Long-term effects of economic recession on fertility: The case of South Korea

Doo-Sub Kim [1] and Sam Hyun Yoo [2, 3]

Manuscript prepared for the European Population Conference

Mainz, Germany

31 August to 3 September, 2016

[1] *Department of Sociology, Hanyang University, Seoul, South Korea*

[2] *International Institute for Applied Systems Analysis, Laxenburg, Austria*

[3] *Wittgenstein Centre (IIASA, VID/ÖAW, WU), Vienna, Austria*

Contact: yoosam@iiasa.ac.at

Abstract

Economic recessions influence the levels and timing of fertility. Fertility frequently declines during economic recessions, and worsening economic conditions also lead to fertility postponement. However, the literature primarily focuses on the temporal effects of economic consequences such as changes in the unemployment rate at the micro and macro levels. However, an economic recession, which often leads to broader societal changes, may have longer-term effects on fertility. Furthermore, research analyzing the economic impacts on fertility outside of Western nations is rare. To address this research gap, we investigate the impacts of economic recession on fertility in South Korea. The country was the most affected by the Asian Economic Crisis from 1997–1998 among East and Southeast Asian countries. We test whether the economic crisis has changed how women value children and has led to lower levels of completed fertility. We use the *Korea National Surveys on Fertility, Family Health and Welfare* between 1991 and 2015, a series of cross-sectional surveys conducted every three years, but also consider various sources, such as censuses and vital statistics. We review trends in marriage and fertility and conduct both micro- and macro- level analyses. The results suggest that the economic crisis in the late 1990s further lowered the value of children among ever-married women, which had already been in decline. The recession also delayed women's marriage and childbearing leading to a decline in cohort fertility: completed fertility that was mainly mediated by the timing of first marriage. The negative recession effects were more pronounced among women married at later ages. Our study suggests that changes in values, attitudes and fertility behaviors triggered by an economic recession can last more than a couple of decades.

Introduction

Economic recessions affect the dynamics of family formation and fertility in diverse ways. A decline in GDP and a rise in unemployment rates are often negatively associated with period total fertility rates (TFRs) at the aggregate level (e.g., Billingsley 2010; Goldstein et al. 2013; Schneider 2015; Sobotka, Skirbekk and Philipov 2011). Income decline and unemployment lower the likelihood of childbearing at the individual level (e.g., Adsera 2004, 2005, 2011; Ahn and Mira 2001; Kravdal 2002; Matysiak and Vignoli 2008). Unemployment and perceived job insecurity affect decisions for family formation and fertility raising the "opportunity cost" of childbearing, although its effect may differ by age, education, and social group (Bernardi, Klärner and Von der Lippe 2008; Kreyenfeld 2010; Matysiak and Vignoli 2008; Ranjan 1999; Schneider and Hastings 2015; Vikat 2004). During recessions, young couples often postpone family formation and time in higher education tends to be extended, which in turn reduces the chance to have a child (Andersson 2000; Jones 2007; Prioux and Mandelbaum 2003; Vikat 2004). In contrast, unemployed youths may decide to have a child under economic downturns depending on the welfare regime and social services (Matysiak and Vignoli 2008; Vikat 2004). Increased economic uncertainty and job instability conscript fertility intentions and make long-term commitment (e.g., childbearing) difficult. Consequently, despite a few exceptions, economic recessions generally lead to a temporary decline in period fertility a couple of years later (Sobotka, Skirbekk and Philipov 2011). As such, a decline in fertility is often recovered by a compensatory catching-up process later when economic conditions have improved; therefore, recession effects on fertility are generally considered short-term.

Recession effects on fertility, however, can be longer-term if a recession is prolonged (e.g., economic depression) or if a catch-up process is not observed (Thévenon 2015:86). The

Great Depression in the United States induced postponement of marriage and a decline in birth rates (Kirk 1960; Ryder 1980). From the cohort perspective, the depression eventually led to an increase in the number of women who remained childless or had only one child by the end of their reproductive span (Campbell 1978; Cutright and Shorter 1979; Morgan 1996). When economic recession persists for several years, as in the 1970s recession and economic shocks in Central and Eastern Europe in the early 1990s, a temporary delay in childbearing usually ends up causing fewer children or an increase in the number of childless couples (Conrad, Lechner and Werner 1996; Hobcraft 1996; Philipov and Dorbritz 2003; Sobotka 2003). However, a long-term secular decline in fertility makes it difficult to disentangle the various effects of a fertility-depressing recession.

An economic crisis is often accompanied by a change in economic structure such as restructuring and massive layoffs. A rapid economic change, uncertainty and anxiety about the future can break down existing norms and values on family and childbearing leading to social anomie. Once value conflicts and disorientation occur, it may last a long time until alternative norms and institutions appear (Philipov 2002). In the states of Central and Eastern Europe, for instance, a fertility decline occurred in the transition to a market economy in the early 1990s and there has not yet been a completely recovery, even though it might be close to depression and in part related to political transitions (Billingsley 2010; Philipov and Dorbritz 2003; Sobotka 2003). In fact, there have been rare cases where a recession has had a longer-term effect on fertility without a catch-up process. As an example, Eloundou-Enyegue and colleagues (2000) reported that the economic crisis in 1987 initiated a fertility decline in Cameroon, which lasted for more than a decade after the crisis. In more recent years, Latvia has experienced a substantial fertility decline in response to the 2008 recession, though it seems too early to judge whether there will

be longer-term effects (Sobotka et al. 2011: 228-229). The question then arises whether a crisis-driven fertility decline can happen in advanced economies that have already reached low fertility.

Understanding the effect of the Asian Economic Crisis is essential for explaining low fertility in South Korea. South Korea (hereafter Korea) was the most affected by the Asian Economic Crisis among East and Southeast Asian countries. The economic crisis, which was triggered by a liquidity crisis, began in December 1997 when the government requested help from the International Monetary Fund. The massive layoffs and reconstruction that followed the onset of the economic crisis came as a shock to a society that was used to rapid economic growth and lifetime employment. Increased economic uncertainty altered the values and attitudes of youth towards family and fertility, resulting in late and less marriage and very low fertility (Eun 2003; Kim 2005). The literature frequently refers to the Asian Economic Crisis as a turning point in explaining the low fertility of Korea, but the discussion about the recession's effects on fertility has mostly remained theoretical. Empirical research analyzing the effects of this recession is rare, probably due to a lack of quantitative data that covers the period. A few studies have referred to a possible link with recession effects in explaining delays in marriage and childbearing or the association between female labor force participation and childbearing (e.g., Kim 2014; Ma 2013, 2014; Park, Lee and Jo 2013; Woo 2012; Yoo 2006, 2014). However, their primary focus was not on the effects of recession. As an exception, Kim (2013) looked at socioeconomic differentials in marital fertility and found that during the recession fertility declined more among women with lower educational attainment and occupational status. However, his study was limited to short-term changes in fertility after the economic recession and did not therefore take into account the timing of childbearing.

This study examines whether the Asian Economic Crisis from 1997–1998 has had longer-term effects on fertility. We argue that the Korean experience provides an interesting case where a catching-up process after a recession is missing. It should be noted that we distinguish the Asian Economic Crisis from the Great Recession of 2008. The later negatively affected the Korean economy, but the impact was not as severe as the former crisis. Definitions of economic recession are diverse, but most studies consider a decline in two consecutive quarters in actual GDP as an economic recession (e.g., Sobotka et al. 2011). The former resulted in a decline in three consecutive quarters in actual GDP, from the 4th quarter in 1997 to the 2nd quarter in 1998 whereas the latter led to a decline in the 4th quarter in 2008 only (see Figure 1).

<Figure 1 is here>

We focus on the Asian Economic Crisis from 1997–1998 and look at the changes in attitudes towards the value of children, the timing of first marriage, and completed family size. As the birth cohorts that met the Asian Economic Crisis in their late 20s reach the end of their reproductive period, it now becomes possible to test whether the economic crisis has affected fertility behaviors. We test the role of childlessness, marriage timing, and marital fertility in understanding the change in cohort fertility. In line with prior research, we hypothesize that the economic recession has reduced the value women put on children, delayed the timing of marriage and childbearing, and lowered levels of childbearing. We expect that the economic crisis has altered long-term trends in marriage and fertility rather than just had temporary effects.

