Research Article

Postponement and recuperation in cohort marriage: The experience of South Korea

Sam Hyun Yoo

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Sam Hyun Yoo[1]

Abstract

BACKGROUND
Despite continuing marriage delay in East Asia, little is known about the shift of marriage towards later ages and the concomitant decline in marriage.

OBJECTIVE
Applying the concept of cohort postponement and recuperation to marriage in South Korea, I study the pattern of marriage delay among women and the extent to which delayed marriages are realized later in life.

METHODS
With Korean census 1% samples microdata, I compare women's marriage schedules across five-year birth cohorts born between 1916 and 1985 and analyze the trend in marriage delay and subsequent recovery at higher ages.

RESULTS
Two distinct patterns of marriage delay can be identified. The first one occurred among the birth cohorts born in the 1930s and early 1940s, who faced successive political upheavals such as World War II and the Korean War. A different pattern of marriage delay is underway among the women born since the 1970s, among whom the proportion of the never-married by age 45 has begun to increase. These two patterns changed with level of education: The wars delayed marriage in a similar way for all social groups, whereas the recent marriage delay is more pronounced among women with tertiary education.

CONCLUSION
The extent to which marriage delay is compensated at later ages differed across cohorts and social groups. Given the recent trend, the proportion of ever-married women by age 45 is expected to decline considerably among the younger cohorts born since the late 1970s, bringing an end to the universal marriage pattern in South Korea.

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1. Introduction

The age at which people marry has been increasing in most industrialized societies since the 1960s. In Western societies, for example, women's mean age at first marriage has shifted from the early to late twenties (Sobotka and Toulemon 2008). A similar increase in women's mean age at first marriage was later seen in the advanced economies of East Asia. Women's singulate mean age at marriage (SMAM) in this region rose from the early to late twenties between 1970 and 2005 (Jones and Gubhaju 2009). Despite similar trends in marriage delay, the pattern of union formation in East Asia remains very different from in Western Europe. In Western societies unmarried cohabitation has become widespread and people frequently choose alternative family forms, such as single-parent families, living apart together, and same-sex relationships. These non-traditional families, although on the increase, remain marginal in East Asian societies.

East Asian societies have different histories and backgrounds and may display more dynamic patterns of marriage transition than Western societies. In this region, increasing marriage delay and, until recently, the persistence of universal marriage imply that a high proportion of those delaying marriage do eventually marry. This marriage 'recuperation' was even stronger in the past, given that the age at first marriage has continued rising since the early 20th century, whereas the share of never-married women at ages 45–49 has remained stable until recently (Atoh, Kandiah, and Ivanov 2004; Jones 2007; Jones and Gubhaju 2009). As most childbearing still occurs in marital unions, marriage delay has strongly contributed to very low fertility in East Asia. Despite its significance, little is known about the process of marriage delay and recuperation in East Asia. Many studies have repeatedly reported the trend towards later and fewer marriages in East Asian societies (Dalla Zuanna et al. 1998; Kwon 2007; Park, Lee, and Jo 2013; Raymo 2003; Raymo and Iwasawa 2005; Retherford, Ogawa, and Matsukura 2001; Yu and Xie 2015b). However, the pattern of cohort postponement of marriages in the region has not yet received much attention, probably due to ambiguity in the definition of marriage 'delay' and limited data availability.

This study explores the marriage postponement and recuperation (P&R) process in South Korea. From a cohort perspective, I define the marriage P&R process as a decline in marriage rates at younger ages and their compensatory rise at older ages across successive birth cohorts. I argue that this marriage P&R process is important for understanding marriage transitions across time and space. In response to broad social change, people often take ways that involve the least institutional organization and the least cost, such as the postponement of marriage (Davis and Blake 1956:235). In this sense, changes in marriage timing constitute an efficient way of adapting to dynamic social and economic changes while maintaining conventional value systems and customs. However, marriage postponement often leads to a decline in the proportion of women who have ever married by the end of their reproductive span. This incomplete recuperation might not be foreseen, but might rather reflect unforeseen circumstances that unfold later in life, changing

preferences among women and men who have got used to a single lifestyle, and slow adaptation to changing circumstances and conditions. A time lag between marriage postponement at younger ages and subsequent recuperation at older ages also contributes to a temporary fall in marriage rates (e.g., Bongaarts and Feeney 1998). Thus, the analysis of marriage recuperation can determine whether the contemporary trend of marriage delay in East Asian societies is just a shift of marriage timing to later ages or a sign of significant decline in marriage rates overall. A study of the marriage P&R process can provide insight into how marriage has changed in East Asia. It can also shed light on the commonalities and differences in the demographic transition between East Asian and Western societies.

As a case study I focus on South Korea (hereafter Korea), which has simultaneously experienced rapid demographic changes and massive educational expansion. I address the following questions. First, how much of the marriage delay has been made up later in life? Second, how does the marriage P&R process change in the course of the demographic transition and among women with different levels of education? I analyze changes in the marriage schedule among women born in 1916–1985. I describe the extent to which marriage was delayed and then subsequently 'recuperated' across subsequent cohorts. To my knowledge, this is the first study to quantify the process of marriage P&R.

2. Background

2.1. Deinstitutionalization of marriage

Different perspectives have been employed to explain why people marry and what factors affect marriage trends. Some look at marriage as a social institution embedded in society's norms and values while others look at it as an individual's rational choice. Cherlin (2004) argues that during the 20th century, American marriage has gone through two distinct transitions. The first one is the shift from an institution to a companionship, accelerated by industrialization accompanying structural change in the economy. During this shift in meaning the spouses' emotional satisfaction became important for marital success, while husbands and wives maintained a sharp division of labor (i.e., the male-breadwinner family). Another change is the ongoing shift to so-called individualized marriage. Women's expanded education, increased economic activity, economic uncertainty, and ideational changes brought about a transformation in gender-role division in households, and also in the perception of marriage. The role of wife became more flexible, while individual satisfaction within marriage changed from performing gendered roles to pursuing self-fulfillment. As other alternative forms of family become more common, marriage increasingly becomes an arrangement of choice rather than a necessity for the transition to adulthood.

Modernization and industrialization also changed marriage patterns in East Asian societies such as China, Japan, and Korea (e.g., Ji 2015; Park and Kim 1995; Raymo et al. 2015). Until recently, the primary goal of marriage in this region was to ensure the continuity of family and lineage. Because in these societies marriage and childbearing were women's most important obligation, unmarried women were often regarded as deviant, immoral, and anti-social. However, the meaning of marriage has changed from a bond of two families to a union between two individuals based on mutual affection, although parental consent is still considered customary. In the early phases of industrialization in this region, women's employment concentrated on low-skilled, low-paid, and temporary jobs. This delayed marriage to later ages, but paradoxically often facilitated marriage by providing young women an opportunity to provide their own dowry and trousseau (Dixon 1978). Initially, this contributed to the emergence of later marriage while preserving the universal marriage pattern of East Asian societies. It is only in the last few decades that the proportion of people getting married at some point in their lives has been declining. In contrast to Western societies, childbearing outside marriage remains rare and generally strongly disapproved of. Other non-traditional living arrangements, especially living single and unmarried cohabitation, are gradually increasing (Park and Choi 2015; Raymo 2015), although the spread of cohabitation is uneven between countries and is almost exclusively practiced by childless couples (Eun and Lee 2005; Raymo, Iwasawa, and Baumpass 2009; Xu, Ji, and Yu 2014; Yu and Xie 2015a). As a result of these trends, women's mean ages at first marriage are now among the highest globally (Jones 2007; Jones and Gubhaju 2009). Given the accelerated socioeconomic change, cohabitation and other non-traditional families could become more visible in the near future as the transition to companionate marriage progresses further.

Marriage also responds to historical events, such as war, famine, infectious disease, and economic recession (Hacker, Hilde, and Jones 2010; Rodgers and Thornton 1985; Sobotka, Skirbekk, and Philipov 2011). The influence of historical events on marriage varies depending on the life stage in which people experience these events. Demographic responses to a short-term crisis usually involve a temporary adjustment in the timing of union formation or childbearing (Davis 1963; Davis and Blake 1956). For instance, the post-war economic boom in the United States resulted in earlier and higher rates of marriage than previously (Rodgers and Thornton 1985). Conversely, the recent economic recession has delayed childbearing without contributing much to a quantum decline in fertility (Sobotka, Skirbekk, and Philipov 2011). East Asian societies have shared some historical events such as World War II and the Asian Financial Crisis in the late 1990s. These events could have delayed first marriages to later ages, but it is not yet clear whether they eventually eroded the universal marriage pattern.

2.2. Marriage postponement and recuperation

Timing of first marriage can change, and it varies by social status and education, even in societies where most marriages are arranged by parents and relatives. Formal education delays women's first marriage for the required school years and also nurtures ideas and values that promote women's involvement in paid work and gender equality (Blossfeld and Huinink 1991; Thornton, Axinn, and Teachman 1995).

Once young adults get involved in mate selection and marriage decisions, women's engagement in both education and economic activity becomes important. According to the economic independence hypothesis, marriage declines first among women with more education, because their higher earning potential reduces the gains from the 'specialization and exchange' within a household (Becker 1981). Alternatively, Oppenheimer (1988, 1997) argues that although educated women are more likely to delay marriage, they do not necessarily remain single, as they wish to marry and eventually do so later on. Having higher earning potential, educated women can also prolong their search for the most suitable partner, which may require significant time and effort, as in a job-search situation. In many advanced societies, women's higher income prospects also make them more attractive in the marriage market.

