Labor force participation, family policy change and second birth rates in South Korea

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Abstract

Over the past decades South Korea's female labor force participation rates have increased, while its fertility decline has been dramatic. The family planning program implemented in 1962 is frequently argued to have initiated this fertility plunge. This study explores how women's labor force participation is associated with second birth rates in South Korea; and how the family planning program among other factors may have contributed to this relationship. Event history analysis has been applied to longitudinal data. Results show that one-child mothers in the labor force has significantly lower second birth rates than homemakers, suggesting that labor force participation after first birth signals an interruption of a woman's reproductive career. The second birth trend during the 1980s and 1990s partly developed in response to changes in the family planning program. The program abolishment in 1988 seems to have temporarily exhilarated second birth rates of homemakers, in particular.

Keywords

Female labor force participation, second birth, family planning program, social policies, South Korea

Introduction

Since the 1960s, women's labor force participation rates have been increasing worldwide. Increase in women's education, growing preferences among women for non-domestic roles, men's gradual acknowledgement of women's employment, growth in occupations attractive to women, and many other factors have been conducive to this development (England and Farkas, 1986). During the same period, fertility decline became universal in many corners of the world. In the 1960s and the 1970s, total fertility rates (TFRs) of many OECD countries dropped to below replacement level one after another. Against this background, female labor force participation in South Korea (or Korea) has increased modestly. However, its fertility decline has been incredibly sharp. Korea's total fertility rate was around the 5-child level by 1965. In 2001, its TFR broke through 1.30 and Korea became one of the lowest-low fertility countries in the world. Korea's family planning program initiated in 1962 has been argued to stimulate the fertility plunge. However, the abolishment of this program did not stop the long-term trend heading downward.

A few relevant studies have addressed fertility development in Korea. Parity progression ratios presented by Choe and Retherford (2009) show that the first birth trend remained relatively stable before the mid-1990s but declined noticeably thereafter. The trends for higher-order births plummeted dramatically well before the mid-1990s. Kye (2008) finds evidence that the influence of educational expansion on delay of first marriage has been strong. Once married, Korean women have children quickly. High-educated women tend to marry and become mothers later than low-educated women do. Ma (2013) shows the extent to which it is typical of Korean women to leave the labor force upon family formation. Still, women with stable employment positions have higher likelihood of entering motherhood than others.

So far, how Korean women's labor force participation contributes to the likelihood of continued childbearing has been under-studied. This paper will address this issue by also considering the role of other individual factors such as women's own demographic and background characteristics, their spouse's socio-economic status, and the role of family planning program and social policies aiming at work-life balance in explaining second birth behavior in Korea.

I will start the paper with a brief review of relevant research on continued childbearing. A detailed account of Korea's context follows. Data, method, findings and discussions will be presented in the empirical section. The paper concludes with a summary of the findings and a discussion of policy implications.

Relevant research on continued childbearing

A large body of research focuses on women's continued childbearing behavior. Most of such research focuses on Europe and the US. Women's education, their labor force participation, social policies and economic (un-)certainty are the most studied factors that explain such fertility. According to Becker's (1981) theory of opportunity cost, women will suffer a loss of earnings if they take a timeout from the labor force for childbearing and childrearing. To minimize this opportunity cost, women with high earning potential, such as the well-educated tend to postpone or even forgo childbearing. Once becoming a mother, well-educated women may concentrate their births in a shorter period of time so that they can resume their professional career soon after attaining their desired family size (Brewster and Rindfuss, 2000).

Evidence from the Nordic countries in Europe and from West Germany shows better-educated women catching up in their fertility after postponing first childbearing. They are more fast to proceed to second births than the less-educated women (Hoem and Hoem, 1989; Kravdal, 1992a; Kravdal, 2001; Kreyenfeld, 2002; Oláh, 2003). In Sweden, "power couples" (both of the couple are highly educated) are more likely than other couples to have higher second-birth fertility, as they have higher potential to combine their career and continued childbearing (Dribe and Standfors, 2010). However, Patterns differ in other contexts. In Russia, low-educated women have a more elevated second birth transition rate than women at other educational levels (Billingsley, 2011). In Austria, educational level of women does not have much influence on women's second or third birth intensity; instead, education of women's partner plays a very important role in determining family size, indicating that partner's social class has a more important influence on family decision of having more children (Hoem *et al.*, 2001; Prskawetz and Zagaglia, 2005).

Female's labor force participation is frequently documented to have driven women's postponement of childbearing in many contexts. Women in the Nordic countries of Europe usually establish themselves properly in society before considering having children so that they have stable employment, a reasonable housing situation and a decent level of living (Andersson, 2000). In East Asia, employment engagement before parenthood entry is also common practice; women with stable employment positions are more likely to become a mother (Ma, 2013).

The possible resumption of labor force participation after motherhood entry is one of many important transitions in a woman's life course. Women who go through this transition have to master the juggling acts of daily life: balancing work and family life. A woman may be less willing to

have another child if she spends more time in the labor force. Based on Swedish data, Hoem and Hoem (1989) find that intensities of both second and third births of housewives exceed those of women in the labor force. The authors argue that a woman's choice of employment when she has a small child may reflect her role orientation. Her employment history after first birth indicates her position on a scale that separates the more family-oriented from the more job-oriented.

Hoem and Hoem (1989) reveals that among women who are involved in the labor force after first birth, full-timers have slightly higher intensities than part-timers; but the differences is small and not significant. They find that total time spent in the labor force does not have significant association with working mothers' intensity of having another child. This weak role of cumulative labor force participation during motherhood is also found in a study on Great Britain (Wright et al., 1988). Kravdal (1992b) finds no significant impact of labor force participation among two-child mothers on third birth fertility in the Norwegian context. Women who appear to be firmly attached to the labor market do not necessarily have lower fertility rates than those seemingly less attached.

A good knowledge of the design of social policies in different contexts will help improve our understanding of the association of labor force participation with continued childbearing. In general, relatively high fertility may appear in countries where social policies mitigate women's work-life role conflict; in countries that encourage traditional gender roles and where women are forced to decide between employment and family life, low fertility occurs (Brewster and Rindfuss, 2000). When women have to make a choice, there would be both low fertility and low female labor force participation (OECD, 2007a).

In Europe, countries with relatively high fertility are mostly located in the Nordic region and in Western Europe. In France, family life has been a public policy issue for decades. By shifting its objectives from alleviating the cost of having children to supporting the reconciliation of work and family life, family policies in France helped to maintain its relatively high fertility (Letablier, 2003). Van Bavel and Różńanska-Putek (2010) point out that France's generous family policies particularly target the promotion of third-order births and potentially stimulate second births. In the Nordic countries with a universalistic welfare regime, social policies support women's labor force participation and promote gender equality. Opportunity of working flexible hours, fathers' uptake of parental leave (with earnings-related benefits and certain periods reserved exclusively for the father), availability of public childcare system facilitate not only women's labor market involvement but also fertility (Andersson *et al.,* 2004; Duvander and Andersson, 2006; Duvander *et al.,* 2010). A facilitating effect of childcare services on fertility is claimed for Switzerland (Bonoli, 2008) and in studies on other European countries (Van Bavel and Różńanska-Putek, 2010).

