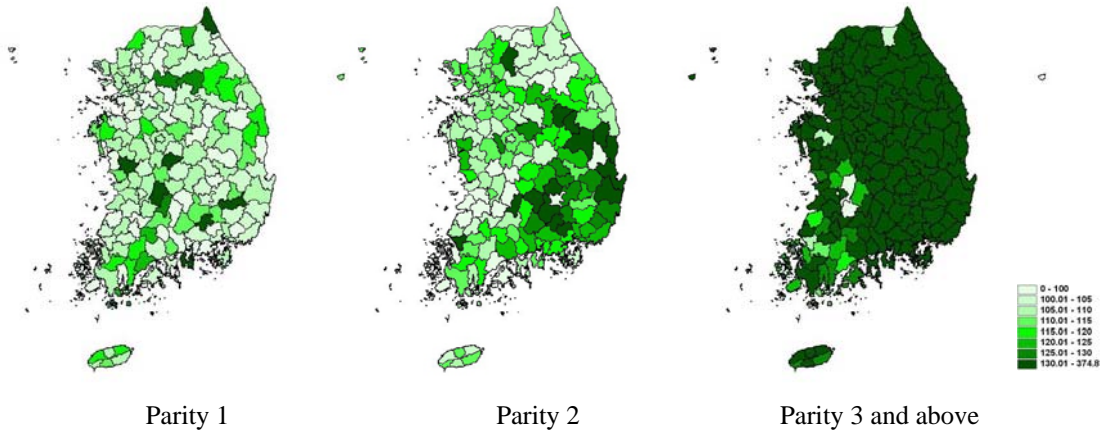
Kwangju city, Jeonnam province and Jeonbuk province, is indicated by light colors, suggesting relatively low sex ratios at birth.

As shown in Figure 4, sex ratio at birth becomes substantially higher and more widespread all over the nation as parity progresses. In 1994, sex ratio at birth for the first child was 106.0. It increased to 114.1 for the second child and reached 204.8 for the third child and above (KNSO, 1995a).

Figures 5 and 6 present maps of sex ratios at birth by region and by parity for 2000. Compared to 1994, the overall sex ratio at birth and sex ratios by region and by parity became substantially lower in 2000. The overall sex ratio at birth in 2000 was

Figure 5. Total Sex Ratio at Birth by Region, 2000
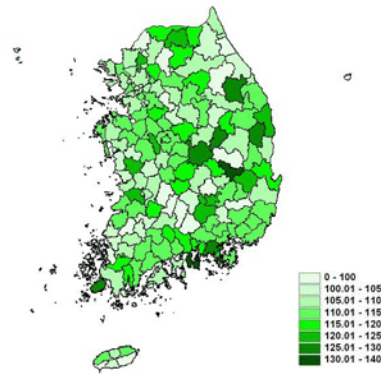
Figure 6. Sex Ratio at Birth by Region and Parity, 2000

| Parity 1 | Parity 2 | Parity 3 and above |
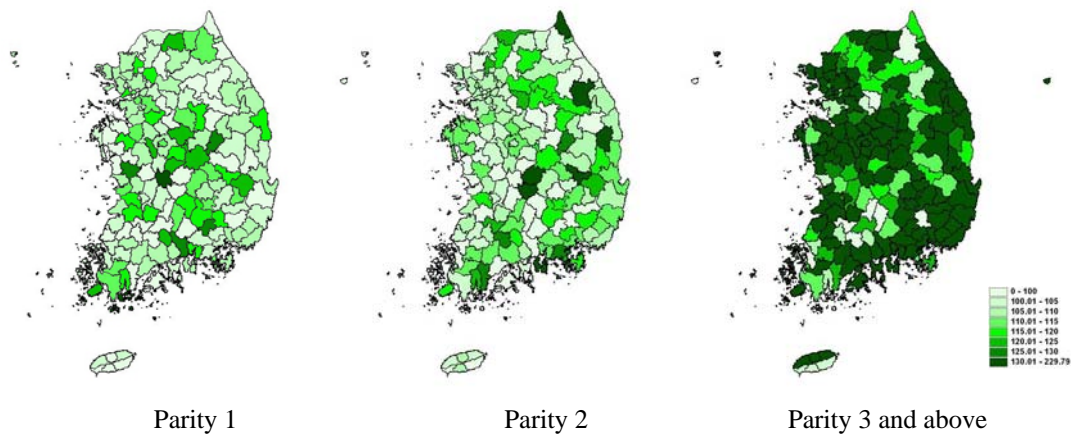
110.2. As the level of sex ratio decreases, differences by region and by parity also become less striking. While high sex ratios at birth for parity 2 are concentrated on the Youngnam region in 1994, the pattern turns out to be less distinct and less concentrated in 2000. Although the map still shows dark colors for parity 3 and above, it is much less dominant than in 1994.