The spouse-search hypothesis essentially describes the process whereby marriage is delayed but the overall marriage rate in a population does not fall, as women eventually get married, at later ages. Goldstein and Kenney (2001) confirm the recuperation of delayed marriage among educated women: among American women between the 1954–1959 and 1960–1964 cohorts the cumulative proportion of ever married was lower for college graduates than for non-graduates in their twenties, but gradually increased and was projected to be higher in their forties. Some studies (e.g., Dixon 1971, 1978; Goldstein and Kenney 2001; Oppenheimer 1997) make an important distinction between marriage delay and marriage forgone, but the process of marriage recuperation has not yet been explored. Research often looks at average timing, prevalence, or relative risk of first marriage and compares these with the proportion of the ever married at later ages (e.g., age 44 or 49). However, marriage occurs at all ages, and factors affecting marriage vary with age. A simple cross-sectional study of marriage prevalence or a static measure of marriage timing might reflect just a fragmentary aspect of the recuperation process and overlook its dynamics. Moreover, studies using forecasting methods (e.g., Coale and McNeil 1972; Goldstein and Kenney 2001) build on a deterministic assumption of the marriage schedule that might deviate from actual observations, in particular in a society like Korea where marriage timing can change rapidly or depart from a standard distribution of age at first marriage.

The marriage P&R process differs with level of education. Generally, educated women delay marriage more than others, but whether they end up having a higher proportion of the ever-married varies with the context, which shapes social norms and gender structure. After taking into account the schooling years, the association between women's education and

lifetime marriage rate is positive or insignificant in gender-egalitarian societies like Sweden and the United States, but appears negative in societies where gender roles are segregated, such as Italy and Japan (Blossfeld 1995; Kalmijn 2013; Ono 2003). Educational gradient in marriage can also change over time in a country. Many studies have reported that the negative relationship between women's education and marriage has reversed in the United States (e.g., Goldstein and Kenney 2001; Lichter, McLaughlin, and Ribar 2002; Sweeney 2002). These findings suggest that understanding dynamic change in marriage timing should take into account regional contexts.

In contemporary East Asian societies, including Korea, educated women delay marriage more than others (Park, Lee, and Jo 2013; Raymo 2003; Raymo and Iwasawa 2005; Tian 2013; Woo 2012; Yu and Xie 2015b). With economic independence, educated women are more likely to recognize and avoid the burdens of traditional gender roles and duties imposed on them as a wife, mother, and daughter-in-law. Marriage postponement and avoidance can be a useful strategy for them to avoid the social risks associated with gender inequity (McDonald 2000). The tradition of hypergamy, the practice of women marrying men of a higher status, also makes it difficult for the most-educated women in this region to marry. However, the educated are also more likely to marry eventually (marriage recuperation) because the symbolic meaning of marriage remains strong, even among young cohorts (Cherlin 2004). Educated women have more resources and earning potential, enabling them to prolong their search for the best suitable match who has more gender-egalitarian attitudes (Oppenheimer 1988, 1997). For instance, in Japan, where women's education has been negatively associated with marriage (Raymo 2003), the relationship between women's earning potential and marriage has recently changed to positive (Fukuda 2013). In Korea the spouse-search hypothesis is also in part supported by a recent rise in the number of educated women marrying men from more developed countries such as Japan, the United States, and Canada (e.g., Kim 2010). Taken together, these findings demonstrate that educated women are more likely to delay and recuperate marriage than others, resulting in a marginal difference in marriage rates at the end of the reproductive span in this region.

2.3 The Korean context

In Korea early and universal marriage was a social norm from the beginning of the Joseon Dynasty (1392–1897), which adopted Confucianism as a ruling ideology, until the first half of the 20th century. During this period, marriage was considered a bond between two lineages that expanded and maintained the family's socioeconomic influence, and thus most marriages were arranged by parents and relatives (Chang 1979). Given the high mortality rate in a pre-modern society, early and universal marriage also had the advantage of achieving marriage's primary goal: the continuation of the family lineage through sons.

Figure 1 illustrates trends in the mean age at first marriage for men and women in Korea. The timing of first marriage has increased monotonically for both men and women

since the first census in 1925. The SMAM was 20.2 for men and 15.9 for women in 1925, and the proportion of women never married by the age of 20–24 was less than 2% by the 1930 census (Kwon 2007). It is noteworthy that at that time this was one of the youngest ages for first marriage and one of the highest marriage rates in the world (Hajnal 1965: 102).

A substantive marriage delay first appeared between 1940 and 1955, when Korea experienced the turbulence of World War II, the liberation in 1945, and the Korean War (1950–1953). During this period the SMAM increased from 21.0 to 24.6 for men and from 17.5 to 20.5 for women. This shift is mainly attributable to massive migration and selective mortality caused by a series of political upheavals. The wars and subsequent unrest caused both men and women to delay marriage, and the unbalanced sex ratios at marriageable ages caused by the wars also contributed to this postponement (Lapierre-Adamcyk and Burch 1974).

While marriage rates declined from the 1960s to the 1990s, the mean age at first marriage continued to increase. Marriage was delayed first as a response to industrialization and urbanization, and later because of women's increased engagement in education and economic activity. At the same time, young adults increasingly took from their parents the right to select a partner. As a result, a traditional arranged marriage determined by parents was gradually transformed into a form of dates arranged by a mutual acquaintance or a friend of both persons, which could develop into a serious relationship leading to marriage. According to a national survey in 1991 (Gong et al. 1992), arranged marriages completely determined by parents, which represented 48% of the marriage cohort before 1964, almost disappeared for the marriage cohort after 1990 (1.2 %).

The Asian financial crisis in 1997–1998 brought appreciable changes to the marriage pattern in Korea. Economic constraints further delayed marriage, and late marriage gradually became prevalent throughout the country (Park, Lee, and Jo 2013). Young people began to consider economic uncertainty when making important decisions about their career, marriage, and having children (Eun 2003). In the 2010 census the SMAM finally exceeded the age of 30 for both men and women: 33.16 for men and 30.25 for women. In fact, the first-marriage rate has declined greatly since the late 1990s (Kwon 2007: 231–235). Nonetheless, the proportion of never-married women aged 45–49 was still only 3.3% in 2010.

Figure 1: **Singulate mean age at first marriage for men and women, 1925–2010, South Korea**
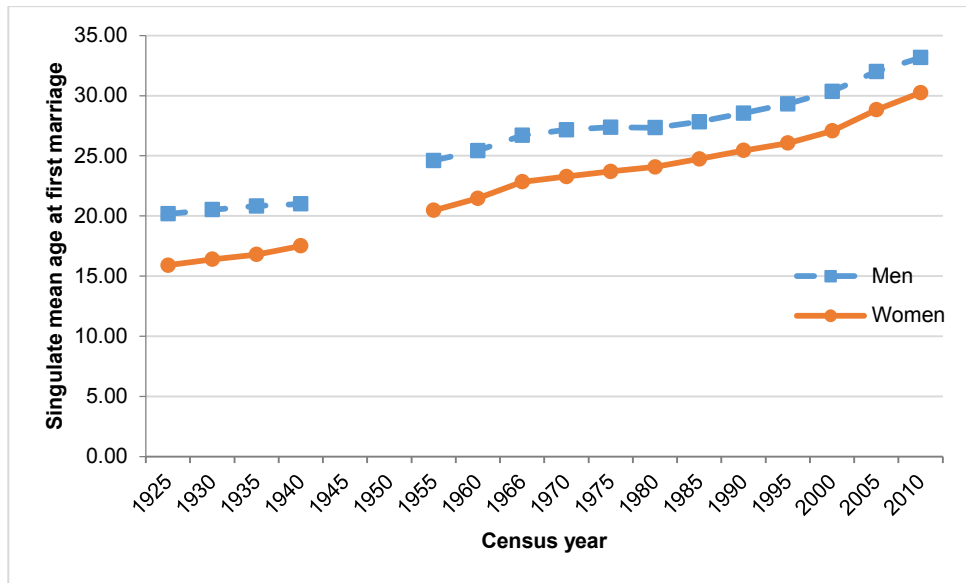
Note: SMAMs for 1945 and 1955 are not available.
Source: Kwon (2005) for 1925–2005; Statistics Korea for 2010

There is a clear trend towards later and fewer marriages among recent cohorts of women (Park, Lee, and Jo 2013; Woo 2012). Educated women have a greater tendency to delay marriage, but they do eventually marry at older ages, meaning there is little difference between the marriage rates for educated and uneducated women over the course of a lifetime. Park and colleagues (2013) reported the most intensive marriage delay and a shift to non-marriage among the 1971–1980 cohort of lowest-educated women, but because of their small share in the entire cohort it is hard to interpret this trend. These studies relied on only three decadal birth cohorts, probably because of low sample size, and focused mainly on relatively recent trends after the Asian Financial Crisis in the late 1990s. They used either the deterministic assumption of the Hernes model (Woo 2012) or the discrete time hazard model (Park, Lee and Jo 2013) and did not discuss the long-term pattern of marriage delay and the recuperation process that has occurred over many cohorts.

3. Data and methods

3.1 Data

This study uses 1% sample data from the 1975, 1990, 2005, and 2010 Korean censuses in which age at first marriage is available. The Population and Housing Census of Korea, conducted by Statistics Korea every five years, includes a short sample survey on demographics such as age, sex, education, and marital status, occasionally including age at first marriage. Having larger sample sizes, the data is more useful than other sources for estimating cohort-specific marriage schedules. From each available census, data was collected on women aged 30–59, including their educational attainment. Taking into account misreporting of the marriage age and possible selection by mortality differentials, I excluded responses from women aged 60 or above. I used responses from women aged 30 and above only because most women complete their education before that age in Korea. In estimating lifetime singlehood, I used age 45 as an upper limit because first marriage after age 45 is still rare among Korean women, and because it also allows for including more recent cohorts in the analysis. As a result, the final analytical sample comprises 338,307 cases. The sample size for every five-year birth cohort varies from a minimum of 4,886 to a maximum of 58,286 cases.

3.2 Methods

The concept of marriage delay is arbitrary and subjective. At the micro level, it is difficult to say whether an individual is delaying marriage unless their original plan and the eventual outcome are known and considered together. Moreover, people frequently change their marriage plans as they get older, but data to analyze this process is not widely available.