In contrast, in countries encouraging traditional gendered division of work and care, governments usually offer less policy support to allow women to reconcile work and family obligations (Matysiak and Vignoli, 2008). Evidence from Austria shows that working mothers have lower likelihood to proceed to second or third births compared to mothers staying at home, reflecting the tension between advancing gender equality and the dominance of traditional norms, as well as the incompatibility between motherhood and labor force participation (Hoem *et al.*, 2001; Parskawetz and Zagaglia, 2005).

Economic (un-)certainty at either macro or micro level also plays important roles in family decisions to have a second child. Andersson (2000) finds that women with low levels of income and women enrolled as students, namely those who have not properly established themselves in society, generally have lower fertility than other women in Sweden. Baizán (2005) finds that labor market insecurity of one or both members of a couple depresses birth rates in Southern European countries. The conventional model of men's employment combined with housewifery has a positive impact on second or higher order births in UK, Spain and Italy. Studying 12 European countries, Adsera (2011) finds that both unemployed women and women who hold unstable jobs tend to postpone second births to later time. Second birth delays are significant in countries with high unemployment. Billingsley (2011) reveals a remarkable decline of second birth rates during economic crisis in Russia and a further decline in the recovery period.

The Korean context

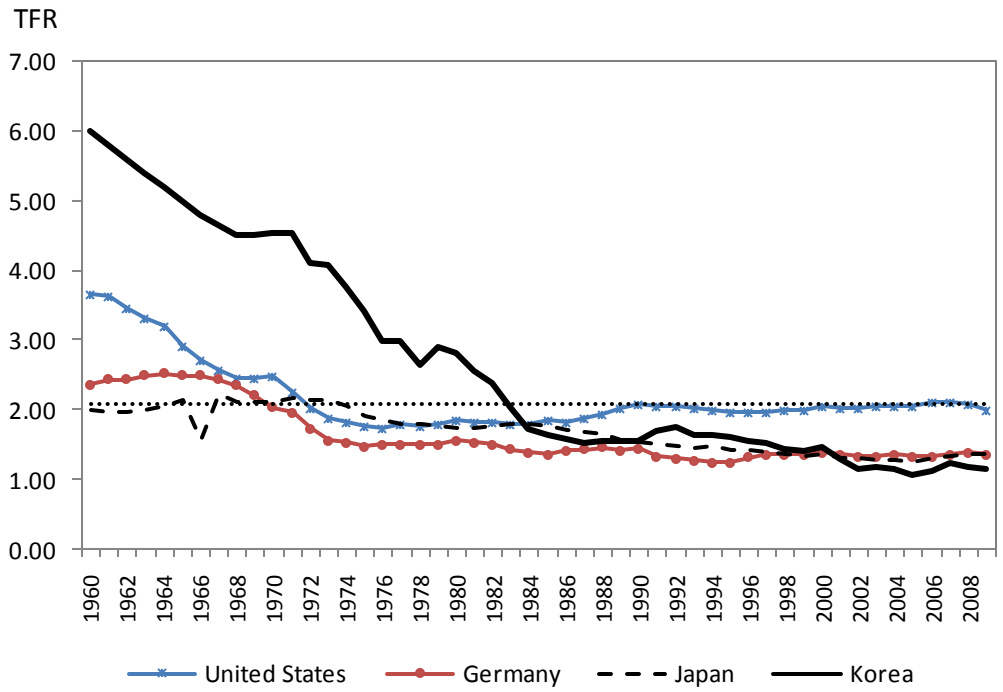
Figure 1 displays period total fertility rates of Korea compared to those of other selected OECD countries. Korea is one of last OECD countries to go through the fertility transition, but it stands out as its fertility decline is the sharpest. Fertility decline occurs for many reasons. In the context of Korea, the decline was fuelled by the implementation of the family planning program initiated in 1962. Education expansion, female labor force participation, postponement of marriage and motherhood entry, financial crisis, changing attitudes towards marriage and childbearing, and increasing cost of educating children are also important underlying factors of fertility decline (Ma 2013).

Korea's fertility development and family planning program

Dating back to the 1950s and 1960s, Korea was a country with rapid population growth, high population density, high fertility and little developed industrial economy *(*Jones and Leete, 2002).

Korea's total fertility rate was around the 5-child level by 1965 (see **Figure 1**). Like many other Asian countries, Korea viewed its growing population an obstacle to economic development. In 1962, the government implemented a family planning program to control population growth (Rhee, 2007). This program was an integral part of Korea's national economic plan, and had the goal of reducing the number of unwanted births and bringing down the ideal number of children in a family to three or fewer. In the early 1980s, the goals became to reduce the family size to two children and even "fewer than 2". In correspondence, Korea's TFR slumped to below the replacement level in 1983. In 1988, it reached as low as 1.55.

Figure 1: Period total fertility rates of Korea compared to those of other selected OECD countries



(a) Source: OECD (2012a)

Partly because the goals of reducing population growth and restricting family size had been achieved, the family planning program was officially abolished in 1988 (Choe and Retherford, 2009; S-S Lee, 2009). However, this abolishment did not mark an end to Korea's long-term fertility decline. After a brief reversal, its fertility level continued to stagnate during the 1990s and then headed downward again even faster at the turn of the century. The breakthrough to 1.3 in 2001 marks the onset of Korea's "lowest-low" fertility era. In 2005, Korea's TFR reached its nadir - 1.08. Since then, it has remained below 1.3, anchoring Korea as one of the lowest-low fertility countries in the world.

The family planning program mainly aimed at reducing the family size to two children or less , and the fertility decline during the period of policy practice was mainly driven by childbearing reduction within marriage. The continuation to the very low fertility levels since the 1990s was largely due to delayed marriage and motherhood entry, a process closely connected with Korea's education expansion and sequential increase of female labor force participation (Jones 2007 and S-S Lee, 2009).

Education expansion, female labor force participation and financial crisis

Korea has experienced dramatic economic development since the 1970s. By the late 1990s, it had already developed itself into one of the world's most industrialized society. The country's economic success is paralleled with remarkable increases in education, especially among women (Jones, 2011). Statistics show that the proportion of female high school graduates who advanced to higher education was only 20% in 1975. This number had increased to 34% in 1985, to 50% in 1995, and to 81% in 2005 (Choe and Retherford, 2009; Frejka *et al.*, 2010). Tsuya, Choe and Wang (2009:16) remark that the educational advancement of young Korean women during the last three decades is "nothing but spectacular" and "unprecedented in the recent history of the world".

