

Premarital Pregnancy and Subsequent Childbirth in Korea: Evidence from the Korean Longitudinal Survey of Women and Families*

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This study examines the relationship between premarital pregnancy, which has more than tripled over the past two decades, and second and third childbirth. Though premarital pregnancy has been reported to increase the preterm birth and elevate the risk of low birth weight, systematic research on this phenomenon is still lacking. In order to overcome the limitations of previous research, the present study analyzed the time taken until the birth of the second and third children using the first through sixth wave of the Korean Longitudinal Survey of Women and Families and the Cox regression analysis model. Results indicated that premarital pregnancy increased the hazard of second child birth by 13.3% compared to post-marital pregnancy. However, premarital pregnancy does not show a significant effect on the risk of birth of the third child. The trivial effect of premarital pregnancy on the hazard of birth of the third child might be related to that only women who have already undergone two successful pregnancies are at risk of having a third child. On the other hand, premarital pregnancy is more likely to be observed among women with low educational attainment and in young ages than among women with higher education and in older ages, and this may exacerbate social inequality over the long term.

Keywords: Premarital pregnancy, second birth, third birth, KLoWF, Cox regression

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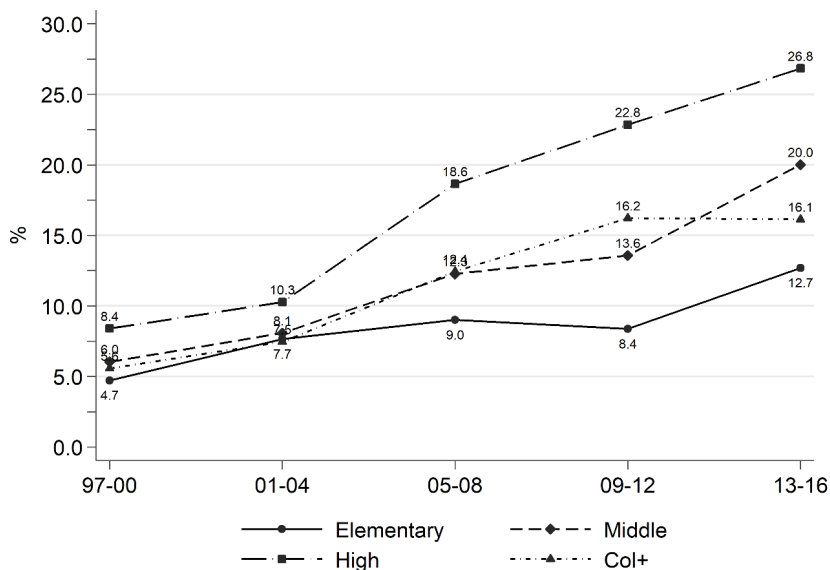
Introduction

Korean society has achieved unprecedented economic growth over the past few decades, and at the same time, many aspects of society have undergone tremendous changes. There have been many changes in such areas as marriage, childbirth, childcare, etc., which have traditionally been regarded as private sphere. One of the most significant transformations is the rapid decline in fertility rates, which reached the lowest level in the world in 2016 with total fertility rate (TFR) of 1.17. This ultra-low fertility rate will lead to a decrease in the number of population in working ages and an increase in the dependency rate of the elderly in the long term, which not only erodes the economic growth potential but also induces social conflicts due to an enormous increase in social security burden.

Though the persistence of this lowest-low fertility rate may have many causes, the steady rise of the age at first marriage is certainly one of the main determinants (K. Kim 2017a). For instance, in 1990, the average age at first marriage was 24.8 years for women and 27.8 years for men, but it has continued to rise since then, with women reaching 30.0 years and men at 32.8 years in 2015. The age at first marriage increased by about 5 years in both men and women in two and half decades. At the same time, as the age of first marriage increases, age at first sexual initiation has also declined rapidly (H. S. Kim 2016). According to the “Online Survey of Youth Health Behavior” in 2015, about 7.0% of male students and 2.8% of female students attending middle and high school ever had experienced sexual intercourse whereas, according to the same survey conducted in 2005, only 4.8% of all adolescents had the same experience. Moreover, the age of first sexual experience among students of middle and high school has gradually decreased over time. The first sexual experience age was 13.6 years in 2005, but fell to below age 13 in 2015.

With the rapid rise of the age of first marriage and the spread of liberal sexual consciousness, on average, the likelihood of having sexual intercourse before the marriage is increasing. In other words, the young women in childbearing age are more likely to be exposed to periodic sexual contact before the marriage than in the past, which may result in the increase in the likelihood of premarital pregnancy. Trends in the prevalence of premarital pregnancy by mother’s educational attainment over the past two decades are presented in Figure 1.¹ Following England, Shafer and Wu (2012), premarital

¹ This graph was drawn using the microdata of birth registration, available at the Korea Statistics



SOURCE.—Vital statistics 1997-2016

NOTE.—Elementary refers to elementary school or less education, middle refers to middle school education, high refers to high school graduates, and col+ denotes college (including junior college or vocational college) or above education. Births are limited to first child (i.e., parity one) to the mother.