In order to understand the general associations between various factors and sex ratio at birth by parity, an ANOVA was first carried out. Table 1 shows that, in 1994, sex ratios at birth for parity 2 or for parity 3 and above are significantly different

Table 1. Sex Ratios at Birth by Major Factors and Parity, 1994 and 2000

	1994				2000			
	Parity of women				Parity of women			
	1	2	3+	Total	1	2	3+	Total
Residence								
Metropolitan area	106.0	115.7	230.3	115.8	105.0	108.0	158.0	110.5
Urban area	105.4	113.2	207.6	115.0	106.4	107.5	145.7	110.5
Rural area	108.5	112.3	171.5	116.2	105.5	108.6	136.4	110.2
F Ratio	1.66	0.23	11.55**	0.41	0.18	0.13	3.38*	0.03
% of high school graduates								
Low	108.7	111.1	167.4	116.0	106.9	109.3	136.1	111.3
Medium	107.0	114.3	189.5	116.6	105.3	106.7	141.0	109.7
High	105.3	113.1	213.3	114.3	105.4	108.2	147.3	110.0
F ratio	1.43	0.76	10.66**	1.02	0.42	0.55	2.14	0.65
Local taxes paid per person								
Low	108.4	112.0	162.4	115.9	106.9	107.8	139.0	110.9
Medium	107.5	112.9	193.0	116.6	105.9	108.2	140.6	110.3
High	105.0	113.5	216.3	114.4	104.8	108.2	144.8	109.8
F ratio	1.43	0.17	15.86**	0.99	0.60	0.02	0.61	0.26
No. of medical institutions per 10,000 people								
Low	107.0	112.5	174.7	115.3	105.2	108.3	139.9	110.2
Medium	108.1	113.3	189.4	116.9	106.0	109.7	141.5	111.2
High	105.9	112.8	205.6	114.8	106.6	106.1	143.0	109.7
F ratio	0.59	0.04	4.61*	0.89	0.25	1.04	0.15	0.50
No. of Protestant churches per 10,000 people								
Low	104.7	117.6	222.7	116.7	105.9	108.1	146.7	110.3
Medium	107.2	112.2	184.4	115.9	106.1	105.9	143.7	110.2
High	109.0	108.8	163.1	114.4	105.8	110.1	134.0	110.5
F ratio	2.32	6.22**	20.47**	1.07	0.02	1.44	3.01	0.02
No. of Catholic churches per 10,000 people								
Low	105.8	112.5	212.8	115.0	105.8	108.1	148.7	110.7
Medium	106.6	116.6	193.4	117.5	106.1	109.0	136.5	110.3
High	108.5	109.4	164.8	114.5	105.8	107.1	139.0	110.1
F ratio	0.94	4.00*	12.01**	1.94	0.01	0.28	2.86	0.08
No. of Buddhist temples per 10,000 people								
Low	106.3	110.4	194.5	113.8	105.5	106.7	145.4	109.6
Medium	106.3	110.8	181.2	114.2	106.2	110.5	136.7	111.1
High	108.3	117.3	194.4	118.9	106.0	107.0	142.3	110.4
F ratio	0.67	4.77**	1.06	6.67**	0.07	1.39	1.29	0.49

Notes: *: $p < 0.05$; **: $p < 0.01$.

Table 2. Correlation Coefficients between Socioeconomic Factors, Religion, and Sex Ratios at Birth by Parity, 1994 and 2000

	1994 Sex ratios at birth				2000 Sex ratios at birth			
	Parity of women				Parity of women			
	1	2	3+	Total	1	2	3+	Total
% of high school graduates	-0.13	0.05	0.36**	-0.09	-0.03	-0.04	0.15	-0.06
Local taxes paid per person	-0.14	0.07	0.39**	-0.06	-0.09	-0.03	0.06	-0.09
No. of medical institutions per 10,000 people	-0.04	0.04	0.18*	-0.03	0.04	-0.08	0.00	-0.04
No. of Protestant churches per 10,000 people	0.09	-0.22**	-0.50**	-0.15	-0.05	-0.01	-0.19*	-0.07
No. of Catholic churches per 10,000 people	0.08	-0.12	-0.30**	-0.07	0.02	-0.05	-0.00	0.02
No. of Buddhist temples per 10,000 people	0.02	0.26**	0.08	0.28**	0.04	0.00	0.06	0.09

Notes: *: $p < 0.05$; **: $p < 0.01$.

according to the level of all factors employed. However, few show significant effects in 2000. Residence is the only variable that produces a significant difference in sex ratios at birth for parity 3 and above. Along with decreases in the level of sex ratio at birth, regional variations became substantially smaller in 2000 compared to 1994.