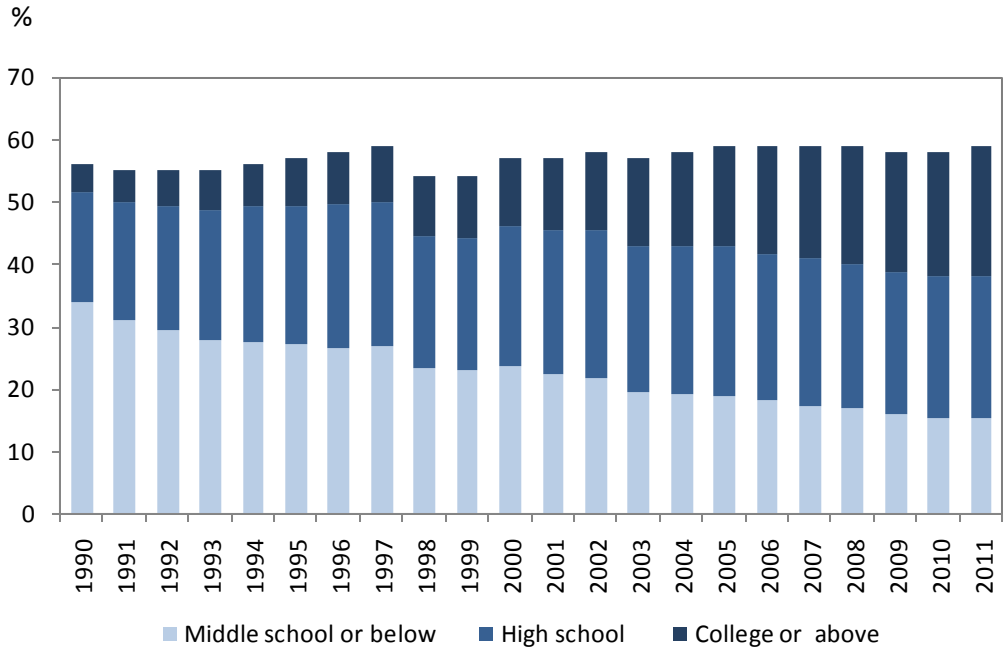
When attaining higher educational levels, women acquire aspirations for economic activity. **Figure 2** presents employment rates of women aged 20-49, by educational attainment of employed women since 1990. It is clear that employed women have become better educated. In the early 1990s, only a small proportion of employed women had obtained an educational level of college or above. By 2011, almost one third of female labor force participants are college graduates. Meanwhile, the overall employment rates have remained at less than 60% during the last two decades.

Figure 3 displays the relationship of Korea's female employment rates and TFR in comparison with other OECD countries in 1980 and 2009, respectively. Korea's female employment rate in 1980 was around 45 percent, and its TFR was among the highest. When female employment rates in most other countries went beyond 70 percent in 2009, Korea's female employment rate modestly increased to nearly 60 percent. Its TFR fell to 1.15, ranking the lowest across these countries.

Largely on account of the unexpected outbreak of Asian financial crisis in late 1997, women's employment rates dropped suddenly in 1998 (**see Figure 2**). Only after 2002 did Korea recover from its aftermath. Social uncertainty during the downturn period increased the constraints for family formation and expansion. Ma (2013) shows the extent to which first birth fertility in Korea was declining since the 1990s. The financial crisis that hit Korea in 1997 exacerbated the decline. Unsure of the future, many Koreans postponed marriage and having children. By the time Korea's economic

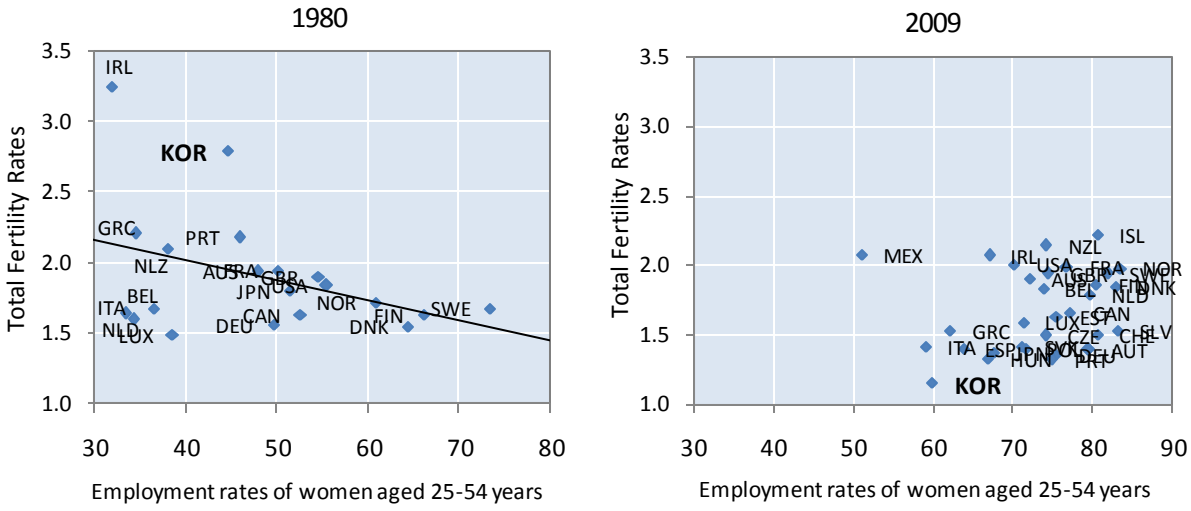
health had recovered, no sign of first-birth fertility recovery had yet emerged. It is predictable that the social instability during the crisis period may have incurred second birth stagnation as well.

Figure 2: Employment rates of women aged (20-49), by educational attainment of employed women, Korea, 1990-2011



Sources: OECD labor force statistics database & Korean Statistical Information Service (KOSIS) 2012

Figure 3: Cross-country relationship between female employment rates and total fertility rates



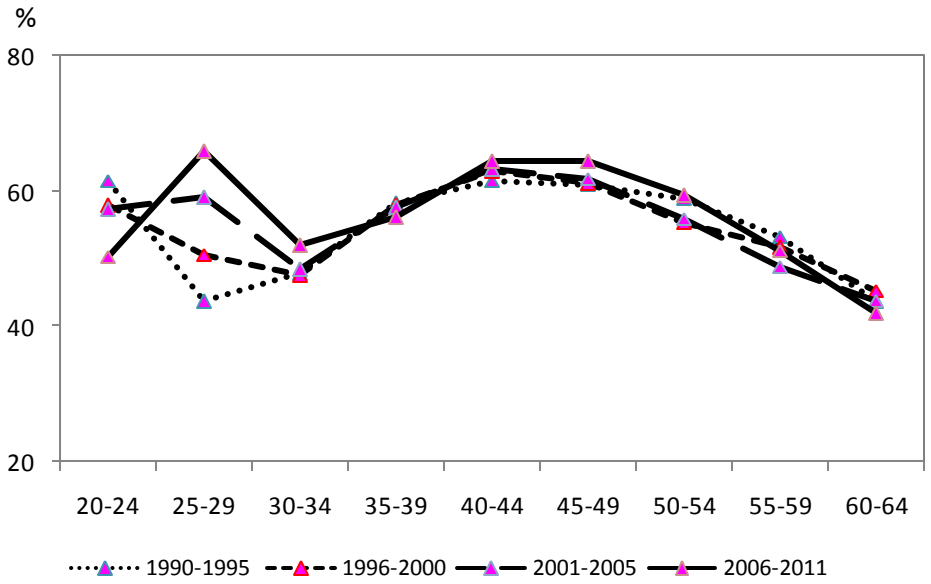
Sources: Employment rates – OECD Employment Outlook UN World Statistics Pocketbook, 2010; Fertility rates- National statistical authorities, UN Statistical Division and Eurostat Demographic Statistics, 2010

Social expectations of women and social policy

Korean women have traditionally been considered the main care giver of the household and men the main bread-winner. Women may work before marriage. They are socially expected to quit jobs upon marriage. Their career prospects have to give way to their family commitment when needed. Raising children and doing household chores become their main responsibilities after marriage (Ma, 2013). **Figure 4** presents women's employment profiles by ages. The persistent M-shaped patterns reflect that Korean women have adopted a distinct strategy to arrange their work-family life for decades: labor market entry – labor market exit upon family formation and expansion – labor market re-entry when the household needs them less. Ages 25-29, which were once women's major labor market exit time, have today rather become a peak time for labor force involvement; the labor market exit time, instead, has gradually shifted to ages 30-34, showing that women's main childbearing ages have been delayed to later time in life.