Cohort analysis can be useful for resolving this kind of problem. At an aggregate level, the marriage schedule of one cohort can be compared to those of successive cohorts. Being still single at the end of the reproductive period is an outcome of successive decisions and behaviors that cumulate over the course of a lifetime (Ryder 1965). Comparison of marriage schedules between the two cohorts of interest reflects the collective differences in the marriage P&R process and marriage-related life trajectories. To be specific, whether or not the gap between successive cohorts in the cumulative first marriage rate observed at younger ages also persists at older ages provides evidence on whether marriages are merely being delayed (the gap narrows down or even closes completely with age) or forgone (the gap persists).

The analysis of marriage postponement and recuperation presented in this study is inspired by earlier research on cohort fertility P&R patterns in Europe (Frejka 2011; Frejka and Calot 2001; Frejka, Jones, and Sardon 2010; Frejka and Sardon 2004; Lesthaeghe
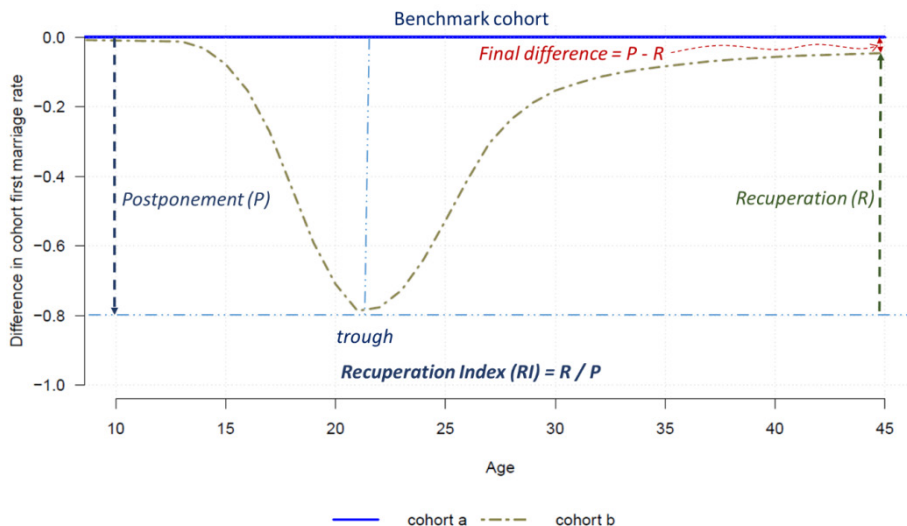
2001; Sobotka et al. 2012). Sobotka et al. (2012) developed a method comparing the gap in cohort cumulative fertility rates at different ages between subsequent birth cohorts. The cumulative fertility in these subsequent cohorts is related to the fertility trajectory of the initial (benchmark) cohort.

I use this method and apply it to the case of marriage delay. Building on prior studies (e.g., Frejka 2011; Sobotka et al. 2012), I investigate the marriage P&R process and quantify the extent of marriage delay and how much of the delay is recouped at later ages. In practice, marriage postponement indicates absolute (or relative) decline in the cumulative cohort first marriage rate (CFMR), which is equivalent to the age-specific proportion of ever married, when the cohort of interest is contrasted with the benchmark cohort. The postponement is measured at the age at which the gap in CFMR between cohorts is widest (the trough). Marriage recuperation at later ages is measured by absolute (or relative) gains in the cumulative cohort marriage rate since reaching the trough.

The way to measure the postponement and recuperation is illustrated in Figure 2. Comparing two hypothetical cohorts, *a* and *b*, suppose the older cohort *a* is a benchmark cohort. Cohort *a*'s CFMRs for ages 13–44 are used as a baseline, which is a horizontal line at zero. As some women reported first marriage before the age of 15, which was not uncommon for Korean women born in and before the 1930s, I used 13 as the lower limit of the age range. For cohort *b*, the age-specific difference in CFMRs from the benchmark is depicted as a trend line. The falling curve on the left side represents an absolute decline in the CFMR of cohort *b* at younger ages compared to the benchmark (cohort *a*), while the rising curve on the right side indicates an absolute increase in CFMR at older ages offsetting the marriage deficit at younger ages. The decline in CFMR at younger ages is considered as 'marriage postponement' (*P*) and the subsequent rise in marriage rate at older ages is labeled 'marriage recuperation' (*R*). For the sake of convenience, I use the terms 'marriage postponement' and 'marriage delay' interchangeably throughout this study. The ratio of marriage recuperation over postponement is computed at ages 30, 35, 40, and 45 as the recuperation index (*RI= R/P*100*). Three measures (*P*, *R*, and *RI*) are used for comparisons across cohorts.

These measures can also be computed using a moving benchmark model that compares the cohort of interest with a moving benchmark, such as an immediate preceding cohort (Lesthaeghe 2001). As the essential part of the moving benchmark model is identical to the fixed benchmark model, other than setting a moving benchmark I do not discuss it further and use it only for supplementary purposes. This method provides a useful opportunity to quantify the marriage P&R process.

Figure 2: **The conceptual illustration of measuring marriage postponement (*P*), recuperation (*R*), and recuperation index (*RI*)**

Source: Frejka (2012), Sobotka et al. (2011)

3.3 Analytical strategy

The analysis presented in this study consists of two parts. First, I study changes in the marriage P&R process across cohorts of women born between 1916 and 1980. Graphical illustrations of the P&R process demonstrate how marriage postponement advanced and also what share of presumably delayed marriage eventually became forgone marriages compared to previous cohorts. Second, I analyze variation in P&R trends by level of education. As a result of the profound educational transition in Korea it was not possible to use the same educational categories for all the cohorts analyzed here. Therefore I separated the birth cohorts into two broad groups, distinguished by their fertility levels: 1) cohorts born before 1960 that had above-replacement fertility and 2) cohorts born in 1960 and later, characterized by sub-replacement fertility. As the sample size for each cohort becomes smaller in education-specific trends, I use five-year birth cohorts.

For both the older and the younger cohort groups, four different educational categories are distinguished and changes in marriage schedules for the corresponding level of education are illustrated. The oldest cohort of women (1916–1920) is chosen as the benchmark for the cohorts born between 1916 and 1960, which have experienced the first demographic transition. By contrast, the younger cohorts born since 1960 can be seen as an

early generation of the second demographic transition because of their experience of below-replacement fertility and their relatively high educational attainment (Yoo 2014). For these cohorts I define the 1956–1960 cohort as the benchmark representing the marriage pattern characteristic of the final stage of the first demographic transition.

4. Results

4.1 Trends in marriage postponement and recuperation

Changes in women's marriage rate by age from the 1916–1920 cohort to the 1981–1985 cohort are illustrated in Figure 3. The upper graph represents the survival curves of never-married women by age. Over the subsequent cohorts the marriage schedule has been continuously delayed in Korea. At the same time the cohort-specific trends tend to converge towards the bottom as women approach age 45, suggesting that a vast majority of women (95%–99%) eventually married. However, the younger cohorts born in and after the 1970s began to depart from this pattern of universal marriage and show a new pattern characterized by later and fewer marriages.

The lower graph in Figure 3 illustrates the marriage P&R process across five-year birth cohorts. The figure was transformed from the survival curves into the differences in CFMR by age, starting from the 1916–1920 benchmark cohort. The u-shaped curves depict how each cohort's marriage schedule by age deviated from the benchmark. A descending slope on the left side represents a decline in CFMR at younger ages over the benchmark cohort, whereas an ascending slope on the right side illustrates the catching-up effect as delayed marriages are made up for at later ages. The u-shaped curve becomes deeper and wider across cohorts, signaling that marriage delay has intensified (deeper trough) while marriage recuperation became more protracted (signaled by widening curves) across cohorts. The graph also demonstrates that marriage recuperation took place especially among women in their late twenties and early thirties.

Figure 3: **Change in timing of women's first marriage between the 1916–1920 and 1981-1985 birth cohorts**
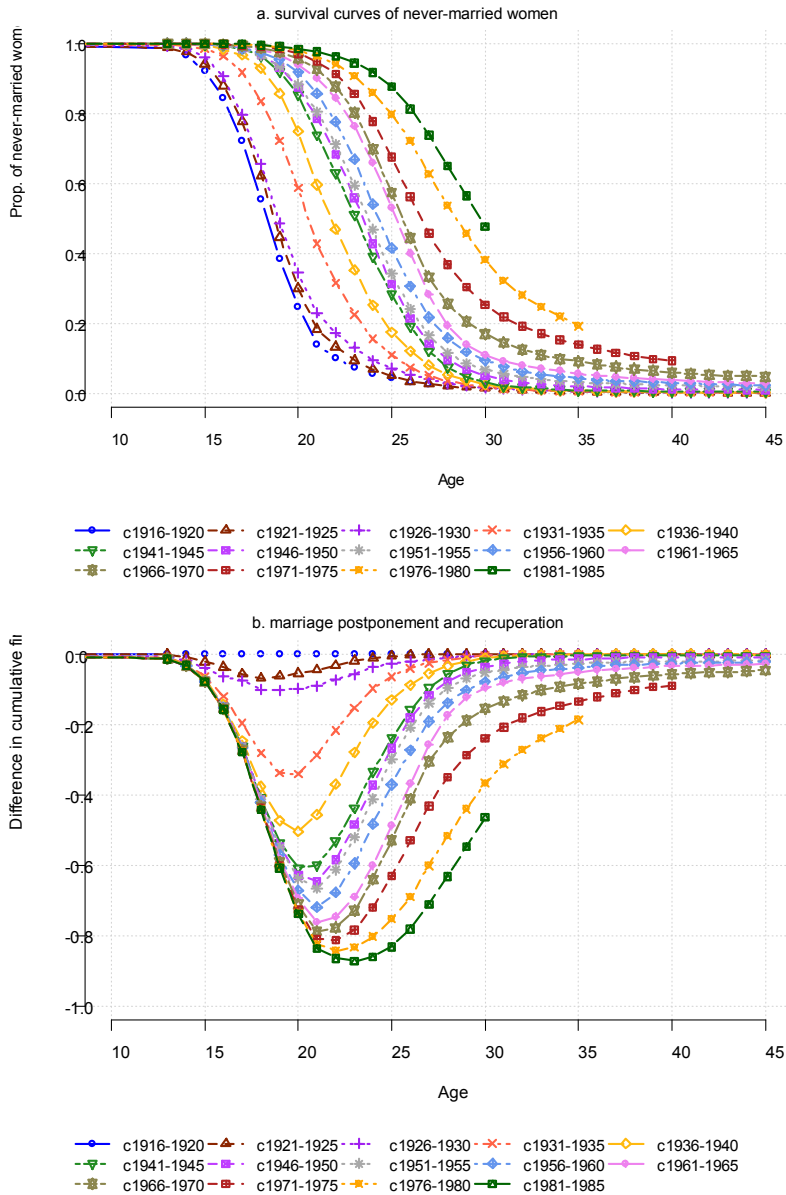
Figure 4 summarizes key indicators of the marriage P&R process: postponement (*P*), recuperation (*R*), recuperation index (*RI*), and a decline in CMFR at age 45. The upper graph (a) is derived from the baseline cohort model, which used a fixed benchmark (cohort 1916–1920), while the lower graph (b) is based on a moving benchmark model. All these measures are documented in Appendices A and B.