FIG. 1.—Percent Distribution of Women Who Had a Premarital Conception by Educational Attainment and Periods in Korea

pregnancy was determined based on the time of childbirth and marriage of women. If the childbirth occurred within 7 months after marriage, the pregnancy was defined as a premarital pregnancy. However, it did not include cases where the birth was completed before legal marriage (i.e., premarital birth). Results indicated that, overall, the proportion of births due to premarital pregnancy has increased by about two and half times since the 1990s. That is, while 7.7% of all first births (i.e., parity one) in 1997 were premaritally conceived, it increased to 18.3% in 2016. Hence, about one in

Bureau, between 1997 and 2016. During this period, 9,991,831 births were registered in total. The periods were grouped into 5 four-year intervals instead of one year and mean values were calculated within each period for concise presentation. The proportion of premarital pregnancy can increase if the composition of the second or higher order births decreases (i.e., as the fertility declines), since premarital conception can occur only for the first births by the definition in the current study. Thus, we restricted the sample to all first births when calculating the proportion of premarital birth within each educational level.

five or six babies born in the most recent years are conceived before their parents' wedding date. In light of the progress made so far, the proportion of such premarital pregnancies is expected to increase steadily (K. Kim 2017b).

Percent distribution of premarital pregnancy by mother's educational attainment suggested, however, that the experience of premarital pregnancy is not dispersed uniformly across social strata, as found in the U.S. or Western Europe (e.g., England, Shafer and Wu 2012). More specifically, although the proportion of premarital pregnancy is increasing at all educational levels over the past two decades, the rate of increase is particularly pronounced among women with middle and high school education compared to women with college education. For instance, the fraction of premarital pregnancy among first children born to women with high school education increased from 8.4% in 1997-2000 to 26.8% in 2013-2016, and in case of mothers with middle school education, it increased from 6.0% to 20.0% during the same periods.

Also, results suggested that, unlike England, Shafer and Wu (2012), who found a negative correlation between educational attainment and the prevalence of premarital pregnancy in the U.S., somewhat different patterns are observed in Korea. That is, women with a high school education is most likely to get pregnant premaritally, whereas the least educated women, who had the greatest likelihood of experiencing premarital pregnancy showed the lowest level of premarital pregnancy in Korea. As a result, the association between educational attainment and the probability of premarital pregnancy shows an inverted U-shape in Korea, contrary to a linear and negative pattern in the U.S. Although the difference in the likelihood of premarital pregnancy by women's educational attainment between the two countries might be attributable to the disparity in the prevalence of cohabitation, other factors, such as racial composition, socioeconomic structure, or culture, are also likely to play.²

More serious is the growing gap in the prevalence of premarital pregnancy by educational level. In the period of 1997-2000, the difference the proportion of premarital pregnancy between college graduates and high school graduates was only 2.8 percentage points. But the difference between the two groups rose to 10.7 percentage points in 2013-2016. The growing disparity in the propensity of premarital pregnancy among educational groups may reflect the diverging socioeconomic conditions by demographic

² According to England, Shafer and Wu (2012), in the U.S., the level of education of women and race (especially black women) are very closely related, and there is a similar tendency for each race.

behaviors (K. Kim 2014). As a result of the dramatic increase in the college enrollment rate among females over the past several decades (K. Kim 2017a), many women are getting more than college education, and women with less than high school education are increasingly socially and economically marginalized. Assuming that there is no significant difference in the frequency of sexual contacts between college graduates and those with lower education levels, the difference in premarital pregnancy by educational attainment might be attributable to the disparities in socioeconomic resources or information. According to Kim Choe and Kim (2007), although reliable estimation cannot be made due to data limitations, more than 90% of premarital pregnancies end in induced abortion in Korea. Given that women must have some resources and information to get an abortion, other things being equal, women with higher education are more likely to terminate an unwanted or unplanned pregnancy compared with their less educated counterparts. Alternatively, due to the positive association between educational attainment and adherence to social desirability (e.g., Heerwig and McCabe 2009), it is possible that women with higher level of socioeconomic resources may be more sensitive to social stigma that is attached to premarital pregnancy compared with those who have less such resources.

Despite the widening gap in the prevalence of prenatal pregnancies among social strata, research on this phenomenon has been limited. However, a small number of studies have found that premarital pregnancy is not merely an unexpected or slightly mistimed pregnancy, but has a significant impact. For example, Lee et al. (2014) reported that premarital pregnancy increased the probability of preterm delivery by 45% and elevated the probability of giving birth to a baby with low birth weight by 66%. And they argued that premarital pregnancy could be a serious risk factor for infants' health. Furthermore, Raymo and Iwasawa (2008) found that brides who become pregnant before their marriage are significantly more likely to marry husbands who are substantially different from themselves in terms of their education attainment compared to those who are not pregnant before marriage. Since married couples with similar educational backgrounds tend to be less likely to experience marital dissolution than those with different socioeconomic backgrounds (Moore and Waite 1981), it is possible that marriage to husbands with very different characteristics due to premarital pregnancy may lead to a decline marital stability over the long term.