Data and Methods

Data

We use various data from censuses, vital statistics and survey data. Most demographic trends in marriage and fertility are available online through the Korea Statistics Information System (KOSIS), but we also used microdata from the census and vital statistics when necessary. For the analysis of ever-married women, we rely on the data from the *Korea National Surveys on Fertility, Family Health and Welfare* between 1991 and 2015. They are a series of cross-sectional surveys with nationally representative samples of ever-married women conducted every three years. The survey samples differ slightly by survey (e.g., age); however, these surveys are useful to test periodic changes in women's values as well as fertility behaviors because the survey designs and core questions have remained the same or are similar across surveys. All of the surveys provide individual weights, but the 2009 survey only has household weights. We use individual weights for all surveys, but also consider household weights for the 2009 survey. As individual weights are calculated by adjusting the individual response rates in each sampling unit to the household weights, both the individual and household weights should not be very different from each other. We normalized the weights for each survey by dividing the weight value by its mean in order to adjust the differences in the scale of the weights across the surveys. For this study, we pooled all the ever-married women from nine surveys between 1991 and 2015 and primarily used a subsample of ever-married women aged 15 to 44.

Measures

Period measures of marriage: We use women's mean age at first marriage, period total first marriage rates (TFMRs), and the table-based total first marriage rate between 1990 and 2014. We compare conventional TFMRs with table-based TFMRs and tempo-adjusted measures. The conventional TFMR, the sum of the marriage rates for single persons per age group, is frequently used for a period measure of first marriage. As it is often distorted when the timing of the first

marriage changes, we also consider table-based TFMR, also known as period proportion ever-married (PPEM). The table-based TFMR is computed by summing the age-specific intensities of marrying from the period nuptiality table, rates of the "first kind" (Bongaarts and Feeney 2008). To compute the age-specific intensities of first marriage, we use the age-specific number of never-married women, instead of the age-specific number of all women. We further adjust it by dividing the age-specific intensities with one minus annual change in the mean age at first marriage. These measures and tempo adjustments can be expressed as follows:

$$TFMR(t) = \sum_a F_m(a,t)$$

$$PPEM(t) = 1 - l_{50}(t) = 1 - \exp[-\sum_a p_m(a,t)]$$

$$r_m(t) = \frac{[MAFM(t+1) - MAFM(t-1)]}{2}$$

$$TFMRp^*(t) = 1 - \exp\left\{-\sum_a \frac{p_m(a,t)}{[1-r_m(t)]}\right\}$$

where the subscript a indicates exact age a, subscript t indicates year t, F_m indicates the age-specific first marriage rate while p_m and r_m represent the age-specific probability of first marriage and the annual change in the mean age at first marriage, respectively.

In computing these measures, we construct the 2010 period marriage table with the marital distribution of the female population by age from the latest 2010 census and update it with vital registration records for the following years. In the same manner, the marriage tables are also updated backward to 1990. The detailed procedure for reconstructing the period marriage tables is equivalent to computing the fertility tables outlined in the method protocol (Jasilioniene et al. 2012) for the Human Fertility Database (http://www.humanfertility.org). As we focus only on first marriage, the tempo-adjusted measures using a nuptiality table should be

close to one another (Bongaarts and Feeney 2008; Bongaarts and Sobotka 2012; Kohler and Ortega 2002; Winkler-Dworak and Engelhardt 2004).

Period measures of fertility: We also review women's mean age at first marriage, period total fertility rates (TFRs), and tempo-adjusted TFRs for the same period. We benefit from a prior study analyzing tempo effects in fertility in Korea. In our review, the tempo-adjusted TFRs indicate the Bongaarts-Sobotka method, which is known to be the most stable over time. The change in the timing and levels of the period fertility informs us whether the economic crisis delayed the timing of childbearing and to what extent it actually lowered levels of fertility.

Variables from survey data: We use 1) the value of children and 2) the completed marital fertility. For the value of children, each survey asks the respondents the following question, "Do you think that people should have a child(ren) once they marry?" The choices were "must have," "do not necessarily have to," and "don't know" in 1991, but were changed into "must have," "better to have," "doesn't matter," and "don't know" in the following years. The question was conditional on marriage, but the samples were restricted to ever-married women. In the 2015 survey, however, the question wording was changed to "Is it necessary for you to have a child?" and thus, it is no longer comparable.

We recode the responses to the question as a dummy variable, whether respondents agreed that people "must have" a child or not. To ensure comparability across surveys, we do not combine "must have" with "better to have." As the great majority of women (about 87%) agreed with the value of having a child in one form or another, combining the two categories generated little variation. Because the question and corresponding choices were exactly the same between 1997 and 2000, any difference between 1997 and 2000 should not be attributable to a difference

in the survey designs. We use the percentage of ever-married women (ages 15–44) agreeing with the statement above.

For completed marital fertility, we measure the average number of children ever born among ever-married women at ages 40 to 42, assuming that a women's reproductive period ends at age 40. As the survey is repeated every three years, we group the sample into three-year birth cohorts so that we can easily compare completed fertility across ages, birth cohorts, and surveys.

Age and birth cohort are directly measured in each survey, but we adjust age so that women born in the same calendar year have the same age. We consider the timing of first marriage (age and year) in the analysis because it affects completed family size in the context of universal marriage. Age at first marriage is also categorized into three-year intervals with open-ended intervals for those who married at less than 21 and at age 33 or older (e.g., <21, 21-23, 24-26, 27-29, 30-32, 33+). Any change in the interval between first marriage and first birth has not yet been reported. Assuming that the interval is stable over time, we look at completed marital fertility according to the timing of first marriage.

Analytic strategy

Our analysis consists of three parts. First, we check whether the value of having a child has changed since the economic crisis. This trend can inform us whether the crisis-driven fertility change was accompanied by any changes in the values and attitudes toward family and fertility. Then, we review trends in marriage and fertility, whether and to what extent the recession has changed the timing and levels of first marriage and fertility. We separate first marriage and childbearing and apply tempo adjustments. It is of particular interest to determine the extent to

which postponement of marriage and childbearing depressed the period rates of marriage and fertility.

In the final part, we test whether the economic recession eventually lowered the cohort fertility rates. In the context of Korea where out-of-wedlock births are rare, completed cohort fertility can be interpreted as a function of marital composition and completed marital fertility. Completed marital fertility can then be expressed as a function between the age distribution of first marriage and completed fertility rates corresponding to age at first marriage. In this sense, the economic recession can decrease completed cohort fertility by 1) raising the number of never-married women (a rise in childless women), 2-a) delaying first marriage (a change in the age distribution of first marriage), and 2-b) lowering fertility rates among ever-married women. We conduct a two-phase decomposition analysis, as in a prior study (Berrington, Stone and Beaujouan 2015). We compare cohort fertility at ages 40 to 42 between the 1958–1960 birth cohort and the 1973–1975 birth cohort, the birth cohorts that faced the economic crisis at ages 37 to 39 and at ages 22 to 24, respectively. The 1958-1960 birth cohort is also often considered as the threshold between two distinct transitions in Korea, falling fertility from high to replacement level and a subsequent drop to lowest-low levels (Yoo 2014; 2016). This two-phase decomposition analysis allows us to assess the relative contributions of the changes in childlessness, marriage timing, and fertility rates to the decline in completed fertility that has happened since the economic crisis.

Results

Changes in values and attitudes

The declining trend in the value of children has been accelerated after the economic crisis from 1997–1998. Figure 2 shows the change in the percentage of married women agreeing with the statement, “People should have a child once they marry.” The share of women strongly agreeing with this statement significantly dropped after the recession, from 74% in 1997 to 58% in 2000, and since then it has remained below 60% until 2012 without recovery. Because the question wording changed in the 2015 survey, the rise in the percentage in 2015 is not comparable. The substantial drop between 1997 and 2000 and the secular downward trend are robust whether we look at an age-specific pattern or a cohort pattern (Appendix A). Given that the value placed on having a child is lower among single women than ever-married women (Lee et al., 2016), the fall is not attributable to either marriage selection or a decline in marriage. Taken together, it demonstrates that the economic recession has lowered the value of having a child among ever-married women in the country.