Marriage postponement (absolute decline in CFMR at the trough age) gradually increased across cohorts, accelerating especially among the women born in the 1930s and 1940s. The absolute value of marriage postponement (*P*) reaches 0.871 at age 23 for the youngest cohort, 1981–1985, representing a decline in the share of women married by that age of 87%. This indicates that marriage at age 22 shifted from being almost universal to becoming rare. The bar plots represent absolute recuperation (*R*) in CFMR from the trough by selected ages (30, 35, and 45), showing the share of delayed marriages that were recuperated by these ages. The recuperation index showed a nearly complete recuperation effect in marriage rate until the 1956–1960 cohort, but began to depart from this complete recuperation from the 1961–1965 cohort onward. As a result, the recuperation index at age 45 stays around 94%–96% for the women born in the 1960s in the fixed benchmark model, but declined to around 85-85% in the moving benchmark model (see Table 1). However, the trend in recuperation at younger ages among the women born in the 1970s has clearly weakened. The proportion of women remaining never-married at age 35 was 9% among the 1965–1970 cohort, but rose to 14% and 19% for the 1971–1975 and 1976–1980 cohorts respectively, signaling a likely rise of permanent non-marriage.

In sum, marriage delay in Korea continued throughout all the cohorts observed in this study. Two qualitatively different shifts in marriage timing can be distinguished. The first major shift towards delayed marriage took place among women born in the 1930s and the early 1940s. For them, the marriage postponement was remarkable, but women never marrying by age 45 remained rare due to the almost complete recuperation of delayed marriages at later ages. The most common age at first marriage for women became their early twenties. The second major transformation in marriage timing coincided with the emergence of below-replacement fertility among the women born since the 1960s. Marriage postponement gradually intensified, while recuperation began to slow down. This new divergence between marriage postponement and recuperation resulted in a rise in permanent non-marriage, manifested especially among the women born in the 1970s.

Table 1: **Women's marriage postponement and recuperation by birth cohort, 1916–1920 to 1976–1980 cohorts**

Birth cohort	Postponement (P)	Age at trough	Recuperation (R) at age				Recuperation Index (RI = R/P)			
			30	35	40	45	30	35	40	45
a. fixed benchmark model, compared to the 1916-1920 cohort										
c1916-1920	0.000	0	0.000	0.000	0.000	0.000				
c1921-1925	0.068	18	0.069	0.069	0.069	0.069	1.015	1.009	1.007	1.005
c1926-1930	0.102	19	0.099	0.101	0.102	0.102	0.979	0.999	1.006	1.002
c1931-1935	0.341	20	0.337	0.341	0.341	0.340	0.989	0.999	1.000	0.997
c1936-1940	0.504	20	0.493	0.502	0.503	0.502	0.979	0.997	0.999	0.997
c1941-1945	0.607	20	0.590	0.603	0.604	0.603	0.971	0.994	0.995	0.994
c1946-1950	0.652	21	0.609	0.635	0.640	0.642	0.935	0.975	0.983	0.985
c1951-1955	0.665	21	0.612	0.638	0.645	0.648	0.921	0.959	0.969	0.974
c1956-1960	0.718	21	0.639	0.681	0.692	0.696	0.890	0.948	0.964	0.969
c1961-1965	0.734	21	0.632	0.677	0.696	0.704	0.860	0.921	0.948	0.958
c1966-1970	0.787	21	0.633	0.703	0.730	0.741	0.804	0.893	0.928	0.942
c1971-1975	0.812	22	0.574	0.678	0.722		0.706	0.835	0.889	
c1976-1980	0.840	22	0.463	0.648			0.551	0.772		
C1981-1985	0.871	23	0.409				0.470			
b. moving benchmark model, compared to the immediate preceding five-year cohort										
c1916-1920	0.000	0	0.000	0.000	0.000	0.000				
c1921-1925	0.068	18	0.069	0.069	0.069	0.069	1.015	1.009	1.007	1.005
c1926-1930	0.046	21	0.043	0.045	0.046	0.046	0.931	0.985	1.001	0.996
c1931-1935	0.243	20	0.241	0.243	0.242	0.242	0.993	0.999	0.997	0.995
c1936-1940	0.169	21	0.163	0.168	0.169	0.169	0.962	0.994	0.999	0.996
c1941-1945	0.161	22	0.154	0.159	0.159	0.159	0.956	0.985	0.984	0.988
c1946-1950	0.059	22	0.034	0.046	0.050	0.053	0.574	0.783	0.855	0.893
c1951-1955	0.033	24	0.023	0.022	0.024	0.026	0.698	0.679	0.725	0.785
c1956-1960	0.073	23	0.047	0.063	0.068	0.068	0.638	0.858	0.923	0.928
c1961-1965	0.057	24	0.033	0.037	0.045	0.048	0.583	0.644	0.791	0.851
c1966-1970	0.104	25	0.052	0.077	0.085	0.089	0.506	0.745	0.820	0.855
c1971-1975	0.125	27	0.041	0.076	0.092		0.326	0.602	0.732	
c1976-1980	0.181	28	0.042	0.123			0.235	0.681		
C1981-1985	0.102	27	0.017				0.166			

Figure 4: **Graphical summary of marriage postponement and recuperation, 1916–1920 to 1976–1980 birth cohorts**

a. fixed benchmark model

b. moving benchmark model
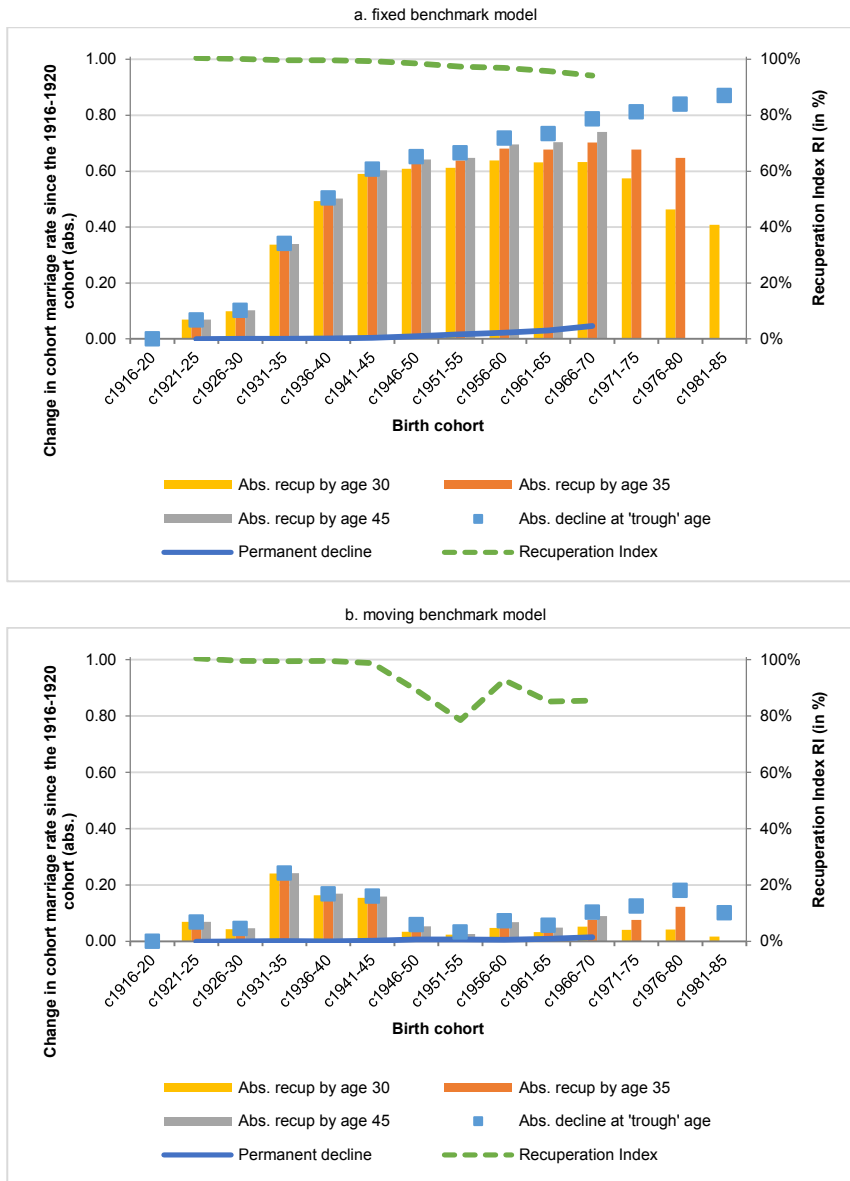
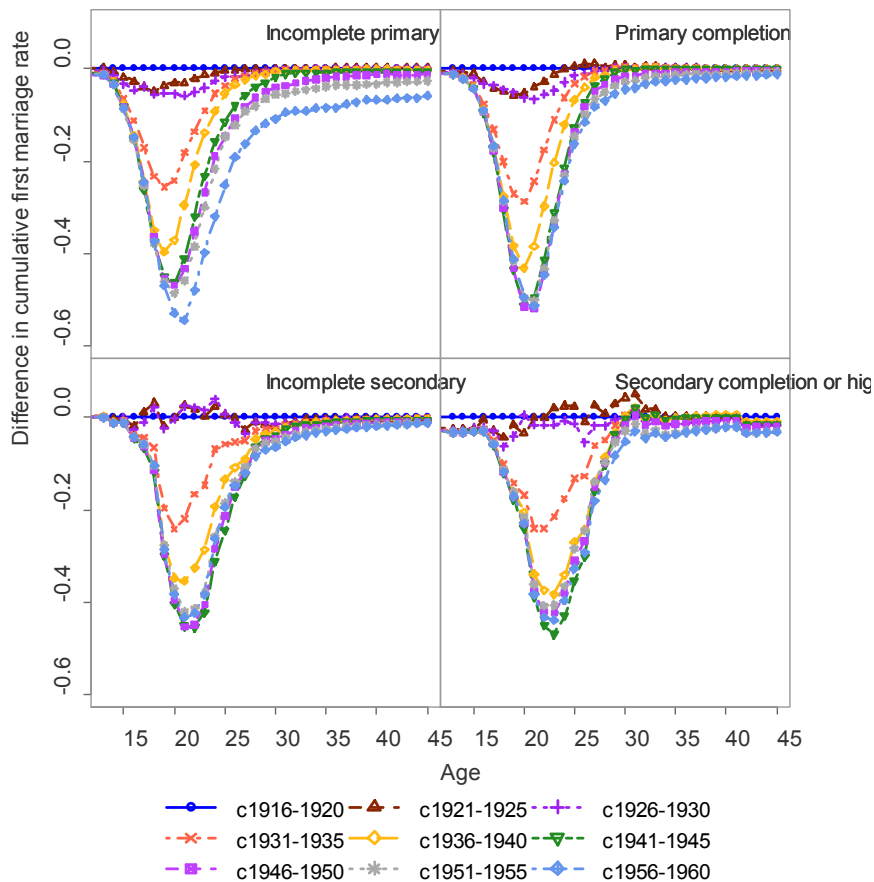## 4.2 Marriage postponement and recuperation by level of education