Korea is a society of familialism; the government has encouraged families to take responsibilities to take care of the welfare of family members. Kwon *et al*. (2010) indicate that this encouragement on personal responsibility is conducive to the observed M-shaped pattern of female employment. Anderson and Kohler (2013) also argue that a lack of public policy support such as childcare facilities make it difficult for the average woman to evade such societal expectation.

Figure 4: Female labor force participation rate by ages and calendar periods, Korea



Source: OECD 2012a

Measured against OECD's three policy directives (flexible working opportunity, day-care services and paid parental leave with job protection) in facilitating women to combine work and family responsibilities, Korea's achievement has been modest (OECD, 2011). First, the opportunity to work flexible hours is very rare. The normal weekly average working hours in Korea has been the highest among OECD countries (OECD, 2012b)[1]. Second, day care services for children below age 3 are not sufficient. As of 2005, only 20% of children below age three had access to childcare services. Third, paid maternity leave with job protection was not available until 2001. After 2002, parents under the protection of employment insurance could enjoy the benefit of parental leave. Usually, it is those who hold stable employment positions that have higher opportunity to be covered by this benefit. The uptake of parental leave was very low, probably because the income compensation took up only one eighth of a woman's ordinary income and one tenth of a man's (K-H Lee, 2009). Fathers' uptake was almost negligible (OECD, 2006).

In 2006 the Korean government announced an action program "the First Basic Plan for Low Fertility and Aged Society" (known as Basic Plan), attempting to transfer some of the burden of child-raising from family to society (Jones, 2011). As of 2008, the childcare enrollment rate for children under three had increased to 38%, surpassing the OECD average of 30% (OECD, 2012a). As of 2011, couples under the protection of employment insurance can enjoy 40% of the ordinary wage for 12 months when taking parental leave (MOEL, 2011).

The majority of Korean men believe that it is good for every member of the family if women stay at home and provide care to the household (Lee and Eun, 2005). In practice, a large amount of women do not work when they have small children. Still, **Figure 4** demonstrates that the number of women who drop out of the labor market at ages 25-34 has been shrinking over time. Apparently, an increasing number of women start feeling it difficult to give up paid work for homemaking (Eun, 2007).

High cost of educating children and competition on the job market

A good university education is a necessity for attaining a well-paid and secure job in Korea (Seth, 2002; Eun, 2007; Choe and Retherford, 2009). To ensure that their children can enter an elite university and have a successful future, many parents send their children to private tutoring or after-school learning institutes (or "cram schools"[2]) to prepare them for competitive college entrance exams. The cost of this is very high. According to OECD (2007b), private after-school education can

[1] In 2000, Koreans had to work 52 hours per week on average, well above the OECD average of 40 hours. As of 2011, it was reduced to 45 hours per week.

[2] Cram schools were once deemed illegal in Korea as they were considered to promote social inequality. In the 1990s, however, they received government approval and have exploded in popularity ever since (Anderson and Kohler, 2013).

cost up to about 25,000 USD per child per annum. With large supplies of university graduates flooding the job market, the competition of getting a good job becomes increasingly severe, especially during the period of financial crisis and thereafter (Choe and Retherford, 2009). Fierce competition on the job market in addition to the high cost of educating children discourages couples to have more children. Korean couples prioritize "quality" of children over "quantity", a notion pervasive throughout East and Southeast Asia (Anderson and Kohler, 2013).

Value changes and traditional norm

Education expansion has empowered women economic independence. Opportunities on the labor market have freed women from the necessity of financial dependence on men. Non-domestic roles of women have become more worshipped, especially among younger women (Bumpass and Choe, 2004). Marriage and childbearing, which were once women's main obligations, are no longer taken as universal responsibilities but have rather become a matter of choice since the 1990s (S-S Lee, 2009). Life options of young women have widened; women's domestic role is challenged by other competing values (Jones, 2011). Women become more concerned about individual life goals and self-actualization (Brinton, 2001). Over recent decades, delays of marriage and increasing non-marriage have become increasingly prominent in this region. "Later and less" marriage particularly occurs to the growing group of women with tertiary education (Jones, 2009).

However, some traditional norm regarding family behaviors still dominates. Childbearing and marriage are closely tied. Though pre-marital cohabitation has gained prevalence in recent years, few births fall out of wedlock[3]. The conventional concept of hypergamy remains strong. Marrying a man of similar or higher social and economic status is considered a well-matched marriage. The rise of female's socio-economic status in recent years makes it harder for women to find a matching partner. Involuntary non-marriage has been increasing (Jones, 2007).

Another pathway that may affect continued childbearing in Korea is couple's gender preference of children. Traditionally, a woman and her husband took full responsibility for caring for her husband's parents (Chung and Das Gupta, 2007). Her primary and filial duty in life was to bear sons for her husband's lineage. This willingness to have a male child might drive a woman to continue childbearing if the first child is a girl.

[3] Though pre-marital cohabitation is becoming prevalent in Korean society, birth out of wedlock is not. As of 2009, the share of births outside marriage in Korea was only 1.5%, ranked the lowest among OECD countries (OECD, 2012a).

Research questions

Based on relevant research on continued childbearing and the specific context of Korea, this study will address the following research questions related to the link between female's labor force participation and continued childbearing. The possible contribution of family planning program to this relationship will be considered and the role of social policies regarding facilitating compatibility of work and family commitment will be discussed. Due to the limited cases of third births and births of higher order in my data, I will only focus on the second birth rates.

1. How is Korean women's labor force participation associated with their second birth fertility?
2. How has Korea's second birth trend developed over time? How has the practice and abolishment of Korea's family planning program helped shape the trend?
3. What are the policy implications of the findings?

Data and Methods

Data used for analyses are from waves 1 to 10 of the Korea Labor and Income Panel Study (KLIPS), Korea's only labor-related panel survey, initiated by the Korea Labor Institute. The first wave was conducted in 1998 with an original sample of 5,000 households in urban areas. Direct face-to-face interviews with the household reference person or the spouse were carried out to collect information on household members aged above 15 years. In limited special cases other methods were used, such as questionnaire or telephone interviews.