<Figure 2 is here>

A decline in nuptiality and fertility

Nuptiality has declined in Korea since the economic crisis. As marital fertility remains dominant in the country, the timing and prevalence of marriage is an important proximate determinant of fertility. Figure 3 shows that women’s mean age at first marriage has increased from 24.8 in 1990 to 29.8 in 2015. Note that annual rises of more than 0.2 years are concentrated in the period after 1997. Such a rapid rise in the mean age at first marriage continued until 2012, except for 2006 when a wedding boom occurred in a double-spring lunar year, a year believed to bring double fortune to newly married couples. Although the rise in the mean age at first marriage changes year to year, the trend in annual change demonstrates that the timing of first marriage has increased since the crisis.

<Figure 3 is here>

Figure 4 displays the period measures of first marriage. All three measures (the TFMRs, table-based TFMRs, and tempo-adjusted TFMRs) share a declining trend with some variation, and the declining trend was further accelerated soon after the economic crisis from 1997–1998. For instance, conventional TFMR was already on a declining trend in the early 1990s and began to drop further after the economic crisis. The fall in the TFMRs continued until 2004, reaching an all-time low of 0.64 in 2003. Although the trend in TFMRs has made a moderate rebound and fluctuation in the last decade, it has never recovered to its original level (0.8 or above) before the economic crisis. Note that the sudden rise in the TFMR in 1996 is attributable to the legislation of a special act at the end of 1995, the Act on Special Cases Concerning Marriage, which temporarily lifted the ban on same surname and family origin marriages.

In the same figure, both table-based TFMRs and tempo-adjusted TFMRs also declined over time but had much higher levels of first marriage. The table based TFMRs, which take into consideration marital composition, show a moderate decline through the observed period, reaching 0.82 in 2014. The tempo-adjusted TFMRs have a modest slope, but it also declined from near 1.0 in 1991 to 0.89 in 2014, suggesting the end of a universal marriage pattern in the country. The difference between the conventional TFMR and the tempo-adjusted TFMR became greater in the late 1990s and early 2000s. The shift of first marriage to later ages, presumably accelerated by the economic crisis, has depressed conventional TFMRs to a great extent in this period. Although considerable tempo effects still remain, undistorted TFMRs already began to drop soon after the crisis and have continued to decline.

<Figure 4 is here>

The economic crisis increased marriage dissolution as well, although divorce rates are still much lower than those in Western countries. The rise in women's crude divorce rates continued in all age groups during and after the economic crisis (see Appendix B). The sustained rise in crude divorce rates brought about public concern over their rapid growth. This resulted in legislation of a so-called "cooling-off period", a period before divorce was first introduced in 2004 and adopted later as a national law, turning the rising trend around (Lee 2013).

The Asian Financial Crisis from 1997–1998 also altered the fertility pattern. According to Yoo and Sobotka (2016), the economic crisis first delayed childbearing and then lowered the levels of fertility in Korea. Figure 5 shows the period measures of fertility and the mean age at first birth. Conventional TFR, which had been around 1.6 or above, began to fall rapidly after the economic crisis and has stabilized around 1.3 or below. Tempo-adjusted TFR, which takes into account both tempo and parity distortions (Bongaarts and Sobotka 2012), has displayed a moderate and consistent decline since 2000.

When order-specific tempo effects are taken into account, the decline in undistorted TFRs after the economic crisis is more related to the fall in the second birth rates (see the lower graph in Figure 5). The prolonged decline of the second birth rates since the crisis and the drop in the first birth rates with a time lag of a decade have been leading the fertility decline in the country for the last two decades. Consequently, undistorted TFR reached below 1.5 for the first time in 2014 while conventional TFR has remained below 1.3 since 2000.

<Figure 5 is here>

Did the recession eventually lower completed fertility?

We have shown evidence that both marriage and fertility, along with the value of having a child, have declined since the economic crisis. Now we examine whether the economic recession actually lowered the rate of completed fertility. The effects of recession on fertility may differ according to an individuals' age at the time of a recession. We compare completed cohort fertility by focusing on the timing of first marriage and completed fertility according to age at first marriage.

Figure 6 shows cohort fertility at ages 40 to 42 among ever-married women for different birth cohorts by year and age at first marriage. By and large, age at first marriage is negatively associated with completed marital fertility (see the upper graph). The descending gradient in fertility with age at first marriage, however, became steeper after the economic crisis, especially among women who married at late ages (e.g., age 33 or older). The greatest gradient was found among women born from 1970–1972, and to a lesser extent, also among those born in 1973–1975. Compared to previous cohorts, the latest 1973–1975 birth cohort actually has more late marriages (e.g., marrying at age 30 or older) and lifetime singles by ages 40 to 42, as will be shown later. Women who married after the crisis are associated with fewer children even after taking into consideration age at first marriage. The decline in marital fertility among those marrying at late ages directly contributed to the decline in the cohort fertility rates.

<Figure 6 is here>

We further investigate the relative contributions of marital composition, marriage timing, and fertility rates to the decline in completed cohort fertility. Table 1 suggests the results of a two-phase decomposition analysis. Women born from 1973–1975 have similar levels of completed marital fertility as those born from 1958-1960 if they first married at ages 24 to 29. Otherwise, the two cohorts have slightly different fertility. In the decomposition result, the

completed marital fertility declined, from 2.02 for the 1958–1960 birth cohort, to 1.88 for the 1973–1975 birth cohort. The age distribution of first marriage suggests that the age at first marriage gradually moved to later ages among the 1973–1975 birth cohort. The completed cohort fertility for all women is estimated to be 1.97 for the 1958–1960 birth cohort and 1.69 for the 1972–1975 birth cohort when the proportions of never-married from the census were applied.

The decomposition analysis suggests that 52% of the decline in completed fertility (-0.14 over -0.27) is attributable to the rise in the never-married proportion whereas the change in completed marital fertility accounts for the rest of the decline (48%, -0.12). The change in marital fertility is further divided into the timing change of first marriage (41%, -0.11) and the change in fertility rates according to age at first marriage (7%, -0.02).

In short, a decline in completed fertility is clear between the 1958–1960 birth cohort and the 1973–1975 birth cohort. The rise in never-married childless women and the shift of childbearing to later ages together explain 93% of the decline between the two birth cohorts. The fertility decline is also salient among those who first married in their 30s. Given that the two birth cohorts have just a 15-year interval, the rise in the never-married proportion and the change in age at first marriage is remarkable. The result also demonstrates that the economic recession lowered completed fertility by raising the proportion of never-married women on the one hand, and by delaying the timing of first marriage on the other.

Summary and conclusion

The purpose of this study was to understand whether and to what extent the Asian Financial Crisis from 1997–1998 affected trends in marriage and fertility in Korea. We particularly focus

on whether the economic recession has had longer-term effects on fertility. We find that marriage and childbearing, along with the value of having a child, have declined in Korea since the economic crisis. The economic crisis relaxed social norms on having a child, which had been maintained for most women for a long time. At the same time, the economic crisis also further pushed up the timing of first marriage and childbearing and eventually lowered the levels of marriage and childbearing. The decomposition analysis also confirms that the decline in completed fertility is also mainly attributable to the delay in first marriage and the rise in lifetime singlehood.

Where the Korean case differs from other European experiences is that the prolonged delay in childbearing is not merely a temporary phenomenon but actually resulted in a decline in fertility. The sustained postponement of marriage and childbearing triggered by the economic crisis has brought out a retreat from universal marriage as well as falling second birth rates and a subsequent drop in first birth rates with a time lag (Yoo 2016; Yoo and Sobotka 2016). Moreover, we also find that the rise in the proportion of never-married women, which is closely related to childless women in this context, accounts for half of the fertility decline between the 1958–1960 birth cohort and the 1973–1975 birth cohort. Adjusting marriage timing can be seen as a short-term response to economic recessions. The rise in lifetime singlehood, however, is a cumulative outcome that involves giving-up or successive delays in first marriage over the life course. Taken together, we can conclude that the economic crisis in the late 1990s has had long-term effects on fertility in Korea; the change in marriage and fertility behaviors triggered by the economic crisis has continued more than 15 years with no signs of recovery.