In general, both residence and socioeconomic level of region are found to be positively related to sex ratio at birth for parity 3 and above. In 1994, with minor exceptions, the prevalence of Protestant and Catholic churches reveals a negative relationship to sex ratio at birth, while Buddhism shows a positive relationship. The effects of Protestantism and Catholicism are statistically significant for parity 2 and for parity 3 and above, while those of Buddhism turn out to be significant only for parity 2.

Recognizing the presence of significant differences in sex ratio at birth according to socioeconomic factors and religion, we examined the correlation coefficients among these variables. Table 2 shows that, compared to 1994, statistical significance of correlation becomes weaker in 2000. In 1994, as parity rises, the percentage of high school graduates, the average amount of local taxes paid per person, and the number of medical institutions per 10,000 people are all positively related to sex ratio at birth, particularly showing statistical significance for parity 3 and above. However, in 2000, no socioeconomic factors reveal a significant relationship with sex ratio at birth.

In 1994, the prevalence of Protestant and Catholic churches is negatively related to sex ratio at birth. Statistical significances are noted for parity 2 and for parity 3 and above in the case of Protestant churches, whereas it is only noted for parity 3 and above in the case of Catholic churches. Buddhism is found to be positively related as hypothesized, although statistical significance is observed only for parity 2. In 2000, no correlation coefficients among variables are significant except the prevalence of Protestant churches. The prevalence of Protestant churches is negatively related to sex ratio at birth, significant only for parity 3 and above.

These descriptive statistics indicate that the socioeconomic factors and religion of region are related to sex ratio at birth, although the statistical significance of the effects may not be consistent. To clarify the independent effects of each factor on sex ratio at birth, regression analyses were carried out, and the results are presented in Tables 3 and 4. Both in 1994 and in 2000, for parity 3 and above, sex ratios at birth turned out to be higher in metropolitan and urban areas compared to rural areas. Among the socioeconomic factors, only the average amount of local taxes paid per person was significant for parity 3 and above in 1994. In 2000, the effects of the socioeconomic levels of the regions lost statistical significance.

Tables 5 and 6 show that religious factors, rather than the socioeconomic factors of the region, are more strongly associated with sex ratio at birth. As religion is included in the model, the effects of residence and of local taxes paid become insignificant in 1994. Instead, the number of medical institutions in the region is found to exert a negative effect on sex ratio at birth for parity 3 and above. It is contrary to our expectations and to the results observed from the ANOVA and correlation coefficients. The fact that the number of medical institutions was not specified by specialization may have caused the unexpected results. In 2000, the inclusion of religious factors does not change the pattern of residence effects.

Tables 5 and 6 indicate that religious factors are clearly related to sex ratio at birth in Korea. Protestantism consistently shows a negative relationship to sex ratio at birth, while Buddhism is positively related to sex ratio at birth. In 1994, for parity 2 and for parity 3 and above, the prevalence of Protestant churches had negative effects on sex ratio at birth, while that of Buddhist temples had positive effects. In 2000,

Table 3. Regression Analysis of Residential and Socioeconomic Factors Related to Sex Ratio at Birth by Parity, 1994

	Parity of Women							
	1		2		3+		Total	
	b	beta	b	beta	b	beta	b	Beta
Residence								
Metropolitan area	-3.46	-0.06	2.37	0.03	53.50	0.18*	0.05	0.00
Urban area	-2.98	-0.14	0.01	-0.00	24.49	0.22*	-0.60	-0.04
Socioeconomic Level								
% of high school graduates	-0.03	-0.03	-0.01	-0.01	0.74	0.12	-0.10	-0.10
Local taxes paid per person	-4.95	-0.10	4.62	0.07	64.99	0.25*	0.47	0.01
No. of medical institutions per 10,000 people	1.46	0.12	-0.13	-0.01	-12.22	-0.19	0.36	0.04
Constant	117.52		102.65		33.96		116.87	
R^2	0.03		0.01		0.19		0.01	
F ratio	1.05		0.18		7.62**		0.31	
No. of cases	165		165		165		165	

Notes: *: $p < 0.05$; **: $p < 0.01$.