The present study explores the relationship between the premarital pregnancy and the timing of the second and third child birth, which may

have a significant effect on the whole family life in the long term. S. Kim (2016), which examined the relationship between premarital conception and transition to second childbirth using the 2006 National Survey on Fertility, Family Health, and Welfare showed that, net of all other factors, women who experienced premarital pregnancy are significantly more likely to give birth to a second child than those who did not experience it. Although it is possible that the effect of premarital pregnancy on the likelihood of third childbirth might be different, she did not examine it. In addition, her study failed to account for the effect of family environment that women were exposed while they grew up. Parents' socioeconomic conditions, sibling constellation, or parents' control during women's adolescence may have a significant influence on the timing of transition to motherhood as well as subsequent births (K. Kim 2015; K. Kim 2017b). In order to overcome the limitations of previous studies, the current study uses the panel data of women's families to examine the relationship between the premarital pregnancy and the second child as well as the third child birth. In doing so, the characteristics of women's family of origin that can have a significant impact on the fertility behavior of women are also considered.

Data and Method

Data

This study draws data from the 1st to 6th wave of the Korean Longitudinal Survey of Women and Families (KLoWF), which is established and maintained by the Korea Women's Development Institute. The KLoWF is a large-scale longitudinal survey of women aged 19 through 64, and the first survey was administered in 2007. It mainly focuses on changes in economic activities, change in job characteristics, and changes in family relations and structure throughout women's life cycles (Joo et al. 2014). The KLoWF sampled 9,997 respondents in the first wave in 2007, and a total of 7,464 respondents responded to the 5th wave in 2014, and the original sample retention rate was 74.6% (Joo 2013).

In this study, the main analytic sample was comprised of 11,606 respondents and was constructed by appending newly added individuals from the second through sixth wave to the first wave personal data (9,997 individuals in the first wave, 302 newly added respondents in the second wave, 376 in the third wave, 317 in the fourth wave, 281 in the fifth wave, and

333 in the sixth wave).³

After listwise deletion (i.e., only cases that do not contain any missing data for any of the variables are included in the analysis), the final data was consisted of 3,871 and 3,143 women in the second childbirth and third childbirth models, respectively. In the model for second birth, only the women who experienced first childbirth were included, and the model for third childbirth included only the women who experienced second childbirth. In addition, the model for second childbirth included the sex of the first child while the model for third childbirth utilized the sex composition of first two children.

Measures

In the present analysis, two dependent variables were used. The first is the time from the birth of the first child to the birth of the second one. The second dependent variable is the time from the birth of the second child to the birth of the third. In the KLoWF, the year and month of each childbirth are reported by the respondent, and, using this information, the timing of birth of each child was converted to a century month, which counted each birth intervals in months from January 1900.

In this study, the following variables were used to estimate the transition to the second and third child births. First, as used in K. Kim (2017b), premarital pregnancy was determined based on the timing of the first birth and marriage of a woman.⁴ In other words, if the childbirth occurred within 7

³ The KLoWF did not provide an identifier that can track down a particular respondent throughout the waves. That is, from the second to the sixth wave, new samples were added to the existing respondents, and the KLoWF assigned new id numbers to all respondents (i.e., existing sample and newly added sample). As a result, it is not possible to follow up a particular respondent from the first wave to the last one. The analytic sample in the current study was constructed by combining respondents in the first wave and those who were newly added at each wave. By doing so, we might lose information on marital and fertility histories that occurred in the second through sixth wave of the KLoWF. However, given respondents' age composition in the first wave, it is unlikely that sample selection may alter our main findings. Furthermore, we drew dates of marriage and childbirths from women who were included in the sample, and, thus, we were able to reconstruct women's life histories and our data is longitudinal in nature though the information was drawn from a single point in time.

⁴ Pregnancy can be terminated by live birth, induced abortion, or still birth, and premarital pregnancy is widely used to refer to all pregnancies that may end in any of those forms. By constructing the date of conception from the reported date of childbirth, the present study considers only those pregnancies that end in live birth. In this sense, premarital conception may be a more accurate term than premarital pregnancy. Nonetheless, this study used premarital pregnancy rather than premarital conception by following the convention in this field of research (see e.g., England et

months after marriage, the pregnancy was defined as a premarital pregnancy.⁵ It should be noted, however, that premarital birth (i.e., births that occurred before wedding date) was not included in the analyses.

A number of previous studies have shown that age at first marriage has a significant effect on the timing of childbirth (Billari and Kohler 2004). It is mainly associated with the fact that, in general, the risk of pregnancy increases after marriage due to frequent and regular sexual contact (K. Kim 2014). Therefore, if all other things being equal, the earlier a woman starts a marriage, the sooner she will be able to give birth to a first child, and, as a result, the more children she will have eventually. In order to account for these influences, this study used the age at first marriage as a continuous variable.