The Asian Financial Crisis has frequently been cited as the explanation for this dramatic change in marriage and fertility in Korea over the last decades. Unfortunately, research analyzing

the effects of the recession on fertility is rare. Our study fills this gap by providing a better understanding of how the recession has depressed marriage and fertility by taking into account tempo effects. More importantly, our study contributes to the literature by shedding light on the longer-term effects of economic recession on fertility in the different context of East Asia. The Korean case is particularly interesting because the recession eventually led to lowest-low fertility and also because a substantive catching-up process after the recession has been missing, which has implications for many developed countries that have been affected by the "Great Recession" of 2008.

Why does an economic recession have longer-term effects on fertility in some countries but not in other countries? One of the reasons could be a social policy that can buffer the negative effects of economic recession on fertility (Sobotka, Skirbekk and Philipov 2011). Facing the economic crisis, Korea had a lack of social policy tools such as a childcare allowance and maternity leave. Lacking this support system, the effects were not limited to an economic crisis that just triggered a series of short-term demographic responses such as a delay in marriage and childbearing but had more long-term consequences. At the time of the economic crisis, there were already many fertility-depressing factors, such as difficulty in balancing work and family life, the high cost of private education, and a lack of childcare services. In this environment, the effect of the recession on fertility was made more pronounced.

Another possible explanation is that the effect of a recession on fertility may last longer if its impact on the entire society is particularly strong. In the case of a nation-wide economic crisis involving restructuring and massive redundancy, both the people and the society as a whole may need more time to adapt to a new order and structure (Philipov 2003). The Asian Financial Crisis forced the country to adapt to more neo-liberal policies and in doing so, the collapse of lifetime

employment began to interrupt predominantly male-breadwinning families and thereby undermine social norms regarding family and fertility. In this sense, these demographic responses to the economic recession should be differentiated from those caused by ideational changes in Western countries.

However, our work has some limitations. A data limitation did not allow us to study out-of-wedlock births. Non-marital births have increased in recent years and should therefore be included for a more complete understanding of fertility change in Korea, even though out-of-wedlock births still remain below 3% of all births. As we rely on period measures of demographic indicators and repeated cross-sectional surveys, our results stand on association rather than causality. Future research would benefit from longitudinal data and improvement in survey designs that cover the fertility of all women regardless of their marital status. It should be also noted that because we combined data from diverse sources, such as censuses, vital registration, and survey data, some of the measures we computed in this study (e.g., tempo-adjusted TFMRs) might be over- or underestimated, although this would be unlikely to alter our conclusions.

Our study suggests that the effects of the economic crisis in the late 1990s are still reverberating on fertility behaviors in Korea. Adjusting the timing of life-course events like childbearing is an easy and common way to adapt to diverse social and structural changes. However, if a delay in marriage and childbearing continues, it may imply a state of social anomie that requires alternative norms to replace existing ones, as in the transition period to a market economy in the states of Central and Eastern Europe (Philipov 2002). The current trend in marriage and childbearing is likely to continue for some time unless innovative ideas and behaviors replace the dominant pattern of marital births in the country. However, once it begins,

such a transition is likely irreversible. Researchers and policy makers would therefore benefit from studying cohabitation and out-of-wedlock births in understanding possible fertility change in the near future. A post-recession policy that makes up for the deficit of marriage and fertility can be helpful, but more research is needed to understand the factors that make the effects of the recession last longer. It would be interesting to see if there are similar recession effects in other countries in East and South East Asia as they shared the same economic crisis, as well as marriage delay and low fertility.

Acknowledgements

This work was supported in part by a National Research Foundation of Korea Grant funded by the Korean Government (NRF-2014S1A3A2043476). S.H. Yoo also gratefully acknowledges the support of the IIASA Postdoctoral Fellowship from the International Institute for Applied Systems Analysis. The authors thank Tomas Sobotka for discussions and suggestions and are also grateful to the Korea Institute of Health and Social Affairs for the information and data used in this work.

References

Adsera, A. 2004. "Changing Fertility Rates in Developed Countries. The Impact of Labor Market Institutions." *Journal of Population Economics* 17(1):17-43.

—. 2005. "Vanishing Children: From High Unemployment to Low Fertility in Developed Countries." *The American economic review* 95(2):189-193.

—. 2011. "Where Are the Babies? Labor Market Conditions and Fertility in Europe." *European Journal of Population / Revue européenne de Démographie* 27(1):1-32.

Ahn, N. and Mira, P. 2001. "Job Bust, Baby Bust?: Evidence from Spain." *Journal of Population Economics* 14(3):505-521.

Bernardi, L., Klärner, A., and Von der Lippe, H. 2008. "Job Insecurity and the Timing of Parenthood: A Comparison between Eastern and Western Germany." *European Journal of Population/Revue européenne de Démographie* 24(3):287-313.

Berrington, A., Stone, J., and Beaujouan, E. 2015. "Educational Differences in Timing and Quantum of Childbearing in Britain: A Study of Cohorts Born 1940−1969." *Demographic Research* 33(26):733-764.

Billingsley, S. 2010. "The Post-Communist Fertility Puzzle." *Population Research and Policy Review* 29(2):193-231.

Bongaarts, J. and Feeney, G. 1998. "On the Quantum and Tempo of Fertility." *Population and Development Review* 24(2):271-291.

—. 2008. "The Quantum and Tempo of Life-Cycle Events." Pp. 29-65 in *How Long Do We Live? Demographic Models and Reflections on Tempo Effects,* edited by E. Barbi, J. Bongaarts, and J.W. Vaupel. Rostock: Springer.

Bongaarts, J. and Sobotka, T. 2012. "A Demographic Explanation for the Recent Rise in European Fertility." *Population and Development Review* 38(1):83-120.

Campbell, A. A. 1978. "Baby Boom to Birth Dearth and Beyond." *The Annals of the American Academy of Political and Social Science* 435:40-60.

Conrad, C., Lechner, M., and Werner, W. 1996. "East German Fertility after Unification: Crisis or Adaptation?" *Population and Development Review* 22(2):331-358.

Currie, J. and Schwandt, H. 2014. "Short-and Long-Term Effects of Unemployment on Fertility." *Proceedings of the National Academy of Sciences* 111(41):14734-14739.

Cutright, P. and Shorter, E. 1979. "The Effects of Health on the Completed Fertility of Nonwhite and White U.S. Women Born between 1867 and 1935." *Journal of Social History* 13(2):191-217.

Eloundou-Enyegue, P. M., Stokes, C. S., and Cornwell, G. T. 2000. "Are There Crisis-Led Fertility Declines? Evidence from Central Cameroon." *Population Research and Policy Review* 19(1):47-72.

Eun, K.-S. 2003. "Understanding Recent Fertility Decline in Korea." *Journal of Population and Social Security (Population)* 1:574-595.

Goldstein, J., Kreyenfeld, M., Jasilioniene, A., and Karaman Örsal, D. D. 2013. "Fertility Reactions to the "Great Recession" in Europe: Recent Evidence from Order-Specific Data." *Demographic Research* 29(4):85-104.

Hobcraft, J. 1996. "Fertility in England and Wales: A Fifty-Year Perspective." *Population Studies* 50(3):485-524.

Jones, G. W. 2007. "Delayed Marriage and Very Low Fertility in Pacific Asia." *Population and Development Review* 33(3):453-478.

Kim, D.-S. 2005. "Theoretical Explanations of Rapid Fertility Decline in Korea." *The Japanese Journal of Population* 3(1):2-25.

——. 2013. "The 1997 Economic Crisis, Changes in the Pattern of Achieved Fertility and Ideal Number of Children in Korea." Pp. 73-89 in *Economic Stress, Human Capital, and Families in Asia*: Springer.

Kim, H. S. 2014. "Female Labour Force Participation and Fertility in South Korea." *Asian Population Studies* 10(3):252-273.