Table 4. Regression Analysis of Residential and Socioeconomic Factors Related to Sex Ratio at Birth by Parity, 2000

	Parity of Women							
	1		2		3+		Total	
	b	beta	b	beta	b	beta	b	beta
Residence								
Metropolitan area	0.75	0.02	2.00	0.03	29.09	0.21*	2.96	0.08
Urban area	2.01	0.10	0.63	0.02	13.77	0.24*	2.28	0.14
Socioeconomic Level								
% of high school graduates	-0.01	-0.01	-0.43	-0.03	0.43	0.12	-0.05	-0.05
Local taxes paid per person	-7.84	-0.14	0.47	0.01	-16.17	-0.11	-4.55	-0.11
No. of medical institutions per 10,000 people	0.39	0.04	-1.17	-0.10	-4.61	-0.17	-0.58	-0.08
Constant	123.29		111.77		117.64		123.83	
R^2	0.02		0.01		0.07		0.02	
F ratio	0.62		0.25		2.30*		0.60	
No. of cases	165		165		165		165	

Notes: *: $p < 0.05$; **: $p < 0.01$.

Table 5. Regression Analysis of Factors Related to Sex Ratio at Birth by Parity, 1994

	Parity of Women							
	\multicolumn{2}{c}{1}		\multicolumn{2}{c}{2}	\multicolumn{2}{c}{3+}	\multicolumn{2}{c}{Total}
	b	beta	b	beta	b	beta	b	Beta
Residence								
Metropolitan area	-3.80	-0.07	1.49	0.02	39.86	0.14	-1.20	-0.03
Urban area	-3.03	-0.14	-1.81	-0.07	12.51	0.11	-2.03	-0.12
Socioeconomic Level								
% of high school graduates	-0.05	-0.04	0.15	0.10	1.22	0.19	-0.02	-0.02
Local taxes paid per person	-4.91	-0.10	-1.83	-0.03	32.19	0.12	-3.58	-0.09
No. of medical institutions per 10,000 people	1.43	0.11	0.13	0.01	-11.99	-0.19[*]	0.42	0.04
Religion								
No. of Protestant churches per 10,000 people	-0.03	-0.01	-0.76	-0.25[*]	-4.60	-0.37[**]	-0.52	-0.27[**]
No. of Catholic churches per 10,000 people	0.29	0.02	-1.79	-0.09	-6.02	-0.08	-1.27	-0.10
No. of Buddhist temples per 10,000 people	-0.18	-0.04	2.05	0.37[**]	6.75	0.30[**]	1.07	0.30[**]
Constant	118.67		114.95		128.60		127.02	
R^2	\multicolumn{2}{c}{0.03}		\multicolumn{2}{c}{0.16}	\multicolumn{2}{c}{0.36}	\multicolumn{2}{c}{0.15}
F ratio	\multicolumn{2}{c}{0.67}		\multicolumn{2}{c}{3.79[**]}	\multicolumn{2}{c}{11.11[**]}	\multicolumn{2}{c}{3.32[**]}
No. of cases	\multicolumn{2}{c}{165}		\multicolumn{2}{c}{165}	\multicolumn{2}{c}{165}	\multicolumn{2}{c}{165}

Notes: [*]: $p < 0.05$; [**]: $p < 0.01$.

Protestantism maintained negative effects but the effects were significant only for parity 3 and above. Although the effect of Buddhism lost statistical significance in 2000, the direction of the effects remained positive. In terms of the effects of Catholicism on sex ratio at birth, an unexpected relationship was found in 2000. The prevalence of Catholic churches revealed positive effects for parity 3 and above.

Considering that Buddhism unequivocally prohibits the taking of life of any living being, the positive relationship between Buddhism and sex ratio at birth is puzzling. Ling (1969) and Perret (2000) provided theoretical discussions on whether or not Buddhism plays any role in the widespread and tolerated practice of abortion in Asia. They pointed out that neither the explicit prohibition of abortion nor formal doctrine stating that life begins at the moment of conception exists in Buddhism. In contrast, Protestantism and Catholicism clearly state that the fetus is a living being

Table 6. Regression Analysis of Factors Related to Sex Ratio at Birth by Parity, 2000

	Parity of Women							
	1		2		3+		Total	
	b	beta	b	beta	b	beta	b	beta
Residence								
Metropolitan area	0.68	0.01	-0.56	-0.01	32.52	0.23[*]	2.38	0.06
Urban area	2.31	0.11	-0.98	-0.04	17.35	0.30[**]	2.26	0.14
Socioeconomic Level								
% of high school graduates	0.01	0.01	-0.12	-0.07	0.71	0.19	-0.04	-0.03
Local taxes paid per person	-9.85	-0.18	-0.88	-0.01	-25.05	-0.17	-7.08	-0.17
No. of medical institutions per 10,000 people	0.22	0.02	-1.55	-0.13	-4.68	-0.18	-0.82	-0.11
Religion								
No. of Protestant churches per 10,000 people	-0.27	-0.14	-0.13	-0.05	-1.28	-0.24[*]	-0.33	-0.23
No. of Catholic churches per 10,000 people	1.40	0.10	-1.91	-0.10	8.80	0.22[*]	1.06	0.10
No. of Buddhist temples per 10,000 people	0.12	0.04	-0.24	-0.06	1.53	0.19	0.13	0.06
Constant	129.80		123.68		191.35		133.20	
R^2	0.03		0.02		0.14		0.05	
F ratio	0.67		0.41		3.18[**]		0.98	
No. of cases	165		165		165		165	