The pattern of marriage P&R can be further studied by level of education. This analysis was conducted separately for the women born before and after 1960 in order to distinguish the changes in marriage between the classic demographic transition and the below-replacement fertility period (which is also referred to as the second demographic transition) in Korea. This division also takes into account the massive educational expansion in Korea and its effect on the different education categories used in the analysis.

Figure 5 illustrates the marriage P&R process for the older cohorts of women born between 1916 and 1960. I use four different education categories: 'incomplete primary,' 'primary completion,' 'incomplete secondary,' and 'secondary completion or higher.' However, only a few women among the older cohorts born before 1930 entered secondary education. Therefore, I merged the two education categories 'incomplete secondary' and 'secondary completion or higher' in the benchmark cohort of 1916–1920 and set them as a joint benchmark for studying subsequent trends in both corresponding groups of women.

Overall, the pattern of the marriage P&R process looks similar for the different education groups. From older cohorts to younger cohorts, the marriage schedule is progressively delayed in the late teen years, and this delay is made up for in their early twenties. The extent of marriage delay was most salient among the cohorts born in the 1930s across all education groups. Thereafter the trend of marriage delay slowed down, and marriage timing generally stabilized across all education groups among the women born in the 1940s and 1950s. On the whole, the marriage P&R pattern did not differ much by level of education during the first demographic transition.

Figure 5 also shows that among the least educated the 1956–1960 cohort displays more intensive marriage postponement with less recuperation, which contrasts with other education groups. As free compulsory primary education became universal and secondary education spread through the country, the number of women with incomplete primary education became marginal. The slower recuperation of their marriage rate might reflect their difficulty finding an appropriate partner. For the most educated the marriage schedules overlapped among the cohorts born in 1936–1960. Across all education groups the troughs, when the falls in cumulative marriage rates were most pronounced, eventually converged to the ages 21–22.

Figure 5: **Marriage delay and recuperation by level of education, 1916–1920 to 1956–1960 birth cohorts**

Figure 6 looks at the changes in marriage timing and levels among the younger cohorts of women born in the 1960s–1980s. The 1956–1960 cohort is taken as a benchmark, representing the universal and relatively young marriage pattern in the late-stage phase of the first demographic transition. I use four educational categories: 'incomplete secondary,' 'secondary completion,' 'some college,' and 'bachelor degree or higher.'

Overall, the four education groups share the general pattern of the marriage P&R process. The younger cohorts tend to delay marriage to ever later ages, and the majority of delayed marriages are then recuperated later. However, in contrast to the older cohorts born before 1960, the recuperation is slower and incomplete. In addition, there are substantial differences in the intensity of marriage postponement across the four education groups.

Among women with incomplete secondary education a reversal of marriage delay took place among the youngest cohort analyzed, 1981–1985, suggesting a move towards an earlier marriage schedule. Since the share of this group is below 5% of the cohort, this had almost no impact on the overall marriage trend among the whole population. It is unclear whether this peculiar trend towards earlier marriage in this group is likely to continue further. Other educational groups share a continuing retreat from marriage at younger ages, which progresses at a different pace. The marriage P&R curve becomes ever deeper and wider across cohorts. The trough age moved from the mid-twenties for the 1961–1965 cohort towards the late-twenties for the 1966–1970 cohort for all levels of education except for the least educated. The deeper troughs go hand in hand with a slowing pace of marriage recuperation, which is moving to later ages and becoming less complete. This protracted recuperation of delayed marriage increasingly results in lifetime singlehood.

The strength and the pace of the P&R process, however, differed by education. The postponement index (P) was positively associated with level of education except for the least educated (see Appendix C). The recuperation index (RI) also varied according to level of education. Women with tertiary education displayed slightly stronger marriage recuperation than other groups, but this was not strong enough to offset the differences in the intensity of marriage declines at younger ages.

Figure 6: **Marriage delay and recuperation by level of education, 1956–1960 to 1981–1985 birth cohorts**
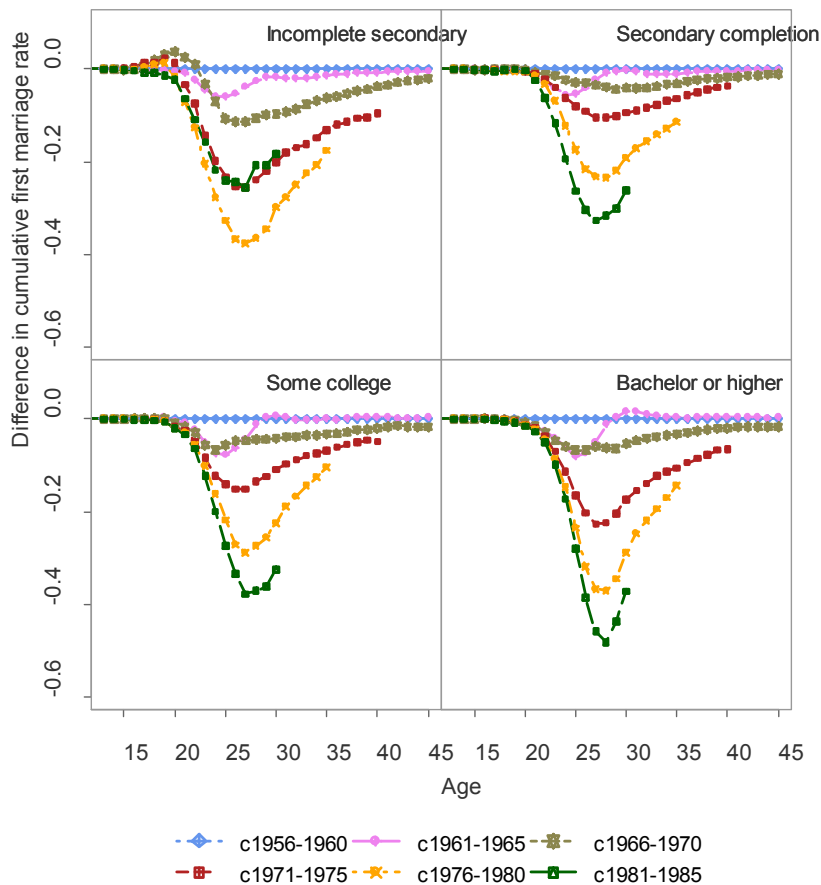
Figure 7 shows the rise in the share of never-married women in different educational groups at ages 35 and 39. The proportion of the never-married at age 35 rapidly increased among the women born in and after the late 1960s. Because of the recuperation of delayed marriage between ages 35 and 39, the share of the never-married at age 40 is smaller than that for age 35, but it already reached more than 10% among the 1971–1975 cohort in all levels of education except for the group which had completed secondary education. The share is higher among women with tertiary education, and the rising gradient is more pronounced among both women with tertiary education and the minority of women with

incomplete secondary education. The slowing-down of marriage recuperation at ages 35 and 39 and its variation by level of education among the women born in the 1970s suggest that more dramatic changes in marriage could emerge in the near future.