The socioeconomic status of women was measured by educational attainment and the occupation at the first marriage. The educational attainment is based on the years of schooling and is divided into five categories: elementary school, middle school, high school, some college (e.g., technical and vocational college), and college graduate (i.e., 4-year university graduates or above). Respondent's occupation at the time of the first marriage was divided into eight categories: managers, professionals and related workers; clerks; service workers; sales workers; skilled agricultural, forestry and fishery workers; craft and related trades workers; equipment, machine operating and assembling workers; and elementary workers.⁶ The socioeconomic characteristics of the husband were measured with the educational attainment, and the category is the same as that of the woman.⁷

al. 2012).

⁵ Note that this is only an approximation because we were not able to distinguish between premature births that were conceived after marriage but occurred within 7 months of marriage and premarital pregnancy. In addition, it is possible that there might be some systematic misreporting of the months in which respondents married and gave birth to their first child. Nonetheless, using alternative definition of premarital pregnancy, e.g., births occurring within the first 8 months of marriage, did not alter our main conclusions.

⁶ Note that, by including occupation at the time of first marriage, women who were not working might be excluded from the current analysis. Given small proportion of women without any work experience before their first marriage, our main conclusions might not be substantially altered by including those without any occupation at the time of marriage.

⁷ In theory, information about a husband is not time-invariant. Thus, it would be more accurate to measure the characteristics of a husband at times at each birth. However, the characteristics of husbands were not measured by marriage in the KLoWF. Owing to KLoWF data structure, husband's information is likely to be about the first husband (i.e., the first child's biological father), and for women who have experienced marital dissolutions due to divorce, separation, or death of a spouse, it is likely that they are about the current husband at the time of the survey. However, in

The family environment that women were exposed while they grew up was measured by religion, the number of siblings, whether they were the eldest daughter in the family, the living arrangement at the age of 15, the level of mother's education, the characteristics of area around age 15, and the level of parental control at age 15. Religion was measured in five categories: None, Buddhist, Protestant, Roman Catholic, and Other Religions. The number of siblings was measured in a continuous variable form. In general, the number of siblings is negatively associated with the amount of parent's resources, such as time, money, or affection, per child. Hence, if all other things are equal, growing with a smaller number of siblings is relatively advantageous for obtaining higher socioeconomic status, which in turn has an important influence on the timing of transition to parenthood and subsequent childbirths (K. Kim 2014). On average, the eldest son or eldest daughter in a family has more time to spend with the parent and is more likely to conform to parents' attitudes and perceptions compared to the other children, and prior research found that they tend to marry faster than their younger siblings. Hence, it is possible that, net of other factors, eldest daughters might get married earlier, and that they can experience the transition to motherhood earlier than their younger siblings. According to K. Kim (2014), parental living arrangement during adolescence can have a significant impact on the development of children's behavior, largely because of the absence of one parent or both parents may lead to substantial reduction of parental controls. In the present study, based on respondent's report, parental living arrangement at age 15 was measured with three categories: both parents; single parent; and other parents. Given the rapid expansion of education during the past several decades in Korea (K. Kim and Kim 2015), the mothers' generation has, on average, lower educational attainment than the respondents' generation, and they were measured in a different category from those of the respondents. Mother's educational attainment was measured with four categories: no schooling, elementary school, middle school, and high school or above. Since the physical environment during adolescence may also have a significant impact, the area grown at the age of 15 years was divided into three categories: large cities, small cities, and towns and villages. In order to measure the degree of parental control more directly in adolescence, the model included parenting attitudes at age 15. Based on

Korea where the rate of marital dissolution is not high, the information of the husband is highly likely to be information about the first husband. Therefore, the bias on the husband's socioeconomic status that are associated with mismatch between marital history and the order of childbirth would be trivial.

respondent's assessment on parental control at age 15, it was measured on a 5-point scale (very lenient, lenient, average, strict, and very strict), with higher scores indicating a stricter parental control.

In the second or higher order childbirths, sex composition of already-born children may have a significant effect on subsequent birth. Although general son preference has been remarkably reduced in recent years in Korea (Yoo, Hayford and Agadjanian 2017), it still persists. As a result, if the first child is a girl, the probability of a second birth is significantly greater than in the opposite case, and if the second child is a girl, the tendency to give birth to a third child increases substantially (Ma 2016). Thus, in the present analysis, sex of the first child entered the model for the second birth, and sex composition of first two children (male-male, male-female, female-male, and female-female) was used for the model for the third childbirth.

Analyses

It is appropriate to use event-history analysis to appropriately deal with the data having censoring problem (Allison 1982). In this study, the Cox proportional hazard model (Cox 1972) is estimated, and the Cox proportional hazard regression model asserts that the hazard rate for the j^{th} subject in the data is:

$$h(t | x_j) = h_0(t) \exp(x_j \beta_x),$$

where $h_0(t)$ represents the baseline hazard function at time t , and the regression coefficients, β_x , are to be estimated from the data. When we divide both sides by $h_0(t)$ and take the log, it becomes:

$$\ln\left(\frac{h(t | x_j)}{h_0(t)}\right) = x_j \beta_x$$

Therefore, the Cox model suggests that the hazard ratio changes linearly with the ratio of the hazard to the baseline hazard when the independent variable changes by one unit.