Notes: [*]: $p < 0.05$; [**]: $p < 0.01$.

from the point of conception (Perret, 2000; Petersen, 2001).[1]

It is hypothesized in this study that a clear statement against abortion in formal doctrine plays a symbolic role in influencing people's values. Based on belief in reincarnation, Buddhism considers that if the fetus is aborted, it is not meant to be born in the current world and can be born in the next life. Although Buddhism neither encourages nor approves of abortion, it reacts to abortion in a passive manner. Facing blame for its ambiguous position on abortion, Buddhism in Korea has recently attempted to manifest opposition to it. However, compared to Protestantism and Catholicism, Buddhism does not take a strong position against abortion (Kim, 2004).

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[1] In western countries, Catholicism is strongly associated with anti-abortion activities, while Protestantism has different perspectives on abortion from liberal to conservative. However, both Catholicism and Protestantism in Korea hold positions against abortion at a lower degree.

Perret (2000) argued that the passive reaction of Buddhism to abortion is due to Buddhism's dual commitment, on the one hand, to refrain from killing living things, and, on the other hand, to expressing compassion for the pregnant woman. The dual commitment in Buddhism reflects conflicting positions between pro–life and pro–choice. To accommodate these alternative perspectives, Buddhism in Japan performs a ritual, which is called the *mizuko kuyo*. The purpose of the ritual is to acknowledge the mother's guilt and to improve the karmic situation of the aborted fetus. Buddhism in Korea recently started holding a similar ritual to comfort both the mother and the aborted fetus.

Even if the doctrine of Buddhism strongly opposes abortion, the direct influence of it on people's values and behaviors is likely to be weak, compared to Protestantism. Petersen (2001) argued that the effective conveyance of religious doctrine depends on a social network among believers in each religious body. In Korea, Protestantism arranges diverse group activities besides Sunday services. By applying Korean people's collectivism to religious activities, group prayer meetings, bible studies, and other socializing activities are organized. Through these group activities, social networks among Protestants are tightly formed and the doctrine of Protestantism is more effectively conveyed.

In contrast, the religious activities of Buddhism are relatively individual and loosely organized. Emphasis on self–discipline and meditation in Buddhism indicates its personal features. Compared to Protestants, Buddhists tend to participate less actively in religious ceremonies. The difference may be partly due to the location of churches and temples. Most Buddhist temples are located in remote areas or mountainous regions. In contrast, Protestant churches are spread out all over the country, and are particularly concentrated in cities and towns.

Another plausible explanation for the positive relationship between Buddhism and sex ratio at birth is that Buddhism has relatively less conflict with traditional Confucian values than Protestantism. Based on the Ten Commandments, Protestantism is strongly opposed to the ancestor worship ceremony. Compared to Protestantism, Buddhism is more likely to respect Confucian traditions and the ancestor worship ceremony. Respecting Confucian tradition can be translated into

acceptance of patriarchal tradition, which may subsequently lead to son preference values. It should be noted that Buddhism neither encourages nor supports son preference and other Confucian values. However, no strong opposition to it grants leeway to people.

To strengthen our findings at the aggregate level that religion exerts significant effects on sex ratio at birth, micro-level analyses were also conducted in this study. It was assumed that regional variations in sex ratio at birth reflect people's values and attitudes toward son preference and abortion in each region, and that religion may influence these values and attitudes. Using the 2000 National Fertility Survey data, a binary logit analysis of factors related to son preference[2] was conducted. Respondent's age, marital status, residence, educational attainment, occupation, and religion were introduced as independent variables in our analysis.

Table 7 shows that those in their thirties are more likely than those who are over sixty to oppose son preference. Compared to the currently married, those who are divorced, separated or widowed tend to have negative opinions on son preference. Those who live in metropolitan areas and other cities are more likely than those who live in rural areas to oppose son preference. As for the effects of occupation, professionals and semi–professionals do not reveal strong son preference. In contrast, those who work as farmers, fishermen, or manual workers tend to have strong son preference. Regarding the effects of religion, Buddhists are more likely than those who have no religion to favor the opinion on son preference. However, being Protestant or Catholic does not show a significant effect on people's values toward son preference.