Two types of data were collected: household data, such as demographic characteristics and changes in household composition; and individual data, such as work history and job characteristics. The survey was conducted annually to track changes in characteristics of households as well as individuals' economic and social activities. If an individual within a household turned 15, or if an individual aged above 15 joined a sampled household, he or she was included in the survey. New respondent data were collected regarding retrospective information. If some members of the households moved out and formed new families, the new household and its members were tracked as well. The most recent data for this study are from wave 10, conducted in 2007.

The rich longitudinal information on women's fertility, work, job features, and characteristics of married women's husband serves as a great input to carry out event history analysis of second birth fertility. Our observation commences from the month of first birth; one-child mothers are tracked

month by month until the occurrence of second birth. When disruption of first marriage occurs, the observation is censored. If there is no occurrence of second births, the observation stops either at the last interview time, age 45, or ten years after first birth. In order to better capture the link between women's post-birth work and their second birth intensities, I subtract 9 months from the date of reported second births. Similarly, I predate 9 months from censoring. Hence, the dependent variable in this study is the confirmed conception of a second live birth. In this paper, the term "conception of second live birth" and "second birth" may be used interchangeably.

Among 3323 one-child mothers who entered our observation window, 2231 proceeded to have a second child. **Table 1** presents descriptive statistics of the covariates used for analysis.

Time since first birth is the basic time factor. This variable is grouped into 0-12 months, 13-30 months, 31-60 months, and more than 60 months, representing up to 1 year, 1-2.5 years, 2.5-5 years, and more than 5 years after the first child was born.

Calendar years is grouped into 1980-84, 1985-89, 1990-94, 1995-99 and 2000-06 respectively. Episodes before 1980 are left censored as there are too few cases for analysis of these earlier years.

Woman's educational attainment is categorized into low, middle and high, representing secondary school or below, high school, and college or above, respectively. Among the 2284 women who had a first and a second child, 24 percent had an educational level of college or above.

Woman's labor force participation (LFP) experience before first birth is held constant at the time of first birth. Women with no labor market experience before motherhood entry are categorized as homemakers; while those who had employment experience are categorized as participants. **Table 1** shows that 67% of the one-child mothers had work experience before motherhood entry.

"LFP after first birth" is dummy variable, representing women's labor force participation after first birth: episodes when women stayed at home are labeled as homemakers; starting from the month when they became involved in economic activity, they are labeled as labor force participants. 67% of episodes after first birth were labeled as homemakers.

Woman's current age, childhood residence, gender of first child and husband's educational level are brought under control. Woman's current age is grouped into 15-24, 25-29, 30-34 and 35-44. The first and last groups include 10 years of age interval to ensure there are enough cases for analysis. Childhood residence (residence at age 14) helps control the contribution of women's background to their second birth intensity. It is grouped into three categories: the Seoul National Capital Area

(including Seoul, Incheon and Gyeonggi-do)[4], other metropolitan areas (including Busan, Daegu, Daejeon, Gwangju and Ulsan), and other provinces (the remaining nine provinces of South Korea). Gender of first child is included as an important indicator for continued childbearing in a society with a long history of son preference.

Ignoring husband's contribution to second births would cause estimation bias when studying fertility in an East-Asian country where husband has been considered household's main bread winner. In this study, husband's education serves as a proxy for this socio-economic status. It is expected that women with high-educated husband have higher second birth rates than others, as their high-educated husband has the potential of collecting sufficient economic resources necessary for a bigger family size.

Women's career paths after first birth are very unstable; mothers enter and exit labor market and change jobs frequently after first birth. To capture how women's second birth intensity may have varied by their labor market characteristics after first birth, I specify three additional expanded models by expanding the category "participant" of "LFP after first birth" by their occupational status, income, and workplace of the first job that a woman undertook during motherhood (**see Appendix 1**).

Based on social economic index (SEI) scores of occupations as defined by Ganzeboom and Treiman (1996) and illustrated in **Appendix 2**, occupational status is stratified into low (e.g. elementary workers), middle (e.g. clerks and sales workers) and high (e.g. managers and professionals), representing occupational status with a socio-economic index score of "SEI <40", "SEI 40-50", and "SEI>50", respectively. Income is evenly divided into 3 parts based on the ordered distribution of income values of one-child mothers in employment within each calendar year: values lower than the 33rd percentile represent low level of income; values higher than the 66th percentile represent high level of income; and values in between stand for the middle level of income. Workplace is grouped into private sector, public sector and state-owned enterprises (SOE), and others. Women who fail to report the above labor market characteristics are categorized as "missing" in each respective covariate.

[4] Seoul, or the Seoul Special City, is the capital and largest city of South Korea. The Seoul National Capital Area includes the Incheon metropolis and most of Gyeonggi province. Around half of Korea's population currently lives in the Seoul National Capital Area and almost a quarter in Seoul itself. However, the proportion of births in this region is much low.

Table 1: Descriptive statistics of covariates in main effects models

	Person-months		Conceptions of 2nd birth
Time since first birth			
0-12m	25574	19%	501
13-30m	38339	29%	1107
31-60m	31369	24%	504
>60 m	35880	27%	119
Woman's age			
15-24	14953	11%	382
25-29	55128	42%	1276
30-34	41771	32%	525
35-44	19310	15%	48
Childhood residence			
Seoul Capital Area	34493	26%	575
Metropolitans	21113	16%	369
Other provinces	75556	58%	1287
Gender of first child			
Boy	75692	58%	1124
Girl	55470	42%	1107
Calendar years			
1980-84	25353	19%	405
1985-89	30614	23%	431
1990-94	25046	19%	481
1995-99	20501	16%	436
2000-06	29648	23%	478
Education			
Low	40147	31%	455
Middle	61117	47%	1231
High	29898	23%	545
LFP before first birth*			
Homemaker	43567	33%	558
Participant	87595	67%	1673
LFP after first birth*			
Homemaker	88412	67%	1649
Participant	42750	33%	582
Husband's education			
Low	29592	23%	333
Middle	57323	44%	1068
High	44247	34%	830
Total	131162		2231

a) Notes: *LFP – Labor force participation
b) Source: KLIPS, author's own calculations

Further, I accumulated women's postpartum work history to capture how women's cumulative employment time after first birth is associated with second birth intensity (**also see Appendix 1**). This variable is grouped into three levels: up to 1.5 years, 1.5 to 3 years and more than 3 years. It is expected that the more time women spend in the labor force when children are small, the less likely they are to continue childbearing.

Findings and discussions

Results from main effects models

Table 2 presents hazard ratios of second birth intensity from the main effects models. Model 1 involves only woman's age, childhood residence, gender of first child and calendar years. Models 2 to 5 build up by adding education, labor force participation before first birth, labor force participation after first birth and husband's education step by step.