Kirk, D. 1960. "The Influence of Business Cycles on Marriage and Birth Rates." Pp. 241-260 in *Demographic and Economic Change in Developed Countries*: Columbia University Press.

Kohler, H.-P. and Ortega, J. A. 2002. "Tempo-Adjusted Period Parity Progression Measures, Fertility Postponement and Completed Cohort Fertility." *Demographic Research* 6(6):91-144.

Kravdal, Ø. 2002. "The Impact of Individual and Aggregate Unemployment on Fertility in Norway." *Demographic Research* 6(10):263-294.

Kreyenfeld, M. 2010. "Uncertainties in Female Employment Careers and the Postponement of Parenthood in Germany." *European Sociological Review* 26(3):351-366.

Lee, J. 2013. "The Impact of a Mandatory Cooling-Off Period on Divorce." *The Journal of Law & Economics* 56(1):227-243.

Ma, L. 2014. "Economic Crisis and Women′s Labor Force Return after Childbirth: Evidence from South Korea." *Demographic Research* 31(18):511-552.

—. 2013. "Employment and Motherhood Entry in South Korea, 1978-2006." *Population* 68(3):419-446.

Matysiak, A. and Vignoli, D. 2008. "Fertility and Women′s Employment: A Meta-Analysis." *European Journal of Population / Revue européenne de Démographie* 24(4):363-384.

Morgan, S. P. 1996. "Characteristic Features of Modern American Fertility." *Population and Development Review* 22:19-63.

Park, H., Lee, J. K., and Jo, I. 2013. "Changing Relationships between Education and Marriage among Korean Women." *Korean Journal of Sociology* 47(3):51-76.

Philipov, D. 2002. "Fertility in Times of Discontinuous Societal Change: The Case of Central and Eastern Europe." MPIDR working paper WP 2002-024.

Philipov, D. and Dorbritz, J. 2003. *Demographic Consequences of Economic Transition in Countries of Central and Eastern Europe*: Council of Europe.

Prioux, F. and Mandelbaum, J. 2003. "Age at First Union in France: A Two-Stage Process of Change." *Population (English Edition, 2002-)* 58(4/5):559-578.

Ranjan, P. 1999. "Fertility Behaviour under Income Uncertainty." *European Journal of Population/Revue européenne de Démographie* 15(1):25-43.

Retherford, R. D., Ogawa, N., and Matsukura, R. 2001. "Late Marriage and Less Marriage in Japan." *Population and Development Review* 27(1):65-102.

Ryder, N. B. 1980. "Components of Temporal Variations in American Fertility." Pp. 15-54 in *Demographic Patterns in Developed Societies*, edited by R.W. Hiorns. London: Taylor & Francis.

Schneider, D. 2015. "The Great Recession, Fertility, and Uncertainty: Evidence from the United States." *Journal of Marriage and Family* 77(5):1144-1156.

Schneider, D. and Hastings, O. P. 2015. "Socioeconomic Variation in the Effect of Economic Conditions on Marriage and Nonmarital Fertility in the United States: Evidence from the Great Recession." *Demography* 52(6):1893-1915.

Sobotka, T. 2003. "Re-Emerging Diversity: Rapid Fertility Changes in Central and Eastern Europe after the Collapse of the Communist Regimes." *Population (English Edition, 2002-)* 58(4/5):451-485.

Sobotka, T., Skirbekk, V., and Philipov, D. 2011. "Economic Recession and Fertility in the Developed World." *Population and Development Review* 37(2):267-306.

Thévenon, O. 2015. "Decreasing Fertility in Europe: Is It a Policy Issue?" Pp. 81-115 in *Population Change in Europe, the Middle-East and North Africa: Beyond the*

Demographic Divide, edited by K.N. Koenraad Matthijs, Christiane Timmerman, Jacques Haers, Sara Mels. Farnham, UK: Ashgate.

Vikat, A. 2004. "Women′s Labor Force Attachment and Childbearing in Finland." *Demographic Research* 3:177-212.

Winkler-Dworak, M. and Engelhardt, H. 2004. "On the Tempo and Quantum of First Marriages in Austria, Germany, and Switzerland: Changes in Mean Age and Variance." *Demographic Research* 10(9):231-264.

Woo, H. 2012. "Birth Cohort and Educational Differences in the Marital and Fertility Life Course in South Korea." *Korea Journal of Population Studies* 35(1):151-179.

Yoo, S. H. 2006. "On Regional Fertility Differentials: Understanding the Causal Mechanisms of Low Fertility in Korea." *Population and Society* 2(2):53-76.

—. 2014. "Educational Differentials in Cohort Fertility during the Fertility Transition in South Korea." *Demographic Research* 30(53):1463-1494.

—. 2016. "Postponement and recuperation in cohort marriage: The experience of South Korea." *Demographic Research* (forthcoming).

Yoo, S. H. and Sobotka, T. 2016. ″The Role of Tempo Effect in the Ultra-Low Fertility in South Korea.″ Paper presentation at the 2016 Population Association of America Annual Meeting in Washington DC, USA.

Table 1. Change in completed fertility (at ages 40 to 42) between the 1958–1960 cohort and the 1973-1975 cohort and decomposition analysis

a. Completed marital fertility according to age at first marriage

	C1958-1960		C1973-1975	
Age at first marriage	CF	%	CF	%
<21	2.34	14.0	2.12	6.0
21-23	2.06	32.6	2.10	22.1
24-26	2.00	33.9	1.98	34.0
27-29	1.84	13.9	1.88	20.1
30-32	1.59	3.4	1.67	10.7
33+	1.53	2.2	1.29	7.2
Completed marital fertility (A)	2.02	100.0	1.88	100.0
Percent of never-married from the census (B)		2.7		10.0
Estimated completed cohort fertility = A* (1-B/100)	1.97		1.69	

b. Two-phase decomposition analysis

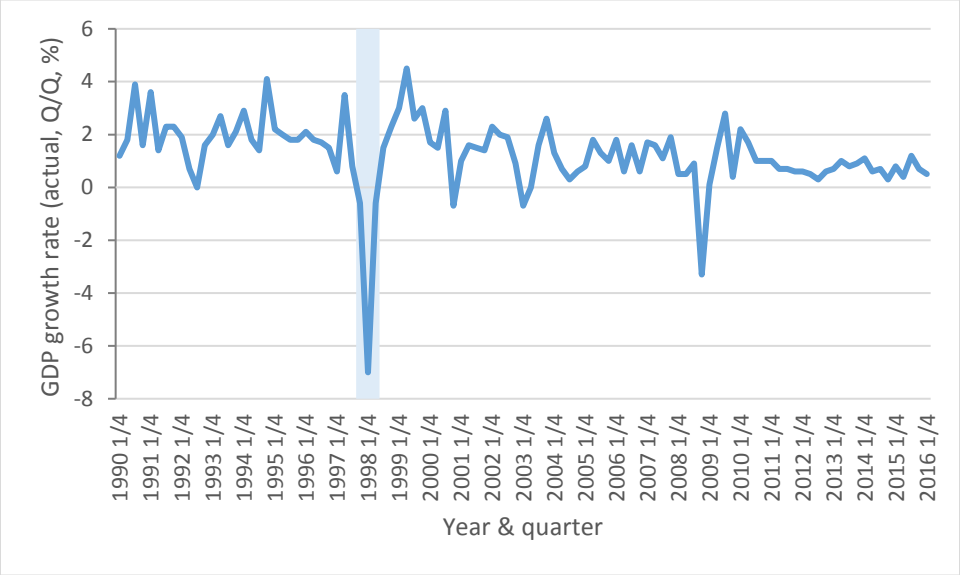
	Phase I		Phase II	
	CF	%	CF	%
Decomposition:				
Change in the never-married proportion	-0.14	52.1		
Change in the completed marital fertility	-0.12	47.9		

Change in the age distribution of the first marriage			-0.11	41.0
Change in the fertility rates according to marriage timing			-0.02	6.9
Δ CCF (C1973–1975 – C1958–1960)	-0.27	100.0		

Note: ages at first marriage were based on the midpoint age for each birth cohort and therefore indicate marriage cohorts that first married in the same period.