Given that son preference is rooted in traditional Confucian values, most results of our analyses are understandable. Those who hold conservative values and those who do work that requires hard labor tend to favor son preference. The effects of religion, however, are not consistent with the results of our analyses at the regional

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[2] Son preference was measured by a respondent's opinion on the following statement, "couples should have at least one son." Suggested answers were "strongly disagree," "disagree," "agree," "strongly agree," and "don't know." By grouping these five types of answers into two categories, "agree" versus "disagree," the dependent variable of this analysis became binary. A few answers of "don't know" were grouped into the "disagree" category.

Table 7.   Binary Logit Analysis of Factors Related to Son Preference, 2000

	b
Age	
20-29	-0.21
30-39	-0.24[*]
40-49	-0.14
50-59	0.02
(reference: 60-64)	
Non-married[#]	-0.17[*]
(reference: currently married)	
Residence	
Metropolitan area	-0.42[**]
Urban area	-0.36[**]
(reference: rural area)	
Educational attainment	
High school	-0.04
College	-0.17
University	-0.13
(reference: middle school and lower)	
Occupation	
Professional worker	-0.39[*]
Semi-professional worker	-0.61[**]
Farmer, Fisherman, etc	1.05[**]
Service worker	-0.08
Manual worker	0.21[*]
(reference: housewife, retired employee, non-paid family employee, and others)	
Religion	
Protestant	0.09
Catholic	0.12
Buddhist	0.51[**]
(reference: no religion)	
No. of cases	7,208
Likelihood ratio	420.71[**]

Notes: 1) [*]: $p < 0.05$; [**]: $p < 0.01$.

  2) [#]: Non-married includes divorced, separated, and widowed.

level. Although Buddhists are found to have a stronger son preference, affiliation with other religions does not show significant effects. It can be possibly attributed to the lack of information on frequency of attendance at religious activities or on the importance of religion in life. Self-reported religious affiliation does not always correspond to religiosity.

In this study, a multinomial logistic regression analysis was conducted to find the major factors related to the individual's attitudes toward abortion.[3] Table 8

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[3] Attitudes toward abortion was measured by a respondent's opinion on the following question, "what do you think about having an abortion after knowing that it would be a girl?" Answers were "strongly

Table 8. Multinomial Logistic Regression Analysis of Factors Related to Abortion, 2000

	(Disagree vs. Agree)	(Neutral vs. Agree)
Age		
20-29	0.45	0.43
30-39	0.22	0.33
40-49	0.21	0.30
50-59	0.23	0.24
(reference: 60-64)		
Non-married[#]	-0.09	-0.20
(reference: currently married)		
Residence		
Metropolitan area	-0.27	-0.14
Urban area	-0.33	-0.29
(reference: rural area)		
Educational attainment		
High school	-0.04	-0.20
College	0.04	0.16
University	-0.19	-0.33
(reference: middle school and lower)		
Occupation		
Professional worker	1.90	1.70
Semi-professional worker	0.97	1.09
Farmer, Fisherman, etc	-0.26	-0.32
Service worker	-0.04	-0.12
Manual worker	-0.16	-0.38
(reference: housewife, retired employee, non-paid family employee, and others)		
Religion		
Protestant	0.65[**]	0.23
Catholic	0.64[**]	-0.04
Buddhist	-0.23	-0.38[**]
(reference: no religion)		
No. of cases	7,204	7,204

Notes: 1) [*]: $p < 0.05$; [**]: $p < 0.01$.

2) [#]: Non-married includes divorced, separated, and widowed.

reveals that none of the factors except religion exert a significant effect on the individual's attitudes toward abortion. Those who have religion tend to oppose abortion compared to those who have no religion, although the degree of opposition may differ by religion. Buddhism shows different effects from both Protestantism and Catholicism. Protestants and Catholics are more likely than those who have no religion to disagree with the statement on abortion. Buddhists are less likely to hold a

disagree," "disagree," "neither disagree nor agree," "agree," "strongly agree," and "never thought about it or don't know." For multinomial logistic regression analysis, answers were grouped into three categories: "disagree," "agree," and "neutral." Answers of "neither disagree nor agree" and "never

neutral position on abortion than those without religion.

It can be concluded that the effects of religion on an individual's values and attitudes are not observed as being as distinct as those of religion on regional variations in sex ratio at birth. The inconsistency may be due to different units of analysis. Micro-level analyses included those who have no religion as a reference group and made a comparison between religious people and non-religious people. In contrast, analyses at the regional level measured prevalence of religion for each region using the number of churches or temples per 10,000 people. Thus, the prevalence of religion did not reflect how many residents in each region did not have religion. Therefore, the regional level of analysis may have ignored those who have no religion and highlighted the effects of religious factors.

However, the analysis of regional variations in sex ratio at birth suggests that Protestantism is negatively associated with sex ratio at birth, whereas Buddhism is positively associated. A consistent finding from the individual and regional level of analysis is that Buddhists tend to favor son preference and are less likely to hold a neutral perspective on abortion.