Figure 7: **Proportion of never-married women at ages 35 and 39 by level of education, 1956–1960 to 1981–1985 birth cohorts**

a. proportion of never-married women at age 35

b. proportion of never-married women at age 35
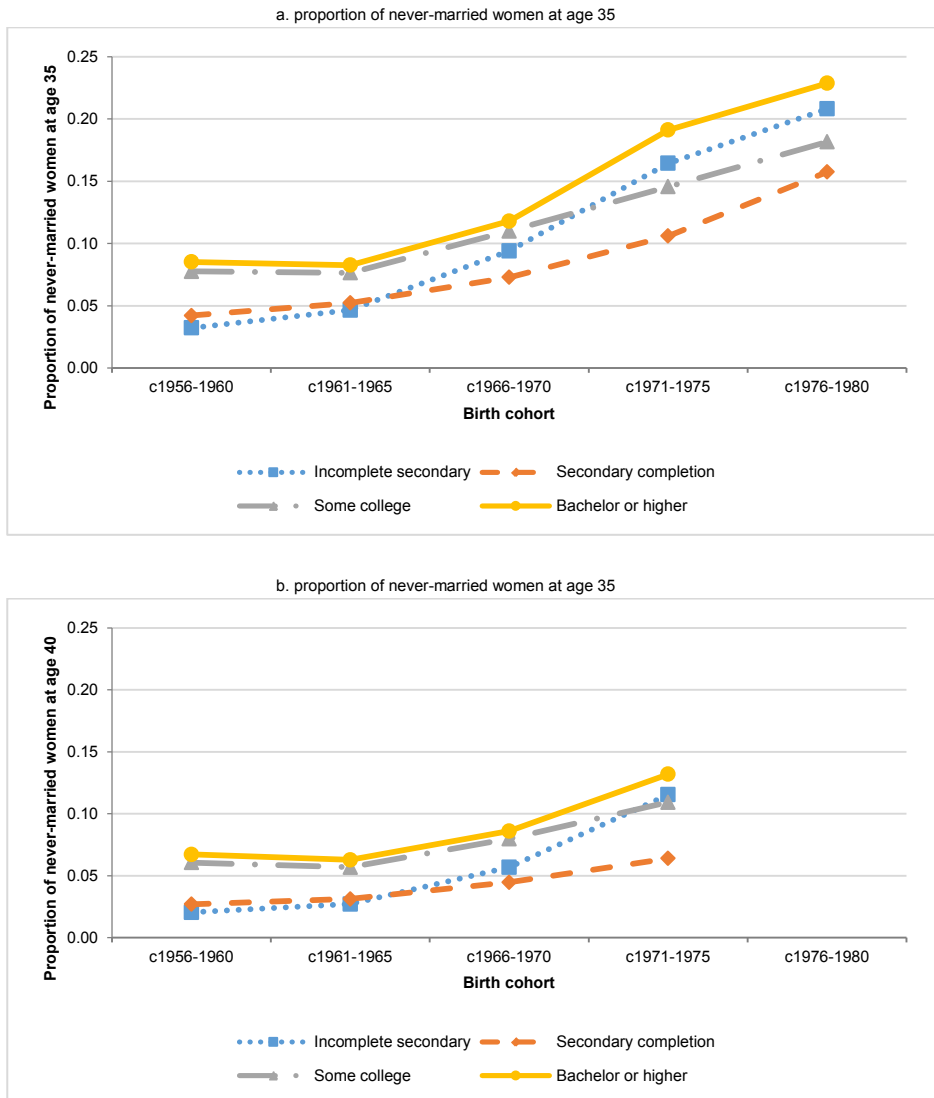
To get further insight into the scale of the declining recuperation of postponed marriages and the rising permanent singlehood by level of education, I developed two projection scenarios of CFMR at age 45 for the women born in 1981–1985 who have already moved beyond the trough age in the analysis presented above. I based my projections on the three key P&R measures analyzed here (see Appendix Tables A-3 and A-4). For the two scenarios, I extrapolated a) recent trends and simply fixed b) the more recent levels of P&R indexes. The projected trends (results not shown here; available upon request) suggest that lifetime marriage is declining rapidly in Korea among the women born between 1971 and 1985. For instance, lifetime singlehood by age 45, which stayed below 5% among the cohorts born up until the 1960s, was projected to reach 15%–29% among the women born in 1981–1985 according to the two scenarios. The four education groups share clear downward trends in marriage, but two groups with tertiary education stand out in their intensity. For instance, one-third (33%) of women born in 1981–1985 with a bachelors degree or higher are expected to remain permanently single, suggesting marriage will be far from universal if the current trend in the marriage P&R process continues. Given the rapid transition towards very high rates of tertiary education in Korea, the marriage trends among these women have a dominant and growing impact on the overall marriage patterns among all women. Applying a projection method based on education-specific trends can therefore provide a more accurate projection of cohort marriage changes in the whole society.

5. Discussion and conclusion

Marriage delay has continued throughout the demographic transition in Korea. Two distinct shifts towards delayed marriage can be identified. The first major delay appeared among women born in the 1930s and early 1940s, who experienced a strong fall in marriages in their late teens and early twenties. This marriage delay was almost completely recouped at later ages during the post-Korean-war period, without a change in levels of permanent singlehood. A second wave of marriage delay took place among the women born from the early 1960s, who experienced a fall in completed fertility towards and then below replacement level. The extent of marriage delay increased, while among the women born in the 1970s and early 1980s marriage recuperation later in life became protracted and eventually declined. As a result, the proportion of women reaching the end of their reproductive lifespan without ever having been married is now projected to rise rapidly.

Educational variation also distinguishes the ongoing marriage postponement shift from the previous one. Marriage postponement is now most pronounced among women with tertiary education, whereas in the first wave all education groups shared a general pattern of marriage P&R process. Women with tertiary education are associated with both a stronger marriage delay at younger ages and an intensive recuperation at later ages, but their recuperation is not enough to cover up the marriage delay at earlier ages. Thus, those with

tertiary education are expected to show the fastest rise in the proportion that never marry. A reversal of marriage delay also appeared among the women born in the early 1980s with incomplete secondary education, but because of the small number of women in this category its impact on the overall trend is negligible. When such educational disparities in P&R trends are taken into account, the proportion of women who have never married by age 45 is expected to reach 15%–29% among the latest cohort, born in 1981–1985.

The two distinct waves of marriage delay have different causes. The first wave is probably due to the political turbulence of the 1940s and 1950s: World War II, liberation, and the Korean War. The wars and the social unrest encouraged women born in the 1930s and early 1940s to delay first marriage. The unbalanced sex ratio at primary marriage age caused by wars could have contributed to this delay (Hacker, Hilde, and Jones 2010). These historical events strongly influenced the marriage pattern for all social groups, and as a result there was little difference in the marriage P&R process by level of education. The shift to universal primary education in the late 1950s and the gradual collapse of traditional arranged marriages (Gong et al. 1992) could also have contributed to the similarity of the marriage P&P process across groups.

By contrast, the major delay in marriage among the more recent cohorts involves the gradual differentiation of marriage behavior by social group. The trend towards later and fewer marriages is most pronounced in younger cohorts and among highly educated women, which is consistent with prior studies (Park, Lee, and Jo 2013; Woo 2012). The factors that caused low birth rates, such as extended education, women's increasing social participation, and economic uncertainty, could also be influencing when women marry. The cohorts born in and after 1960 benefited most from the expansion of higher education and grew up with greater economic prosperity than the previous cohorts. As they have more education and economic opportunities, women with higher education can delay marriage to avoid the heavy burden of traditional gender roles, such as childcare and housework, which might accompany marriage (Kim 2005). Economic uncertainty, which has spread rapidly since the Asian Financial Crisis in 1997–1998, could also be contributing to marriage delay (Eun 2007). The cohorts marrying during this crisis and afterwards are also the first cohorts to experience higher rates of permanent singlehood, heralding the end of universal marriage in Korea.

The findings in this study also shed light on the historical pattern of marriage delay in East Asia and its contrast with the West. The first wave of marriage delay in Korea among women in the 1930s–1940s constituted a shift away from teenage marriages, but did not affect the underlying universality of marriage. At the same time, many Western countries were experiencing a shift towards earlier and more frequent marriages, concomitant with the post-WWII baby boom era. By contrast, the second wave of marriage delay has two main features that are broadly shared with western societies: a shift towards later marriage (with first marriages often peaking among women in their late 20s and early 30s) and, among the younger cohorts, a move away from getting married at all, especially among the highly educated. Where Korea and East Asian countries differ from the western world,

however, is in the extent to which cohabitation and other, less traditional living arrangements substitute for the decline in marriages. In most western countries, cohabitation has become widely accepted and childbearing outside marriage has risen rapidly, with some countries registering more than half of births outside marriage. In this respect, Korea and East Asia in general remain distinct, as childbearing outside marriage is not accepted by society and cohabitation is spreading only slowly, and by and large only among childless people. The move away from marriage in Korea may therefore also have strong consequences for birth rates in the country as the rising share of never-married women remain childless.

This study has several limitations. The measure of marriage postponement is influenced by the choice of the benchmark cohort in the benchmark cohort model. A different benchmark might lead to different trends in marriage delay, although it should not alter the overall results of this study. Because of data limitations I was not able to investigate changes in union formation other than marriage and could not shed light on the role of cohabitation in Korea. Additionally, I did not consider men's marriages in this study. Given the tradition of hypergamy and the positive association between men's education and marriage, the least-educated men are more likely to delay marriage, and their delayed marriages are less likely to be made up at higher ages.

Both the impending collapse of universal marriage and the greater variation in marriage across social groups are likely to intensify in the coming decades. This is likely to contribute to the greater acceptance of cohabitation and possibly also of non-marital childbearing in Korea and East Asia in general. It is too early to tell, however, whether highly educated women, who are most likely to remain unmarried, will be those pioneering the spread of non-traditional family forms in the region, or whether these will spread fastest among less-educated women, as was the case in some countries in Western Europe and the United States.

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References

Atoh, M., Kandiah, V., and Ivanov, S. (2004). The second demographic transition in Asia? Comparative analysis of the low fertility situation in East and South-East Asian countries. *The Japanese Journal of Population* 2(1): 42–75.

Becker, G.S. (1981). *A treatise on the family*. London: Harvard University Press.