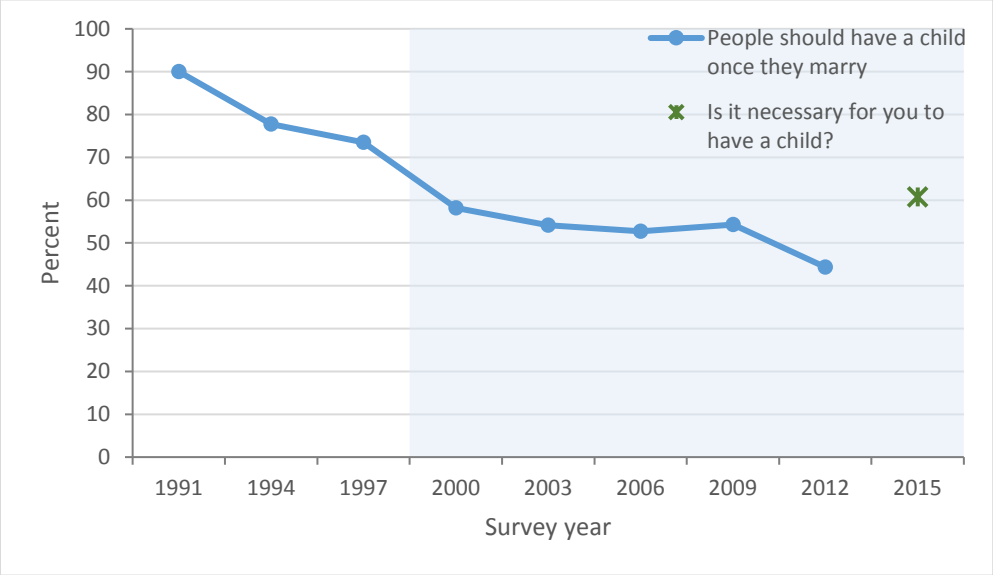
Source: Korea National Surveys on Fertility, Family Health and Welfare (2000-2012)

Figure 1. Quarterly growth rates in actual gross domestic product (seasonal adjustment), 1990–2016



Source: Korea Statistical Information System (2016)

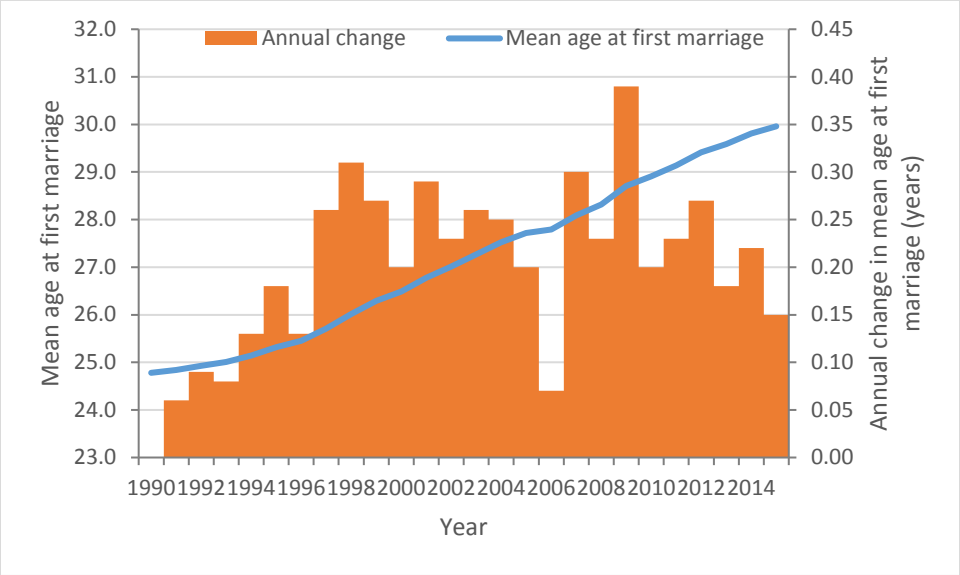
Figure 2. Percentage of ever-married women ages 15–44 agreeing with “People should have a child once they marry,” 1991–2015



Note: The question wording changed into “Is it necessary for you to have a child?” in 2015.

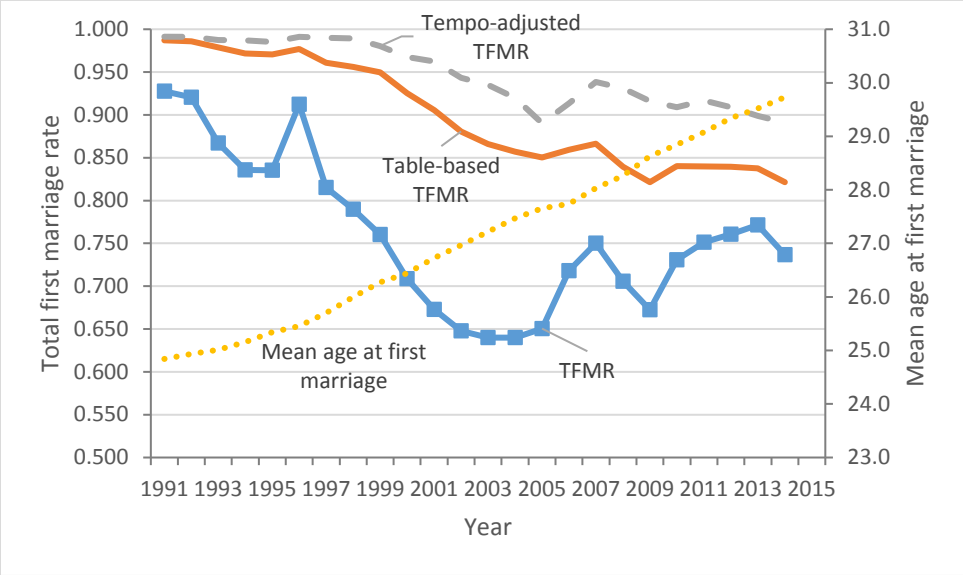
Source: Korea National Surveys on Fertility, Family Health and Welfare (1991-2015).

Figure 3. Women's mean age at first marriage and annual change, 1991–2015

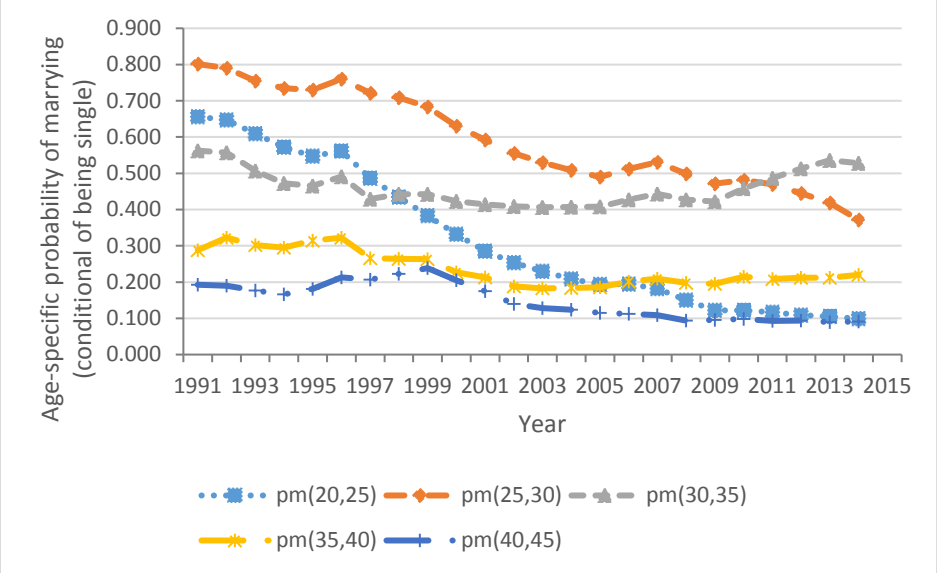


Source: authors' own computations based on census and vital statistics.