Results

Before discussing about results from Cox regression models, descriptive

TABLE 1
DESCRIPTIVE STATISTICS BY PREMARITAL PREGNANCY STATUS FOR THE
VARIABLES USED IN THE ANALYSIS OF SECOND AND THIRD CHILD BIRTH:
KOREAN LONGITUDINAL SURVEY OF WOMEN AND FAMILY 1-6 WAVES

	Second Birth				Third Birth			
	Post-marital Pregnancy		Premarital Pregnancy		Post-marital Pregnancy		Premarital Pregnancy	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age at First Marriage	24.18	3.46	23.77	3.19	23.73	3.30	23.36	3.06
<i>Highest Grade Completed</i>								
Elementary School	0.16		0.12		0.19		0.14	
Middle School	0.08		0.08		0.09		0.09	
High School	0.38		0.49		0.38		0.49	
Some College	0.14		0.16		0.12		0.14	
College Graduate	0.24		0.17		0.21		0.15	
<i>Occupation at First Marriage</i>								
Managers, Professionals and Related Workers	0.18		0.12		0.16		0.10	
Clerks	0.36		0.41		0.35		0.41	
Service Workers	0.10		0.10		0.09		0.10	
Sales Workers	0.06		0.08		0.06		0.07	
Skilled Agricultural, Forestry and Fishery Workers	0.16		0.12		0.19		0.14	
Craft and Related Trades Workers	0.08		0.09		0.09		0.09	
Equipment, Machine Operating and Assembling Workers	0.02		0.03		0.02		0.03	
Elementary Workers	0.05		0.05		0.05		0.06	
<i>Husband's Education</i>								
Elementary School	0.11		0.09		0.13		0.10	
Middle School	0.09		0.06		0.10		0.07	
High School	0.32		0.42		0.32		0.43	
Some College	0.12		0.14		0.11		0.13	
College Graduate	0.36		0.30		0.34		0.27	
<i>Religious Affiliation</i>								
None	0.41		0.47		0.40		0.45	
Buddhist	0.24		0.22		0.26		0.25	
Protestant	0.25		0.22		0.25		0.22	

TABLE 1
(CONTINUED)

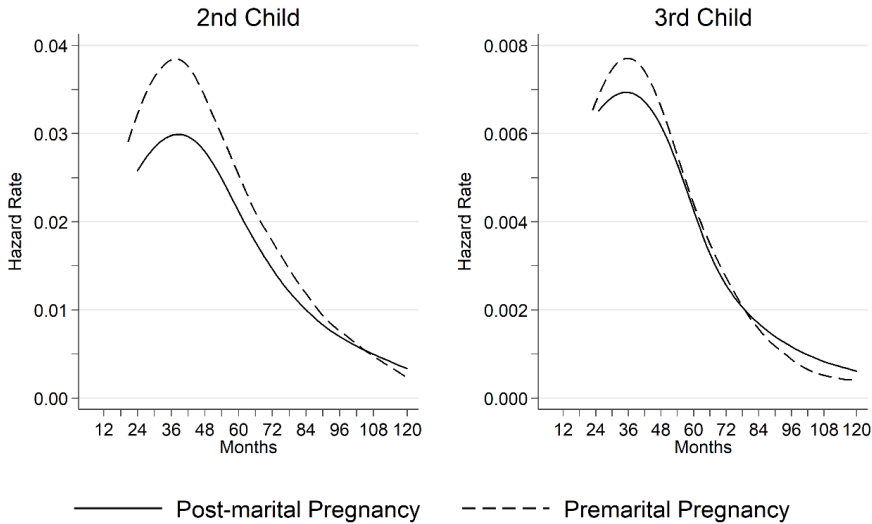
	Second Birth				Third Birth			
	Post-marital Pregnancy		Premarital Pregnancy		Post-marital Pregnancy		Premarital Pregnancy	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Roman Catholic	0.08		0.08		0.08		0.07	
Other	0.01		0.01		0.01		0.01	
<i>Sex of the First Child</i>								
Male	0.52		0.52		---		---	
Female	0.48		0.48		---		---	
<i>Sex of the First and Second Child</i>								
Male-Male	---		---		0.27		0.28	
Male-Female	---		---		0.24		0.24	
Female-Male	---		---		0.24		0.26	
Female-Female	---		---		0.25		0.22	
Number of Siblings	4.65	1.83	4.60	1.81	4.82	1.82	4.74	1.83
First Daughter in the Family of Origin	0.26		0.28		0.25		0.28	
<i>Living Arrangement at Age 15</i>								
Both Parents	0.90		0.89		0.90		0.89	
Single Parent	0.07		0.07		0.07		0.08	
Other Parents	0.02		0.03		0.02		0.03	
<i>Mother's Education</i>								
No Schooling	0.24		0.23		0.27		0.26	
Elementary School	0.45		0.49		0.46		0.51	
Middle School	0.17		0.18		0.15		0.16	
High School or Above	0.14		0.10		0.11		0.07	
<i>Living Area at Age 15</i>								
Metropolitan Area	0.31		0.25		0.28		0.23	
Small to Mid-Size Cities	0.21		0.27		0.20		0.25	
Rural Area	0.48		0.48		0.52		0.52	
<i>Parents' Control at Age 15</i>								
Very Lenient	0.04		0.03		0.03		0.04	
Lenient	0.24		0.27		0.23		0.27	
Average	0.31		0.33		0.32		0.32	
Strict	0.33		0.31		0.34		0.31	
Very Strict	0.08		0.06		0.08		0.06	
N	3,325		546		2,686		457	