Blossfeld, H.-P. (1995). Changes in the process of family formation and women's growing economic independence: A comparison of nine countries. In: Blossfeld, H.-P. (ed.). *The new role of women: Family formation in modern societies.* Boulder: Westview: 3–32.

Blossfeld, H.-P. and Huinink, J. (1991). Human capital investments or norms of role transition? How women's schooling and career affect the process of family formation. *American Journal of Sociology* 97(1): 143–168. doi:10.1086/229743.

Bongaarts, J. and Feeney, G. (1998). On the quantum and tempo of fertility. *Population and Development Review* 24(2): 271–291. doi:10.2307/2807974.

Chang, D.H. (1979). The Korean family. In: Das, M.S. and Bardis, P.D. (eds.). *The family in Asia.* London: Allen and Unwin: 277–319.

Cherlin, A.J. (2004). The deinstitutionalization of American marriage. *Journal of Marriage and Family* 66(4): 848–861. doi:10.1111/j.0022-2445.2004.00058.x.

Coale, A.J. and McNeil, D.R. (1972). The distribution by age of the frequency of first marriage in a female cohort. *Journal of the American Statistical Association* 67(340): 743–749. doi:10.1080/01621459.1972.10481287.

Dalla Zuanna, G., Atoh, M., Castiglioni, M., and Kojima, K. (1998). Late marriage among young people: The case of Italy and Japan. *Genus* 54(3/4): 187–232.

Davis, K. (1963). The theory of change and response in modern demographic history. *Population Index* 29(4): 345. doi:10.2307/2732014.

Davis, K. and Blake, J. (1956). Social structure and fertility: An analytic framework. *Economic Development and Cultural Change* 4(3): 211–235. doi:10.1086/449714.

Dixon, R.B. (1971). Explaining cross-cultural variations in age at marriage and proportions never marrying. *Population Studies* 25(2): 215–233. doi:10.1080/00324728.1971.10405799.

Dixon, R.B. (1978). Late marriage and non-marriage as demographic responses: Are they similar? *Population Studies* 32(3): 449–466. doi:10.1080/00324728.1978.10412808.

Eun, K.-S. (2003). Understanding recent fertility decline in Korea. *Journal of Population and Social Security (Population)* 1(Suppl.): 574–595.

Eun, K.-S. (2007). Lowest-low fertility in the Republic of Korea: Causes, consequences and policy responses. *Asia-Pacific Population Journal* 22(2): 51–72.

Eun, K.-S. and Lee, Y.-S. (2005). A cross-national comparative study of family value in Korea. *Korea Journal of Population Studies* 28(1): 107–132.

Frejka, T. (2011). The role of contemporary childbearing postponement and recuperation in shaping period fertility trends. *Comparative Population Studies–Zeitschrift für Bevölkerungswissenschaft* 36(4): 927–958.

Frejka, T. and Calot, G. (2001). Cohort reproductive patterns in low-fertility countries. *Population and Development Review* 27(1): 103–132. doi:10.1111/j.1728-4457. 2001.00103.x.

Frejka, T., Jones, G.W., and Sardon, J.P. (2010). East Asian childbearing patterns and policy developments. *Population and Development Review* 36(3): 579–606. doi:10.1111/j.1728-4457.2010.00347.x.

Frejka, T. and Sardon, J.-P. (2004). *Childbearing trends and prospects in low-fertility countries: A cohort analysis*. Dordrecht: Kluwer Academic.

Fukuda, S. (2013). The changing role of women's earnings in marriage formation in Japan. *The Annals of the American Academy of Political and Social Science* 646(1): 107–128. doi:10.1177/0002716212464472.

Goldstein, J.R. and Kenney, C.T. (2001). Marriage delayed or marriage forgone? New cohort forecasts of first marriage for U.S. women. *American Sociological Review* 66(4): 506–519. doi:10.2307/3088920.

Gong, S.-K., Jo, A., Kim, S.-K., and Son, S.-H. (1992). *Family formation and fertility behaviors in Korea*. Seoul: Korea Institute for Health and Social Affairs.

Hacker, J.D., Hilde, L., and Jones, J.H. (2010). The effect of the Civil War on southern marriage patterns. *The Journal of Southern History* 76(1): 39–70.

Hajnal, J. (1965). European marriage patterns in perspective. In: Glass, D.V. and Eversley, D.E.C. (eds.). *Population in history: Essays in historical demography*. London: Arnold: 101–143.

Jones, G.W. (2007). Delayed marriage and very low fertility in Pacific Asia. *Population and Development Review* 33(3): 453–478. doi:10.1111/j.1728-4457.2007.00180.x.

Jones, G.W. and Gubhaju, B. (2009). Factors influencing changes in mean age at first marriage and proportions never marrying in the low-fertility countries of East and

Southeast Asia. *Asian Population Studies* 5(3): 237–265. doi:10.1080/174417309 03351487.

Kalmijn, M. (2013). The educational gradient in marriage: A comparison of 25 European countries. *Demography* 50(4): 1499–1520. doi:10.1007/s13524-013-0229-x.

Kim, D.-S. (2005). Theoretical explanations of rapid fertility decline in Korea. *The Japanese Journal of Population* 3(1): 2–25.

Kim, D.-S. (2010). The rise of cross-border marriage and divorce in contemporary Korea. In: Yang, W.-S. and Lu, M.C.-W. (eds.). *Asian cross-border marriage migration: Demographic patterns and social issues*. Amsterdam: Amsterdam University Press: 127–153.

Kwon, T.-H. (2007). Trends and implications of delayed and non-marriage in Korea. *Asian Population Studies* 3(3): 223–241. doi:10.1080/17441730701746367.

Lapierre-Adamcyk, E. and Burch, T.K. (1974). Trends and differentials in age at marriage in Korea. *Studies in Family Planning* 5(8): 255–260. doi:10.2307/1964895.

Lesthaeghe, R. (2001). Postponement and recuperation: Recent fertility trends and forecasts in six Western European countries (Austria, Belgium, France, Germany, Switzerland and the Netherlands). Paper presented at International Perspectives on Low Fertility: Trends, Theories and Policies, Tokyo, 21–23 March, 2001.

Lichter, D.T., McLaughlin, D.K., and Ribar, D.C. (2002). Economic restructuring and the retreat from marriage. *Social Science Research* 31(2): 230–256. doi:10.1006/ssre. 2001.0728.

McDonald, P. (2000). Gender equity, social institutions and the future of fertility. *Journal of Population Research* 17(1): 1–16. doi:10.1007/BF03029445.

Ono, H. (2003). Women's economic standing, marriage timing, and cross-national contexts of gender. *Journal of Marriage and Family* 65(2): 275–286. doi:10.1111/j.1741-3737.2003.00275.x.

Oppenheimer, V.K. (1988). A theory of marriage timing. *American Journal of Sociology* 94(3): 563–591. doi:10.1086/229030.

Oppenheimer, V.K. (1997). Women's employment and the gain to marriage: The specialization and trading model. *Annual Review of Sociology* 23(1): 431–453. doi:10.1146/annurev.soc.23.1.431.

Park, I.H. and Cho, L.-J. (1995). Confucianism and the Korean family. *Journal of Comparative Family Studies* 26(1): 117.

Park, H. and Choi, J. (2015). Long-term trends in living alone among Korean adults: age, gender, and educational differences. *Demographic Research* S15(43): 1177–1208. doi:10.4054/DemRes.2015.32.43.

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.

Raymo, J.M. (2003). Educational attainment and the transition to first marriage among Japanese women. *Demography* 40(1): 83–103. doi:10.1353/dem.2003.0008.

Raymo, J.M. (2015). Living alone in Japan: Relationships with happiness and health. *Demographic Research* S15(46): 1267–1298. doi:10.4054/DemRes.2015.32.46.

Raymo, J.M. and Iwasawa, M. (2005). Marriage market mismatches in Japan: An alternative view of the relationship between women's education and marriage. *American Sociological Review* 70(5): 801–822. doi:10.1177/000312240507000504.

Raymo, J.M., Iwasawa, M., and Bumpass, L. (2009). Cohabitation and family formation in Japan. *Demography* 46(4): 785–803. doi:10.1353/dem.0.0075.

Raymo, J. M., Park, H., Xie, Y., and Yeung, W.-j. J. 2015. Marriage and Family in East Asia: Continuity and Change. *Annual Review of Sociology* 41(1):471–492. doi:10.1146/annurev-soc-073014-112428.

Retherford, R.D., Ogawa, N., and Matsukura, R. (2001). Late marriage and less marriage in Japan. *Population and Development Review* 27(1): 65–102. doi:10.1111/j.1728-4457.2001.00065.x.

Rodgers, W.L. and Thornton, A. (1985). Changing patterns of first marriage in the United States. *Demography* 22(2): 265–279. doi:10.2307/2061181.

Ryder, N.B. (1965). The cohort as a concept in the study of social change. *American Sociological Review* 30(6): 843–861. doi:10.2307/2090964.

Sobotka, T. (2008). Overview chapter 6: The diverse faces of the second demographic transition in Europe. *Demographic Research* S7(8): 171–224. doi:10.4054/DemRes.2008.19.8.

Sobotka, T., Skirbekk, V., and Philipov, D. (2011). Economic recession and fertility in the developed world. *Population and Development Review* 37(2): 267–306. doi:10.1111/j.1728-4457.2011.00411.x.

Sobotka, T. and Toulemon, L. (2008). Overview chapter 4: Changing family and partnership behaviour: Common trends and persistent diversity across Europe. *Demographic Research* 19(6): 85–138. doi:10.4054/DemRes.2008.19.6.

Sobotka, T., Zeman, K., Lesthaeghe, R., Frejka, T., and Neels, K. (2012). Postponement and recuperation in cohort fertility: Austria, Germany and Switzerland in a European context. *Comparative Population Studies* 36(2–3): 417–452.

Sweeney, M.M. (2002). Two decades of family change: The shifting economic foundations of marriage. *American Sociological Review* 67(1): 132–147. doi:10.2307/3088937.