Figure 4. Period measures of first marriage and age-specific probabilities of marrying



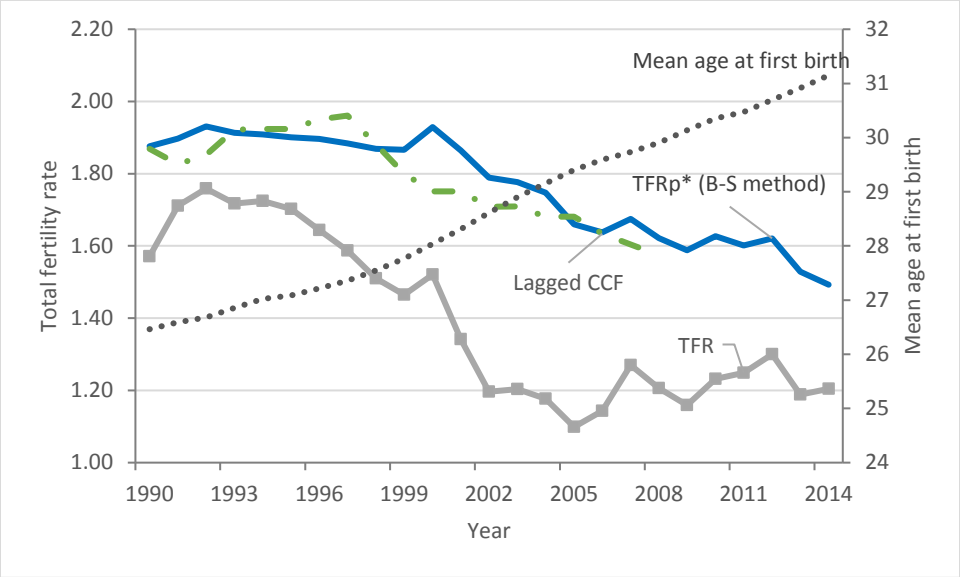
a. Period first marriage measures (up to age 49)



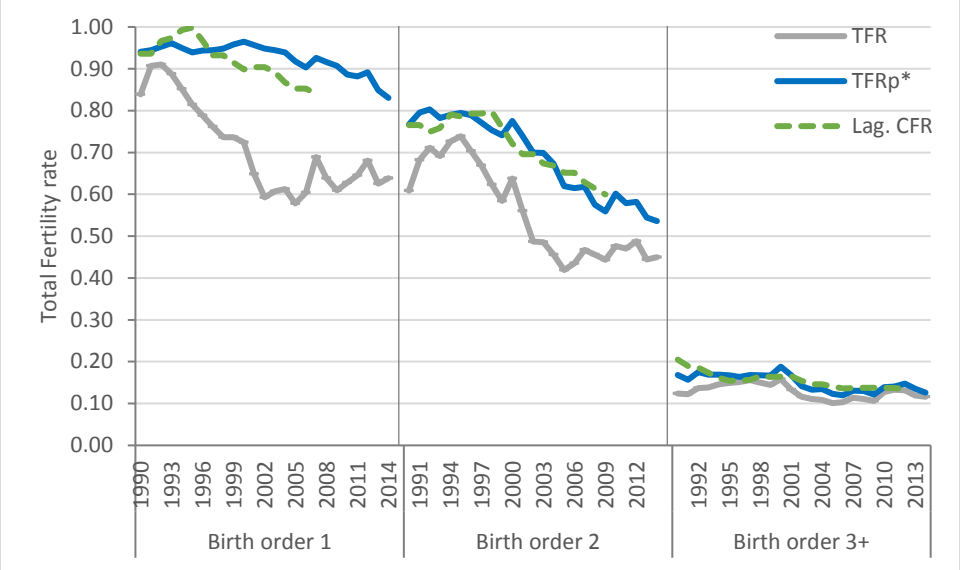
b. Age-specific probabilities of marrying conditional on being single

Source: authors' own computations based on census and vital statistics.

Figure 5. Total fertility rate and tempo-adjusted fertility measures, 1990–2015



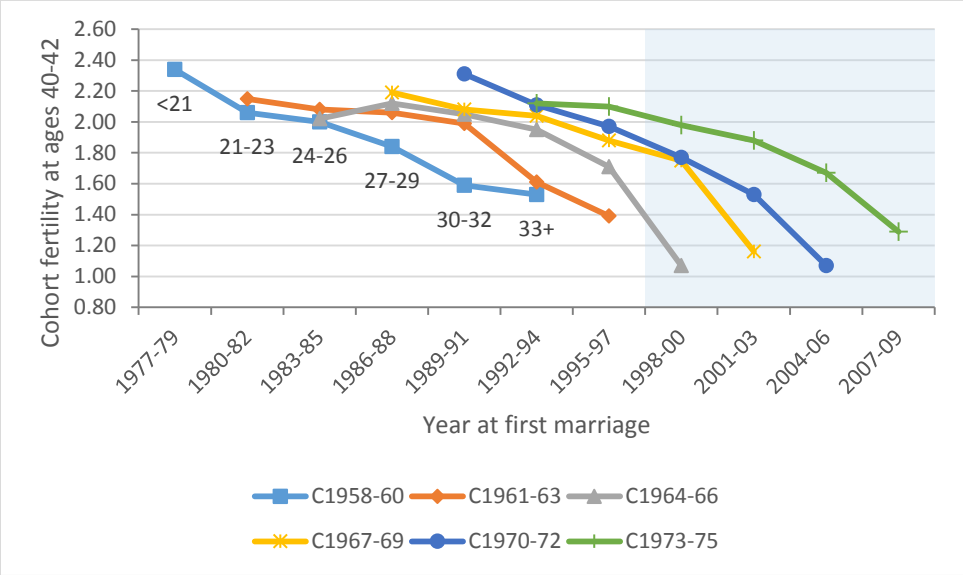
a. Period measures of fertility and mean age at first birth



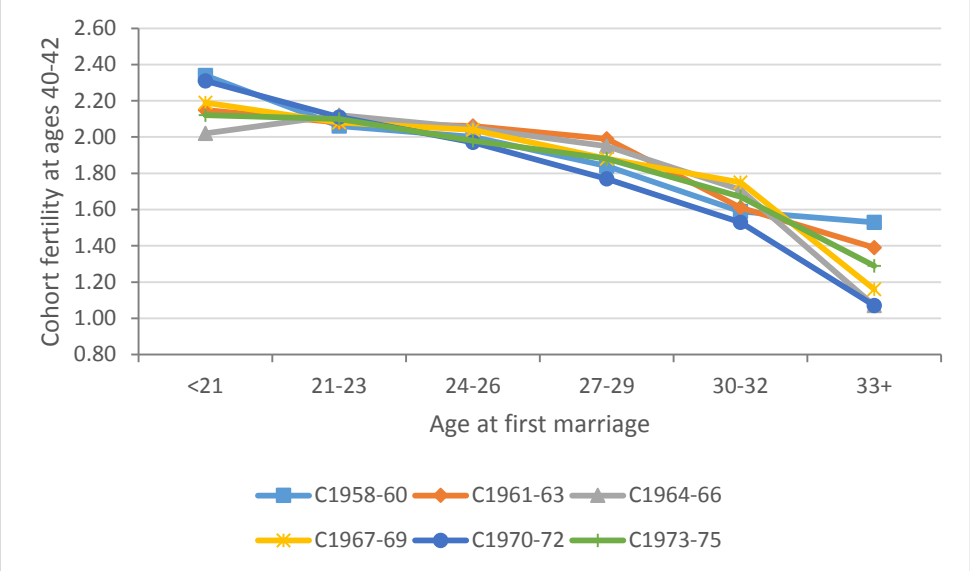
b. Tempo and parity distortion in total fertility rates

Source: Yoo and Sobotka (2016).