Concluding Remarks

In the second half of the 1980s and the early 1990s, sex ratios at birth rose markedly in Korea as people could not adjust their reproductive behavior to meet the new conditions of low fertility and a changed social environment. Distortions in sex ratio at birth have been most serious in the Youngnam region, while sex ratios have been relatively low in the Honam region.

The main purpose of this study is to develop explanations for high sex ratio at birth and its regional variations in Korea. As major determinants of sex ratio at the regional level, this study employs prevalence of religion as well as residential and socioeconomic factors. Micro-data from vital statistics, household registration data, various reports on regional statistics for years 1994 and 2000, and the 2000 National Fertility Survey data were used in this study.

thought about it or don't know" were grouped into the "neutral" category.

This paper first presents maps of sex ratio at birth by parity for 165 "Si" and "Gun" for years 1994 and 2000. The maps reveal a general pattern where sex ratio at birth becomes substantially lower in 2000 than in 1994, and that sex ratio increases as parity progresses.

Findings from ANOVA and regression analyses at the regional level suggest that religion has stronger effects than socioeconomic factors on regional variations in sex ratio at birth. Buddhism is found to have a positive relationship with sex ratio at birth, while the prevalence of Protestant and Catholic churches is negatively associated with sex ratio at birth. Yet, the effects of religion are weaker in 2000 than in 1994, because the overall level of the sex ratio decreased in 2000. Sex ratios at birth are also found to be higher in metropolitan and urban areas than those in rural areas, and the socioeconomic level of the region shows a positive relationship to sex ratio at birth.

In an effort to generalize the effects of religion on sex-selective reproductive behavior and sex ratio at birth, this study expanded its research scope from the regional level to the individual level of analysis. It was assumed that religion affects the individual's values and attitudes toward son preference and abortion.

The results of the logit analysis and multinomial logistic regression analysis at the individual level suggest that Buddhism is positively related to son preference. Both Protestants and Catholics are more likely than those who have no religion to oppose abortion. However, the effects of religion on the values and attitudes of individuals were found to be diluted, compared to the results of the analysis at the regional level.

Based on the findings, this paper provides explanations for why religion exerts different effects on sex ratio at birth. Given that son preference, which is rooted in Confucian values, is related to high sex ratio at birth, the compatibility of each religion with Confucianism provides part of the explanation. Buddhism is more compatible with Confucianism than Protestantism. For example, Buddhism respects the tradition of the ancestor worship ceremony, whereas Protestantism is strongly against it. Traditionally, only sons can perform the ancestor worship ceremony, and respect for this tradition implicitly approves of son preference.

As for each religion's stand on abortion, Buddhism does not actively manifest its position toward abortion. It is apparent that Buddhism encourages neither son preference nor abortion. However, Buddhism also shows neither strong opposition nor active involvement with social movements against abortion, while the doctrine of Protestantism specifies that abortion is the same as murder. Belief in reincarnation and dual commitment of compassion for the aborted fetus and the mother in Buddhism results in a moral dilemma and weaker opposition toward abortion. Even if the doctrine of Buddhism states its opposition to abortion, it is less likely than Protestantism to be effectively conveyed. Compared to Protestantism, the religious activities of Buddhism are more individual and less tightly organized.

It should be noted that this study has a few limitations in the data. By employing the administrative region as a unit of analysis, the prevalence of religion was measured by the number of religious churches and temples per 10,000 people in the region without counting their size or scale. Due to the unavailability of information on medical institutions with obstetrics and gynecology departments, the variable of medical institutions adopted in the regional level of analysis included private clinics, general hospitals, and public health centers. Some of these medical institutions might be less closely associated with sex ratio at birth. The micro-level analysis of this study also suffered from a lack of information on the frequency of attendance with regards to religious activities or degree of religiosity.

Despite these limitations, based on the regional and individual levels of analysis, it can be concluded that religion is an important factor in explaining the high sex ratio at birth and sex-selective reproductive behavior in Korea. It is not our intention to be judgmental or criticize a certain religion because of its association with sex ratio at birth or its stand on abortion. Rather, we attempt to provide explanations for high sex ratio at birth and its regional variations, and adopted religion as an important cultural determinant. Further research on the effects of religion, in particular Buddhism, in other Asian countries may contribute to enhancing our understanding on the causal mechanisms of sex ratio at birth and sex-selective reproductive behavior.

References

Bélanger, Danièle, Thi Hai Oanh Khuat, Jianye Liu, Thanh Thuy Le and Viet Thanh Pham. 2003. "Are Sex Ratios at Birth Increasing in Vietnam?" *Population (English Edition)* 58(2): 231-250. Paris: Institut National D'études Démographiques.