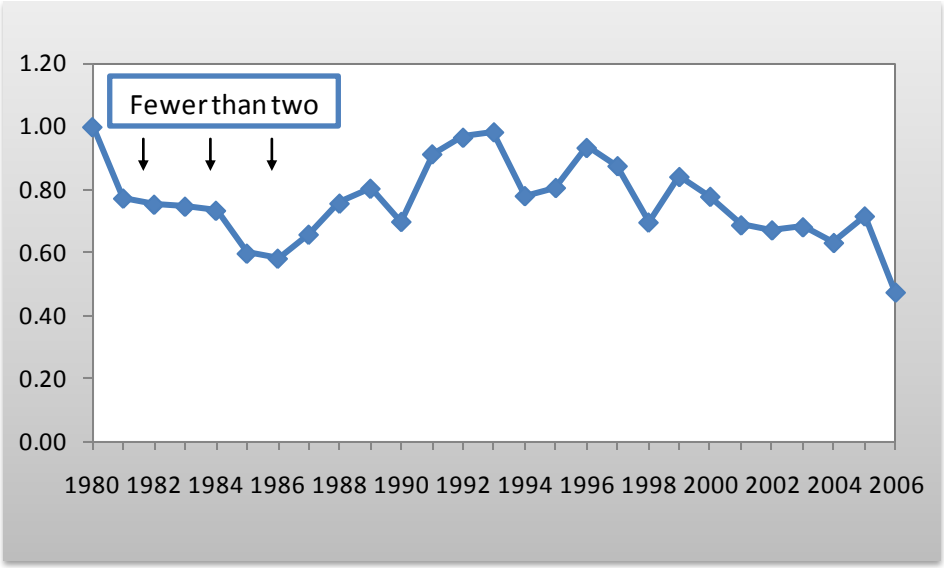
Estimates of calendar periods show that second birth trend fluctuated over the study period (see **Table 2**). To capture how the trend developed in more detail, I expanded Model 5 by replacing calendar periods with single years while standardizing for all other variables. The results are presented in **Figure 5**. It is clear that the second birth trend develops in accordance with the practice of family planning program. During the 1980s when the family planning program was at its last stage and the "fewer than two" concept was propagandized, the second birth trend headed toward its lowest point, with second birth rates decreasing by some 40%. In the early 1990s when the family planning program had been abolished, the trend returned to the level of 1980. This level was sustained for some 10 years. However, at the turn of the 21st century, the second-birth level declined again.

Table 2: Relative risks of second births, Korea 1980-2007

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Haz. Ratio	P>z	Haz. Ratio	P>z	Haz. Ratio	P>z	Haz. Ratio	P>z	Haz. Ratio	P>z
Time since first birth										
0-12m	0.65	***	0.65	***	0.65	***	0.64	***	0.64	***
13-30m	1		1		1		1		1	
31-60m	0.64	***	0.65	***	0.65	***	0.67	***	0.67	***
>60 m	0.18	***	0.19	***	0.19	***	0.20	***	0.20	***
Woman's age										
15-24	1.06		1.08		1.09		1.11	*	1.12	*
25-29	1		1		1		1		1	
30-34	0.78	***	0.79	***	0.79	***	0.80	***	0.79	***
35-44	0.26	***	0.27	***	0.27	***	0.27	***	0.27	***
Childhood residence										
Seoul Capital Area	1		1		1		1		1	
Metropolitans	0.99		1.00		0.99		1.00		1.00	
Other provinces	1.03		1.05		1.05		1.05		1.06	
Gender of first child										
Boy	1		1		1		1		1	
Girl	1.20	***	1.18	***	1.19	***	1.19	***	1.19	***
Calendar years										
1980-84	1.08		1.14	*	1.17	**	1.17	**	1.17	**
1985-89	1		1		1		1		1	
1990-94	1.36	***	1.30	***	1.27	***	1.28	***	1.27	***
1995-99	1.34	***	1.26	***	1.22	***	1.23	***	1.22	***
2000-06	1.05		1.00		0.96		0.98		0.97	
Education										
Low			1		1		1		1	
Middle			1.30	***	1.29	***	1.27	***	1.16	**
High			1.22	***	1.20	**	1.21	***	1.08	
LFP before first birth										
Homemaker					1		1		1	
Participant					1.19	***	1.24	***	1.24	***
LFP after first birth										
Homemaker							1		1	
Participant							0.85	***	0.85	***
Husband's education										
Low									1	
Middle									1.16	**
High									1.22	**
Constant	0.02		0.02		0.02		0.02		0.02	
No. of subjects	3323									
No. of conceptions	2231									
Time at risk	131162									
LR chi2	1052.11		1071.74		1082.81		1093.41		1099	
Log likelihood	-3977.93		-3968.12		-3962.59		-3957.29		-3954.49	
Prob > chi2	0.00		0.00		0.00		0.00		0.00	

a) Notes: Statistical significance: ***p<.01; ** .01<p<.05; * .05<p<.10
b) LFP: Labor force participation
c) Source: KLIPS, author's own calculations

Figure 5: Relative risks of second births by single years, one-child mothers in Korea, 1980-2007 (Reference category: 1980)



a) Source: KLIPS, author's own calculations

Many possible pathways may explain the most recent decline, among which the following deserve consideration. First, the social insecurity brought about by the 1997 financial crisis increased constraints for family expansion. The sense of uncertainty during the economic downturn period and thereafter may cause families to go for smaller family size. Second, the rising cost of educating children since the 1990s and the increasing competition in entering universities and the job market may encourage parents to treasure the "quality" rather than the "quantity" of children.

Women have a higher second birth rate by 24 per cent if they had labor force participation experience before first birth than if not (Models 4 and 5). This finding not only reflects that women's employment engagement before becoming a mother is socially approved, but also underlies the importance of having a secured and stable social position before entering parenthood in Korean society.

Women engaged in postpartum economic activity have significantly lower second birth intensity than do homemakers. Retaining a job after first birth seems to signal an interruption of childbearing career or can be seen as an obstacle to continued childbearing in Korean society. To some extent, it reflects that the social policy support is not sufficient to facilitate reconciliation of their productive and reproductive career. In a context of demanding working hours, fewer child-care services, and restricted parental leave, opting for one is at the risk of blighting the other. A further explanation to

this pattern is that women returning to employment are more career-oriented than others. They may be more satisfied with having only one child than are the homemakers.

Estimates for women's educational attainment from Models 2-4 reveal that women with an attainment of high school education are more likely to have another child than women with other educational levels. Involvement of labor force participation either before or after first birth does not make much difference to these estimates. A significant change occurs when husband's education is taken into account: the difference across woman's own educational levels is significantly reduced, indicating that a woman's second birth intensity in Korea is substantially subject to her husband's socio-economic status, namely his potential of collecting economic resources necessary for a bigger family size. Estimates of husband's educational attainment demonstrate that the higher educational achievement a woman's husband has, the more likely she is to have a second child.

Estimates of control variables show that women's likelihood of having a second child is significantly reduced 5 years after the first birth. the intensity becomes lowered after women turn 30. Son preference is an important driving force for second birth fertility: families who got a girl for the first birth have around 20 per cent higher second birth intensity than do families that got a boy. Women who grew up in provinces have slightly higher likelihood of having a second child than do women who grew up in Seoul area or other metropolitans, but the difference in intensities are small and not significant.