NOTE.—Sample means are unweighted. Due to rounding, some proportions do not add up to one.

statistics of variables used in this analysis are presented in Table 1 by premarital pregnancy status. First, in the case of the second child birth, the age at first marriage was found to be about 0.41 years lower for women who experienced premarital pregnancy compared with those who did not, and this difference was statistically significant ($p < 0.01$). As implicated in Figure 1, the level of educational attainment of the women who experienced premarital pregnancy was also lower than that of the women who did not. Of the women who experienced premarital pregnancy, about 48% were high school graduates while 38% of those who did not have completed high school education. Conversely, the proportion of college graduates was 24% in the post-marital pregnancy group, while only 17% of the women in the prenatal pregnancy group had graduated from college. With respect to women's occupation at the time of the first marriage, although there was no significant difference between pre- and post-marital pregnancy groups, the proportion of the "manager, the professionals and the related worker" category was higher in the post-marital pregnancy group compared with those who had become pregnant before marriage. The husband's educational attainment is also lower in the group who experienced premarital pregnancy. For example, 30% of husbands who have had premarital pregnancies completed college education whereas 36% of husbands of post-maritally pregnant women were college graduates. In the other characteristics other than these variables, however, no significant differences were found between the groups that experienced premarital pregnancy and those who did not.

Attributes that are used for estimating birth of third child showed a similar pattern as in the variables for the second birth. There was no significant difference even in the sex composition of the first two children between the premarital and post-marital pregnancy groups. On the other hand, women who have experienced premarital pregnancy are less educated, less likely to be in the managerial and professional occupations, and married husband with lower educational attainment compared with those who experienced pregnancy after marital relationship started. These consistent disparities regardless of parity in the socioeconomic circumstances between the two group of women suggest that premarital pregnancy may not be a merely a personal preference on the timing of having a child, but something complex beyond individual level may be operating.

The hazard rate of second and third births by premarital pregnancy status is shown in Figure 2. The results indicated that the risk of second birth after the first birth increases rapidly in both the premarital and post-marital pregnancy groups, and it gradually declines after the peak in 36 months



NOTE.—Premarital pregnancy denotes all births that occurred within 7 months from the date of marriage and post-marital pregnancy refers to all births after 7 months from the date of marriage. Premarital births (i.e., births that occurred before the date of marriage) are not included in the analysis.

FIG. 2.—Hazard Rate for the Second and Third Child by Pre- and Post-Marital Pregnancy Status: Korean Longitudinal Survey of Women and Family Waves 1-6

(roughly 3 years after first child birth). It is also important to note that women who have experienced premarital pregnancy are at higher risk of second birth until about 9 years after their first childbirth compared with women who experienced the transition to motherhood after marriage. The results for risk of third birth is also similar to that of second birth. That is, the risk of the third birth after the second birth increases rapidly, reaches the peak at about 3.5 years, and rapidly decreases thereafter. However, contrary to the second child birth, the gap between the premarital and post-marital pregnancy groups decreases quickly, and there is little difference between the two groups after about 5 years after the second birth. Note that, although both of the risk of second and third births is associated in inverted U shape with time, the magnitude of risk is substantially different. The risk of third birth is much lower than the second birth largely because the number of women giving birth to a third child is significantly smaller.

The results of the Cox regression analysis are presented in Table 2. First, results from the determinants of the second birth indicated that, net of all other factors, the women who experienced premarital pregnancy are about

13.3% more likely to experience the transition to the second birth compared with those who conceived after marriage, and the difference between these two groups was statistically significant. Furthermore, consistent with past research, the risk of second birth decreased by 1.5% as the age at first marriage increased by one year. Also, as the educational attainment of women increases, the hazard of second birth decreases monotonically. That is, women with high school education compared with those with middle school education, women with college diploma compared with those with high school education are significantly less likely to experience the transition to the second child birth. With respect to the occupation at first marriage, “equipment, machine operating and assembling workers” showed significantly higher hazard rate of second childbirth compared with “managers, professionals and related workers.” The former group had a 43.7% higher risk of second birth than the latter group. Although it is not clear why the difference in hazard of second birth by occupation arises, it is potentially associated with the substantial fraction of male workers and male dominant cultures among the “equipment, machine operating and assembling workers.”