Cho, Nam-Hoon, Moon-Sik Hong, and Il-Hyun Kim. 1994. "Effects of Induced Abortion and Son Preference on the Imbalance of Sex Ratio in Korea." *The Journal of the Population Association of Korea* 17(2): 77-97.

Chung, Chang Soo and Sin Yeol Kim. 1993. "Regional Differentials in Prevalence of Religious People in Korea: A Sociological Perspective" (in Korean). *Korean Journal of Sociology* 27: 117-151.

Das Gupta, M. 1999. "Gender Bias in China, South Korea and India 1920-1990." *Development and Change* 30: 619-652.

Eun, Ki-Soo. 2002. "Effects of Religion on Attitudes toward Abortion: A Comparative Study on the World Value Survey." *Journal of Research on Culture* 25(2): 55-82.

Goodkind, Daniel. 1996. "On Substituting Sex Preference Strategies in East Asia: Does Prenatal Sex Selection Reduce Postnatal Discrimination?" *Population and Development Review* 22(1): 111-125.

KIHASA. 2000. *2000 National Fertility Survey.* Seoul: Korea Institute of Health and Social Affairs.

Kim, Doo-Sub. 1997. "Son Preference of Koreans and the Regional Differences in the Sex Ratio at Birth: Evidence from Korea and Jilin Province, China." In Doo-Sub Kim and Barbara Anderson (eds.). *Population Process and Dynamics: For Koreans in Korea and China.* Seoul: Hanyang University Press.

_____. 2004a. "Le déficit de filles en Corée du Sud: évolution, niveaux et variations régionales." *Population* 59(6): 983-998. Paris: Institut National D'études Démographiques.

_____. 2004b. "Missing Girls in South Korea: Trends, Levels and Regional Variations." *Population (English edition)* 59(6): 865-878. Paris: Institut National D'études Démographiques.

Kim, Mi-Ok. 2004. "Religion and Regional Differentials in Sex Ratio at Birth" (in Korean). Unpublished Master's Thesis. Seoul: Hanyang University.

KNSO. 1994. *Household Registration Data.* Daejeon: Korea National Statistical Office.

_____. 1995a. *Vital Statistics Yearbook, 1994.* Daejeon: Korea National Statistical Office.

_____. 1995b. *Major Statistics by County, 1994.* Daejeon: Korea National Statistical Office.

_____. 2000. *Household Registration Data.* Daejeon: Korea National Statistical Office.

_____. 2001a. *Vital Statistics Yearbook, 2000.* Daejeon: Korea National Statistical Office.

_____. 2001b. *Major Statistics by County, 2000.* Daejeon: Korea National Statistical

Office.

_____. 2005. *Korean Statistical Information System (KOSIS).* On-Line Statistics Database. Daejeon: Korea National Statistical Office. http://kosis.nso.go.kr/.

Ling, T. O. 1969. "Buddhist Factors in Population Growth and Control: A Survey Based on Thailand and Ceylon." *Population Studies* 23(1): 53-60.

Oh, Jin Tak. 2003. "How Buddhism Perceives Abortion" (in Korean). *Buddhism and Culture* 51: 120-132.

Oh, Sun Joo. 1993. "Religion, Women's Participation in Economic Activities, Son Preference, and Practicing Abortion" (in Korean). *Journal of Korean Family* 5: 43-60.

Park, Chai Bin and Nam-Hoon Cho. 1995. "Consequences of Son Preference in a Low-Fertility Society: Imbalance of the Sex Ratio at Birth in Korea." *Population and Development Review* 21(1): 59-84.

Perret, Roy W. 2000. "Buddhism, Abortion and the Middle Way." *Asian Philosophy* 10(2): 101-114.

Petersen, Larry R. 2001. "Religion, Plausibility Structures, and Education's Effect on Attitudes toward Elective Abortion." *Journal for the Scientific Study of Religion* 40(2): 187-203.

Roy, Krishna. 1994. "Socio-Cultural Factors and Sex Preference for Children in South and East Asian Countries: A Review of Selected Studies." Presented at the Symposium on Issues Related to Sex Preference for Children in the Rapidly Changing Demographic Dynamics in Asia. Seoul: UNFPA and Korea Institute of Health and Social Affairs.

Strickler, Jennifer and Nicholas L. Danigelis. 2002. "Changing Frameworks in Attitudes toward Abortion." *Sociological Forum* 17(2): 187-201.

Sullins, D. Paul. 1999. "Catholic/Protestant Trends on Abortion: Convergence and Polarity." *Journal for Scientific Study of Religion* 38(3): 354-369.

Yoo, Seung Hee. 2003. "How Catholicism and Protestantism Deal with Abortion." *Buddhism and Culture* 51: 103-117.