Results from expanded main effects models

To see how women's labor market characteristics after first birth are associated with their second birth intensity, I expanded Model 5 into four additional models (Models 5A-5D) by expanding the category of participant of "LFP after first birth" with further detail on occupational status, income, and workplace of the first postpartum job and cumulative employment history after first birth, while standardizing for all other variables in Model 5 (**Table 3**). Estimates of other variables resemble those presented in Model 5, and are thus not shown.

High occupational status seems to have significantly enhanced the probability of continued childbearing. Likewise, middle- and high-income earners have higher probability of having a second child than low-income earners, though the difference between the levels was small and insignificant. These results indicate that the influence of potential in gathering economic resources during motherhood on second birth intensity was positive. Model 5C shows that retaining a job at public sector improves the likelihood of having a second child, though this difference was insignificant. Given that these women usually hold stable employment positions; and that they are the potential

beneficiaries of maternity or parental leave, the result implies that the role of stable employment and eligibility for welfare benefits may play a positive role in women's likelihood of continued childbearing. The Expected negative effect of cumulative work experience during motherhood is not seen.

Table 3: Relative risks of second births by female labor market characteristics after first birth, standardized for other covariates (results from models expanded from model 5)

Model 5A	**Haz. Ratio**	**p>z**	**Log likelihood**
Occupational status (first job after first birth)			-3952.89
Homemaker	1.36	***	
SEI<40	1		
SEI 40-50	1.17		
SEI>=50	1.26	*	
Missing *	1.24		
Model 5B			
Income (first job after first birth)			-3954.01
Homemaker	1.22		
Low	1		
Middle	1.12		
High	1.07		
Missing	1.01		
Model 5C			
Workplace (first job after first birth)			-3950.92
Homemaker	1.15		
Private	1		
Public	1.17		
Others	0.54		
Missing	0.93		
Model 5D			
Work experience (accumulated after first birth)			-3954.27
Homemaker	1.16	**	
<1.5 years	1		
1.5-3 years	0.94		
>3 years	1.00		

a) Notes: Statistical significance: ***p<.01; ** .01<p<.05; * .05<p<.10
b) The estimation of missing values in "occupational status" is not statistically significant because of limited number of cases in this category.
c) Source: KLIPS, author's own calculations

Results from interaction models

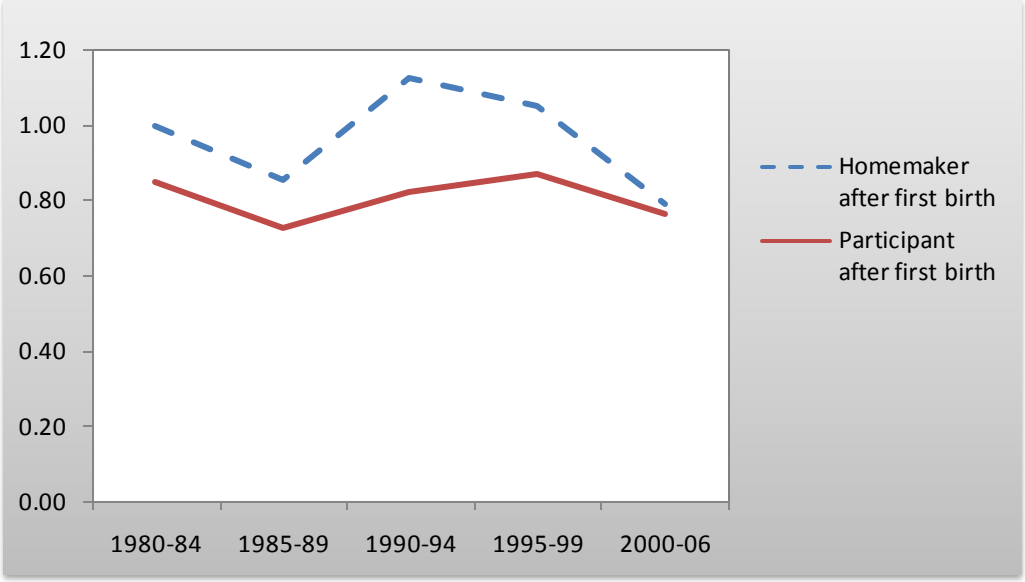
The interaction term between calendar period and women's employment activity after first birth deserves attention (see **Figure 6).** During our observation time, women who stay at home as homemakers after first birth have always been more likely to have a second child than one-child mothers in the labor force. Largely influenced by the family planning program, birth trends for both groups headed downward in the 1980s. Stimulated by the abolishment of this policy in 1988, the trend for homemakers strikingly turned upwards. However, this reversal was temporary; the trend declined again at the turn of the century. Women in the labor force were somewhat slower in reacting to the policy change. Their second birth trend was also reversed but at a more moderate pace.

An interaction term of women's labor force participation before and after first birth further reveals that women who were converted to homemakers upon entering motherhood had especially elevated intensity of having a second child (see **Figure 7**). Complementary to the findings discussed above, the result suggests that women determined to leave the labor market upon family expansion tend to be more family oriented. They were more fully prepared to fulfill their role as a care provider and more ready to proceed to continued childbearing than others.

Another interesting finding is worth a few lines, despite not being the focus of this study. **Figure 8** discloses that in the 1980s women who got a girl for the first birth had significantly higher probability to continue childbearing than did women who had a boy. However, this difference has been substantially reducing over time. By the end of our observation, the difference was practically non-existing. The result reveals that son preference, which was once a prime notion and a driving force for family's continued childbearing loses its influential power today.

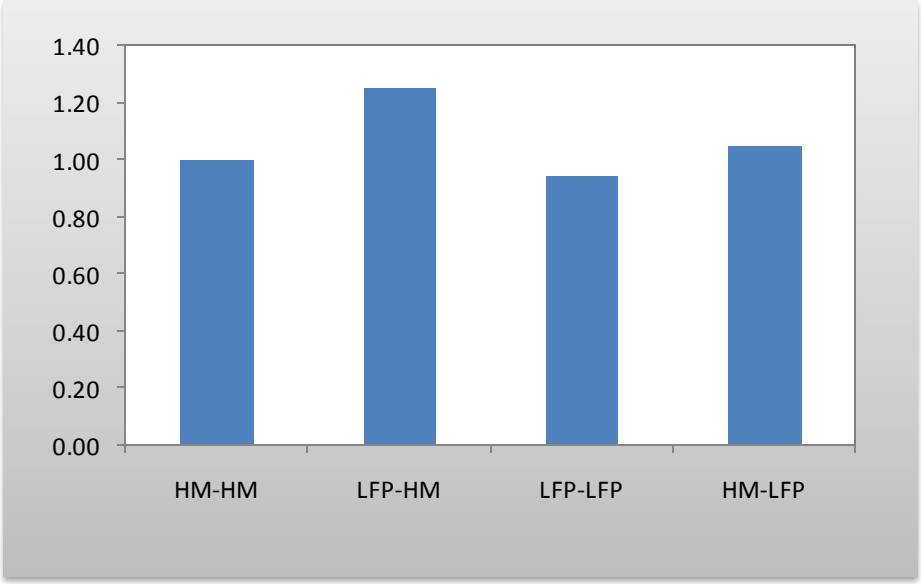
An interaction term of woman's own education and duration since first birth does not show that highly educated women tend to concentrate first and second births within a shorter interval than others. I have specified other interaction models for the evidence of further interactive effect. These results are in line with the multiplicative findings from the main effects model, and thus not presented in this paper.