Results also suggested that gender of the first child is also one of the most significant factors determining the second birth. If the sex of the first child is a girl, the risk of giving a second birth increases by 17.3% compared with when the first child is a boy. These pattern implies that the culture of son preference has persisted, or that because the son preference has only recently weakened, such patterns have not appeared in the KLoWF respondents who are predominantly women who have experienced second births many years ago. The recent trends in sex ratio at birth by parities suggests that the latter seems more plausible explanation for the elevated hazard of second birth when the first child was a girl.

One of the most significant predictors in terms of the association between family background and risk of second birth is mother’s educational attainment. Results indicated that if the mother has completed high school education or above, the risk of daughter’s second birth is reduced by about 17.5% compared with when the mother had no formal education. In addition, the risk of second birth for women who grew up in rural areas at age 15 was about 21.3% higher than those who grew up in large cities during their adolescence. This result suggests that women who grew up in rural areas might have more positive attitude about second birth compared with those who grew up in metropolitan areas because they might internalize pronatal culture relatively more prevalent in rural areas.

Contrary to the accelerating effects of premarital pregnancy on the

TABLE 2
HAZARD RATIOS FROM THE COX REGRESSION OF TRANSITION TO SECOND AND
THIRD BIRTH: KOREAN LONGITUDINAL SURVEY OF WOMEN AND FAMILIES
(KLOWF) WAVES 1-6

	Second Birth		Third Birth	
	HR	SE	HR	SE
<i>Pregnancy Status</i>				
Post-marital Pregnancy	1.000		1.000	
Premarital Pregnancy	1.133**	(0.057)	1.026	(0.096)
Age at First Marriage	0.985**	(0.006)	0.951***	(0.011)
<i>Highest Grade Completed</i>				
Elementary School	1.000		1.000	
Middle School	0.876	(0.078)	0.595***	(0.074)
High School	0.802**	(0.079)	0.401***	(0.063)
Some College	0.764**	(0.088)	0.342***	(0.076)
College Graduate	0.746**	(0.088)	0.273***	(0.063)
<i>Occupation at First Marriage</i>				
Managers, Professionals and Related Workers	1.000		1.000	
Clerks	1.049	(0.062)	0.949	(0.149)
Service Workers	0.938	(0.074)	0.994	(0.197)
Sales Workers	0.955	(0.089)	1.263	(0.266)
Skilled Agricultural, Forestry and Fishery Workers	1.163	(0.117)	1.992***	(0.394)
Craft and Related Trades Workers	1.115	(0.098)	1.044	(0.207)
Equipment, Machine Operating and Assembling Workers	1.437**	(0.209)	1.690**	(0.429)
Elementary Workers	1.007	(0.108)	1.009	(0.223)
<i>Husband's Education</i>				
Elementary School	1.000		1.000	
Middle School	1.036	(0.090)	0.959	(0.100)
High School	0.992	(0.092)	0.814	(0.103)
Some College	1.238*	(0.136)	0.966	(0.184)
College Graduate	1.115	(0.119)	0.993	(0.175)
<i>Religious Affiliation</i>				
None	1.000		1.000	
Buddhist	1.080*	(0.050)	1.118	(0.086)
Protestant	1.044	(0.048)	1.075	(0.098)
Roman Catholic	1.069	(0.075)	1.068	(0.155)
Other	1.233	(0.190)	1.401	(0.364)

TABLE 2
(CONTINUED)

	Second Birth		Third Birth	
	HR	SE	HR	SE
<i>Sex of the First Child</i>				
Male	1.000		---	---
Female	1.173***	(0.042)	---	---
<i>Sex Composition of the First and Second Child</i>				
Male-Male	---	---	1.000	
Male-Female	---	---	1.532***	(0.155)
Female-Male	---	---	1.299**	(0.133)
Female-Female	---	---	3.343***	(0.301)
Number of Siblings	1.016	(0.012)	0.986	(0.019)
First Daughter in the Family of Origin	1.004	(0.043)	1.069	(0.082)
<i>Living Arrangement at Age 15</i>				
Both Parents				
Single Parent	1.023	(0.070)	1.103	(0.132)
Other Parents	0.958	(0.114)	1.343	(0.255)
<i>Mother's Education</i>				
No Schooling	1.000		1.000	
Elementary School	0.957	(0.047)	0.854**	(0.065)
Middle School	0.942	(0.064)	0.751**	(0.107)
High School or Above	0.825**	(0.065)	0.684**	(0.129)
<i>Living Area at Age 15</i>				
Metropolitan Area	1.000		1.000	
Small to Mid-Size Cities	1.080	(0.057)	0.997	(0.116)
Rural Area	1.213***	(0.060)	1.029	(0.106)
<i>Parents' Control at Age 15</i>				
Very Lenient	1.000		1.000	
Lenient	1.182*	(0.120)	0.867	(0.163)
Average	1.221**	(0.122)	0.800	(0.149)
Strict	1.229**	(0.123)	0.900	(0.166)
Very Strict	1.104	(0.126)	0.932	(0.192)
N	3,871		3,143	
Log-likelihood	-23,781		-7,117	
Number of births	3,198		988	
Person-months	170,346		339,418	

NOTE.—Standard errors of hazard ratios in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

second childbirth, the premarital pregnancy did not show a significant influence on the hazard of third childbirth. The coefficients from Cox regression indicated that the premarital pregnancy is associated with the hazard of third childbirth in the positive direction, but it failed to reach to statistical significance. Probably, many different factors may be responsible for this non-significant effect of premarital pregnancy on the third childbirth, but it is possible that those who give birth up to the second child have distinctive characteristics, such as the greater desire for a big family or some religious beliefs that emphasizes pronatal attitudes, compared with those who have one child or less. In other words, it is possible that the women who have already completed the second birth may be the selected group who have undergone two screening processes, and, hence, the premarital pregnancy did not show a significant impact on the hazard of third childbirth.