Figure 6. Completed marital fertility at ages 40–42 by year and age at first marriage



a. Completed marital fertility by birth cohort and year at first marriage

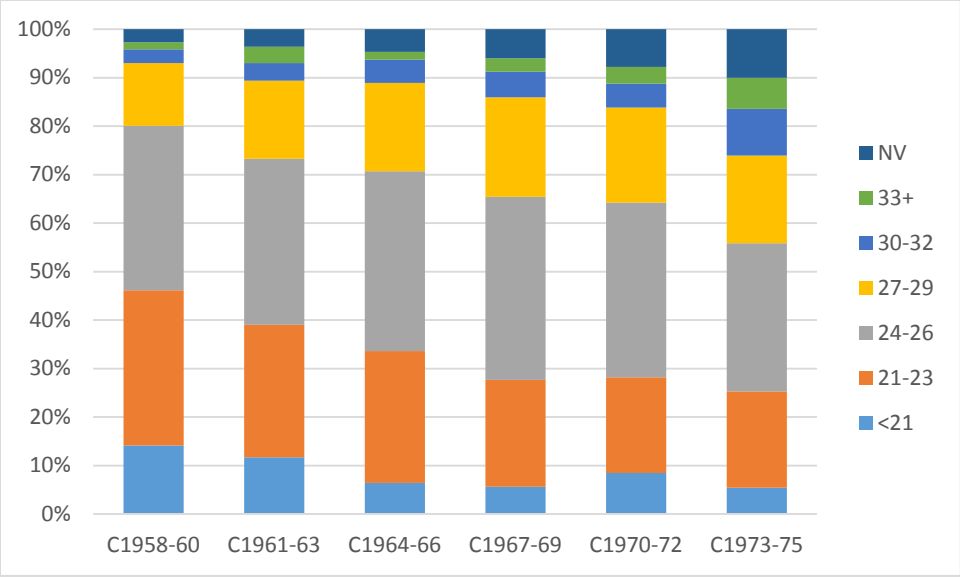


b. Completed marital fertility by birth cohort and ages at first marriage

Note: ages at first marriage were based on the mid-age for each birth cohort and therefore indicate marriage cohorts that first married in the same period.

Source: Korea National Surveys on Fertility, Family Health and Welfare (2000-2015).

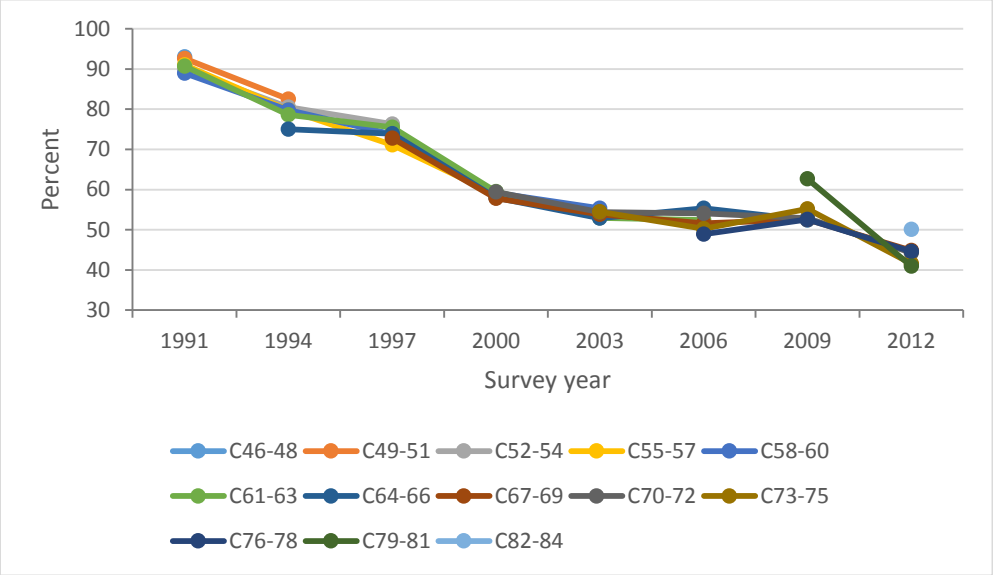
Figure 7. Compositional change in the timing of first marriage among women ages 40–42



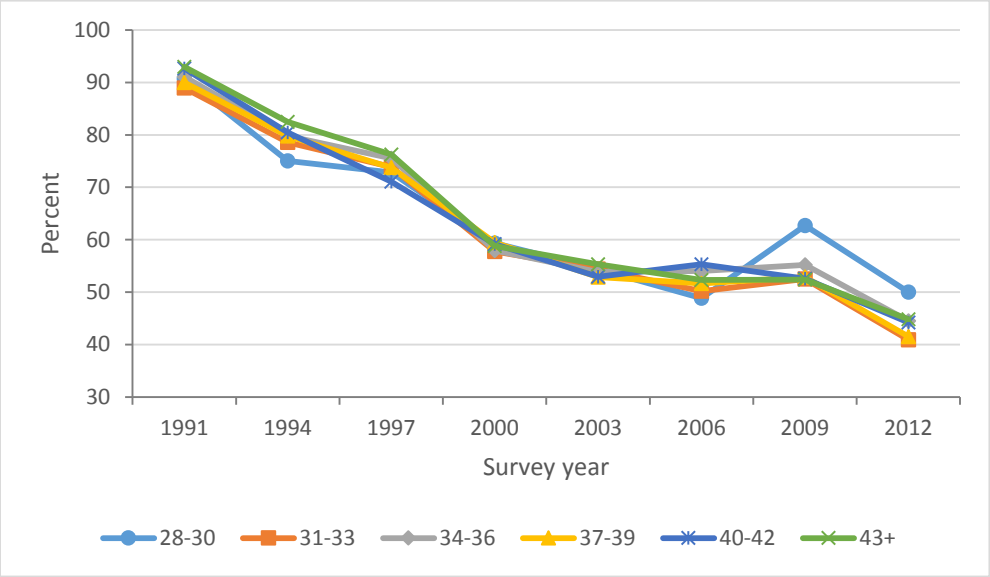
Note: The proportions of never-married at ages 40–42 were estimated from census data while the age distribution of first marriage comes from repeated cross-sectional data.

Source: Census (1990–2010) and the Korea National Surveys on Fertility, Family Health and Welfare (2000–2015).

Appendix A. Percent of currently married women aged 26–44 agreeing with the statement, "people should have a child once they marry" by birth cohort and age at the time of interview



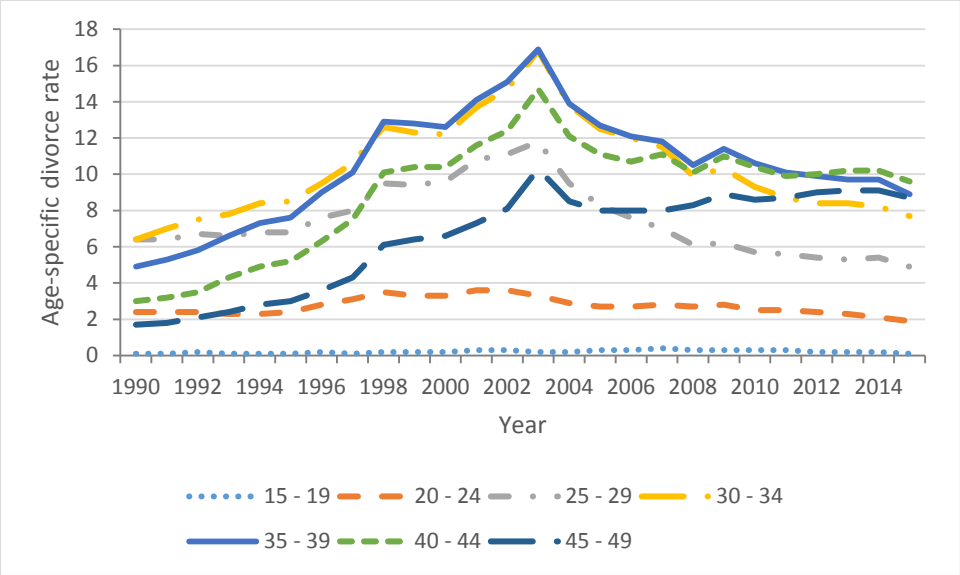
a. Trends by birth cohort



b. Trends by age at first marriage

Source: Korea National Surveys on Fertility, Family Health and Welfare (1991–2012)

Appendix B. Trends in age-specific female crude divorce rate, 1990–2015



Source: Korea Statistical Information System (2016).