Figure 6: Interactive effect of women's labor force participation after first birth and calendar periods, second births in Korea, 1980-2007 (Reference category: Homemaker after first birth, 1980-84)



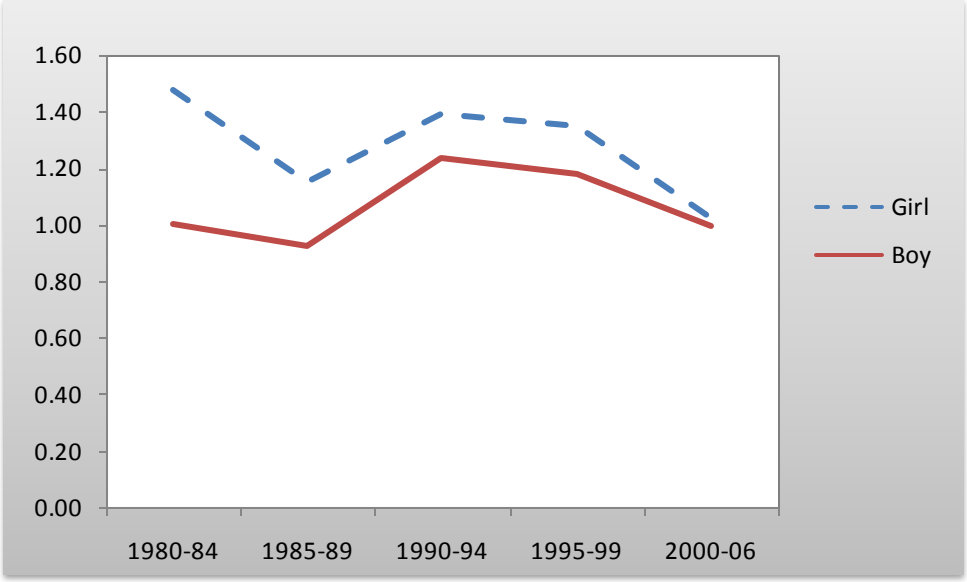
Source: KLIPS, author's own calculations

Figure 7: Interactive effect of women's labor force participation before and after first birth, second births in Korea, 1980-2007 (Reference category: Homemaker-Homemaker)



Notes: HM – Homemaker; LFP – Labor force participant
Source: KLIPS, author's own calculations

Figure 8: Interactive effect of gender of first child and calendar periods, second births in Korea, 1980-2007 (Reference category: Boy, 1980-1984)



Source: KLIPS, author's own calculations

Robustness check

To assess the robustness of our estimates of the contribution of the independent covariates, I tried involving educational level of women's parents and women's own religion into analysis; and found that low educational attainment of women's parents slightly propels women's second birth intensity; and that catholic women are under slightly higher risks of having a second child than are others. Further, I tried replacing women's age with the fixed value at first birth and found that women who enter motherhood at later ages have lower second birth rates, indicating that postponement of first birth reduces the likelihood of second birth intensity. In addition, I tried expanding the category of participant of "LFP before first birth" with detailed job characteristics of woman's last job before first birth; the role of these characteristics becomes vague and unclear when women's current postpartum labor force participation is involved. These results are not presented in the paper, as involvement of new variables or re-specification of existing variables neither makes notable change to the estimated results nor improves the model's fit significantly.

Conclusion

This study has enriched our understanding of Korea's fertility development by presenting the association between women's labor force participation and their second birth intensity; and how the practice and abolishment of family planning program may have contributed to this relationship. Event history analysis has been applied to longitudinal data. Main effects models and interaction models have been specified to address the research questions.

Results show that Korea's second birth fertility was indeed related to the practice and abolishment of the family planning program in 1988. During the 1980s when the program was in practice, the trend was heading down to its nadir. After the program was discarded, the trend started to reverse and quickly reached the level of 1980 again. However, the policy change only temporarily exhilarated second birth fertility. At the turn of the 21st century, the birth trend declined anew and then leveled off till the end of our observation time. Social insecurity during and after the financial crisis, insufficient family policy support, and high cost of educating children are argued to have helped shape the most recent trend.

Women's employment engagement before motherhood transition and leaving the labor market for homemaking after the transition is socially expected behavior. Labor force participation after first birth signals an interruption of a woman's reproductive career. One-child mothers who were labor force participants had significantly lower second birth intensity than homemakers. When the family planning program was in practice, birth trends for both homemakers and labor force participants headed downward. The abolishment of family planning program temporarily exhilarates second birth rates of homemakers, more strongly than that of one-child mothers in the labor force.

This study also reveals that a woman's second birth intensity in Korea is highly susceptible to her husband's educational attainment. Given that high educational attainment is an important indicator for socio-economic status in Korean society, the result suggests that the maintenance of two-child norm in Korean families is dependent on husband's potential of collecting economic resources.

Findings of this study arouse some reconsiderations of Korea's social policy during our observation period. In a context where women had to work long hours; flexible working was almost impossible; childcare services for children under three years' old were limited; and paid parental leave was not universal, incompatibility of work and family responsibilities would be prominent. When mothers had to choose between their productive and reproductive careers; the choice of one signaled the possible forgoing of the other. Since 2006, Korean government has made strides in creating a more

family-friendly environment. Welfare expansions thereafter may have improved work-life compatibility. However, available data only stretch to 2007. To get a more updated picture of the recent development in Korea, further research based on more recent data is needed. It is hoped that findings of this study may motivate further data collection. They serve the purpose to stimulate the on-going debate in East Asia about whether to promote policies aiming at work-life balance.

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Appendix 1: Descriptive statistics of covariates for advanced main effects models

	Person-months		Conceptions of 2nd birth
Occupational status (first job after first birth)			
Homemaker	88412	67%	1649
SEI<40	11611	9%	110
SEI 40-50	21502	16%	305
SEI>=50	7786	6%	144
Missing	1851	1%	23
Income (first job after first birth)			
Homemaker	88412	67%	1649
Low	4577	3%	64
Middle	5642	4%	107
High	6142	5%	104
Missing	26389	20%	307
Workplace (first job after first birth)			
Homemaker	88412	67%	1649
Private	9188	7%	147
Public	5329	4%	114
Others	1012	1%	7
Missing	27221	21%	314
Cumulative work experience (after first birth)			
Homemaker	88412	67%	1649
<1.5 years	18793	14%	337
1.5-3 years	10124	8%	156
>3 years	13833	11%	89
Total	131162		2231

Source: KLIPS, author's own calculations

Appendix 2: Korea standard classification of occupations (KSCO) and corresponding social economic index (SEI) scores based on Ganzeboom and Treiman (1996)

KSCO	SEI score
1. Managers	55
2. Professionals and related workers	70
3. Clerks	45
4. Service workers	40
5. Sales workers	40
6. Skilled agricultural, forestry and fishery workers	23
7. Craft and related trades workers	34
8. Equipment, machine operating and assembling workers	31
9. Elementary workers	20