The risk of third birth, as found in the second one, shows a gradual decrease as the age at first marriage rises and the socioeconomic status of women increases. In addition, the discrepancies in the hazard of third birth across social strata are more pronounced compared with the second birth. For instance, compared with women with elementary school education, college graduates were 25.4% less likely to experience the transition to the second childbirth while the same women were 72.7% less likely to have a third child. Another interesting point is that the risk of third birth among women who were skilled agricultural, forestry and fishery workers at the time of first marriage is roughly twice as high as that of managers, professionals and related workers.

Also, the risk of the third childbirth was found to be strongly associated with the sex composition of the first two children. The hazard of third childbirth increased by 53.2% and 29.9%, respectively, when the first two children were male-female or female-male compared when the first two children were males. However, when the first children were all females, the hazard of third childbirth was found to be 3.34 times (i.e., 334%) greater than the son-son combination. This result suggests that parents' underlying preference for son is more acutely manifested as the parity increases and that it is greatest when the first two children are girls.

Discussion and Conclusion

The primary purpose of this study was to explore the association between premarital pregnancy, which has increased more than three times over the

past two decades, and the risk of birth of the second and third children in Korea. Despite the findings that premarital pregnancy may not only increase the risk of premature birth and the likelihood of low birth weight but also undermine the stability of marriage in the long run, research on this issue is still in infancy in Korea. To fill in the gap in the extant literature, the present study examined the influence of premarital pregnancy on the transition to second and third childbirth using the first through sixth wave of the KLoWF and Cox regression analysis model.

Results suggested that premarital pregnancy had a significant effect on the risk of second birth, even after controlling for all other factors. Women who got pregnant before their marriage date were 13.3% more likely to experience the transition to second childbirth compared to those who conceived after marriage. On the contrary, premarital pregnancy had no significant effect on the risk of third childbirth, and it may be related to the longer time interval between premarital pregnancy and second childbirth than between premarital pregnancy and third childbirth.

As found in a number of past studies, results from regression analysis also indicated that as the socioeconomic status of women increases, the risk of second and third births gradually decreases. Recently, in some European countries, it has been reported that women's socioeconomic status is negatively associated with the likelihood of the first childbirth but turns into positive relationship in the second childbirth (Muresan and Hoem 2010). According to these studies, the higher socioeconomic status of women has the postponing effect for the birth of the first child, but once the first child is born, they experience the transition to the second birth more quickly than their counterparts in lower social strata. However, this cross-over between mother's socioeconomic status and the transition to second childbirth was not found at least in Korean women in the KLoWF. This might be associated with the fact that women in higher socioeconomic strata may have a stronger preference for higher quality children (i.e., those who have high level of human capital), rather than for a greater number of children, compared with their counterparts in lower strata. Furthermore, unequal division of household labor may make higher status women become reluctant to have additional children in Korea.

As found in many prior studies, the current study is not without limitations. In particular, the effects of economic resources such as household income among the determinants of childbirth suggested in the existing theory could not be examined. Though the KLoWF also provides extensive information on various forms of income not only at individual level but also

at household level, all of the income measures were reported at the time of the survey. Since the vast majority of women in the KLoWF experienced childbirth before the beginning of the survey, current income information could not be utilized in this study. Furthermore, due to data limitation, all independent variables had to be composed of time constants. Certainly, many individual characteristics change over time, and those should be taken into account more explicitly in subsequent studies. Beyond individual's attributes, decision to have another child can also be influenced by unemployment rate or economic downturns. Nevertheless, this study could not incorporate the macro or structural factors, and this also needs to be addressed in subsequent studies. By doing so, future research should elaborate more on the social contexts in which premarital pregnancy increases as well as disparities in the propensity of premarital pregnancy by educational attainments or conservatism toward the family behaviors. Finally, as sex ratio at birth has been changing rapidly over the past several decades in Korea (Yoo et al. 2017), it is possible that fertility behaviors among young cohorts of women, particularly those born after 1990, would be significantly distinguished from those of earlier cohorts of women in Korea. And younger cohorts of women might be less affected by the sex composition of their first and second child compared with their older counterparts. Unfortunately, this possibility could not be examined in the present study because the youngest cohort in the KLoWF was born between 1980 and 1989. However, as more waves of the KLoWF are administered in the future, changes in the effect of sex composition in children across birth cohorts should be examined more carefully.

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