Thornton, A., Axinn, W.G., and Teachman, J.D. (1995). The influence of school enrollment and accumulation on cohabitation and marriage in early adulthood. *American Sociological Review* 60(5): 762–774. doi:10.2307/2096321.

Tian, F.F. (2013). Transition to first marriage in reform-era urban China: The persistent effect of education in a period of rapid social change. *Population Research and Policy Review* 32(4): 529–552. doi:10.1007/s11113-013-9272-y.

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.

Xu, Q., Li, J., and Yu, X. (2014). Continuity and change in Chinese marriage and the family. *Chinese Sociological Review* 47(1): 30–56.

Yoo, S.H. (2014). Educational differentials in cohort fertility during the fertility transition in South Korea. *Demographic Research* 30(53): 1463–1494.

Yu, J. and Xie, Y. (2015a). Cohabitation in China: Trends and determinants. *Population and Development Review* 41(4): 607–628. doi:10.4054/DemRes.2014.30.53.

Yu, J. and Xie, Y. (2015b). Changes in the determinants of marriage entry in post-reform urban China. *Demography* 52(6): 1869–1892. doi:10.1007/s13524-015-0432-z.

Appendix A

Table A-1: Marriage *P&R* process by level of education, 1916–1920 to 1956–1960 birth cohorts, fixed benchmark model

Birth cohort	Postpo nement (P)	Age at trough	Recuperation (R) at age				Recuperation Index (RI = R/P)			
			30	35	40	45	30	35	40	45
Incomplete primary										
c1916–1920	0.000		0.000	0.000	0.000	0.000				
c1921–1925	−0.049	18	0.048	0.049	0.050	0.050	0.980	0.994	1.017	1.026
c1926–1930	−0.058	21	0.055	0.056	0.059	0.058	0.944	0.975	1.011	1.005
c1931–1935	−0.256	19	0.252	0.255	0.255	0.255	0.984	0.997	0.999	0.998
c1936–1940	−0.397	19	0.391	0.394	0.396	0.394	0.984	0.992	0.997	0.993
c1941–1945	−0.463	20	0.447	0.456	0.457	0.457	0.964	0.983	0.986	0.986
c1946–1950	−0.469	20	0.429	0.449	0.457	0.457	0.915	0.958	0.974	0.974
c1951–1955	−0.487	20	0.431	0.449	0.454	0.461	0.885	0.921	0.933	0.947
c1956–1960	−0.545	22	0.437	0.461	0.478	0.487	0.802	0.846	0.877	0.894
Primary completion										
c1916–1920	0.000		0.000	0.000	0.000	0.000				
c1921–1925	−0.057	19	0.064	0.060	0.057	0.057	1.117	1.047	0.995	0.995
c1926–1930	−0.066	21	0.070	0.069	0.066	0.067	1.059	1.050	1.000	1.018
c1931–1935	−0.288	20	0.293	0.290	0.288	0.288	1.017	1.008	1.000	1.001
c1936–1940	−0.432	20	0.432	0.433	0.432	0.432	0.998	1.003	0.998	1.000
c1941–1945	−0.514	20	0.512	0.514	0.513	0.514	0.997	1.001	0.998	1.000
c1946–1950	−0.518	21	0.503	0.511	0.512	0.515	0.970	0.985	0.988	0.994
c1951–1955	−0.502	21	0.474	0.489	0.491	0.495	0.945	0.975	0.979	0.986
c1956–1960	−0.514	22	0.470	0.490	0.497	0.502	0.914	0.954	0.968	0.977
Incomplete secondary										
c1916–1920 a	0.000		0.000	0.000	0.000	0.000				
c1931–1935	−0.242	21	0.234	0.239	0.240	0.242	0.967	0.987	0.991	0.998
c1936–1940	−0.377	21	0.361	0.374	0.375	0.376	0.958	0.991	0.993	0.996
c1941–1945	−0.475	21	0.452	0.468	0.469	0.471	0.952	0.985	0.988	0.992
c1946–1950	−0.476	21	0.446	0.464	0.466	0.469	0.937	0.974	0.979	0.984
c1951–1955	−0.445	21	0.408	0.426	0.430	0.435	0.918	0.958	0.967	0.977
c1956–1960	−0.456	21	0.408	0.431	0.439	0.445	0.894	0.945	0.962	0.976
Secondary comp. or higher										
c1916–1920 a	0.000		0.000	0.000	0.000	0.000				
c1931–1935	−0.231	22	0.222	0.232	0.232	0.231	0.959	1.005	1.005	0.998
c1936–1940	−0.381	23	0.370	0.388	0.389	0.386	0.971	1.018	1.021	1.014
c1941–1945	−0.467	23	0.452	0.472	0.470	0.467	0.967	1.011	1.007	1.001
c1946–1950	−0.420	23	0.391	0.414	0.416	0.416	0.931	0.986	0.990	0.989
c1951–1955	−0.403	23	0.361	0.379	0.385	0.388	0.895	0.939	0.955	0.961
c1956–1960	−0.436	23	0.370	0.407	0.417	0.419	0.849	0.934	0.957	0.961

Note: a. Due to the small sample size, the 1921–1925 and 1926–1930 cohorts for the corresponding educational categories were integrated into the benchmark (the 1916–1920 cohort).

Table A-2: **Marriage *P&R* process by level of education, 1916–1920 to 1956–1960 birth cohorts, moving benchmark model**

Birth cohort	Postponement (P)	Age at trough	Recuperation (R) at age				Recuperation Index (RI = R/P)			
			30	35	40	45	30	35	40	45
Incomplete primary										
c1916–1920	0.000		0.000	0.000	0.000	0.000				
c1921–1925	–0.049	18	0.048	0.049	0.050	0.050	0.980	0.994	1.017	1.026
c1926–1930	–0.030	22	0.027	0.028	0.029	0.029	0.924	0.961	0.994	0.966
c1931–1935	–0.204	19	0.203	0.204	0.203	0.203	0.996	1.003	0.995	0.996
c1936–1940	–0.141	19	0.139	0.139	0.140	0.139	0.983	0.982	0.993	0.983
c1941–1945	–0.117	21	0.106	0.112	0.111	0.113	0.913	0.962	0.955	0.969
c1946–1950	–0.034	23	0.010	0.022	0.028	0.028	0.309	0.639	0.836	0.839
c1951–1955	–0.033	23	0.017	0.015	0.013	0.019	0.509	0.448	0.378	0.580
c1956–1960	–0.105	25	0.054	0.060	0.071	0.074	0.512	0.567	0.677	0.699
Primary completion										
c1916–1920	0.000		0.000	0.000	0.000	0.000				
c1921–1925	–0.057	19	0.064	0.060	0.057	0.057	1.117	1.047	0.995	0.995
c1926–1930	–0.035	23	0.032	0.035	0.035	0.036	0.918	1.017	1.007	1.043
c1931–1935	–0.224	20	0.225	0.223	0.224	0.223	1.005	0.995	1.001	0.996
c1936–1940	–0.145	20	0.139	0.144	0.144	0.144	0.961	0.992	0.995	0.996
c1941–1945	–0.117	22	0.117	0.117	0.117	0.117	0.994	0.996	0.996	1.001
c1946–1950	–0.029	22	0.015	0.021	0.024	0.026	0.514	0.706	0.829	0.897
c1951–1955	–0.018	27	0.005	0.013	0.013	0.014	0.306	0.727	0.741	0.791
c1956–1960	–0.018	29	0.002	0.007	0.012	0.013	0.091	0.390	0.667	0.721
Incomplete secondary										
c1916–1920 [a]	0.000		0.000	0.000	0.000	0.000				
c1931–1935	–0.242	21	0.234	0.239	0.240	0.242	0.967	0.987	0.991	0.998
c1936–1940	–0.160	22	0.152	0.159	0.159	0.158	0.951	0.998	0.997	0.993
c1941–1945	–0.136	23	0.129	0.132	0.132	0.133	0.948	0.974	0.977	0.982
c1946–1950	–0.013	31	0.006	0.008	0.009	0.009	0.435	0.592	0.690	0.727
c1951–1955	–0.008	33	0.002	0.002	0.003	0.005	0.236	0.212	0.396	0.660
c1956–1960	–0.016	28	0.005	0.010	0.014	0.016	0.279	0.624	0.849	0.942
Secondary comp. or higher										
c1916–1920 [a]	0.000		0.000	0.000	0.000	0.000				
c1931–1935	–0.231	22	0.222	0.232	0.232	0.231	0.959	1.005	1.005	0.998
c1936–1940	–0.169	23	0.168	0.175	0.176	0.175	0.991	1.034	1.041	1.034
c1941–1945	–0.089	24	0.085	0.088	0.085	0.084	0.953	0.981	0.948	0.945
c1946–1950	–0.017	31	0.003	0.005	0.009	0.012	0.170	0.330	0.521	0.698
c1951–1955	–0.019	32	0.005	0.000	0.005	0.008	0.285	0.008	0.262	0.419
c1956–1960	–0.047	26	0.024	0.043	0.047	0.046	0.513	0.916	0.989	0.971

Note: a. Due to small sample size, the 1921–1925 and 1926–1930 cohorts for c the corresponding educational categories were integrated into the benchmark (the 1916–1920 cohort).

Table A-3: **Marriage *P&R* process by level of education, 1956–1960 to 1981–1985 birth cohorts, fixed benchmark model**

Birth cohort	Postponement (P)	Age at trough	Recuperation (R) at age				Recuperation Index (RI = Rc/Pc)			
			30	35	40	45	30	35	40	45
Less than high school										
c1956–1960	0.000	13	0.000	0.000	0.000	0.000				
c1961–1965	−0.060	25	0.042	0.045	0.053	0.056	0.700	0.760	0.886	0.933
c1966–1970	−0.114	26	0.017	0.052	0.077	0.093	0.150	0.457	0.680	0.815
c1971–1975	−0.256	27	0.055	0.124	0.161		0.216	0.483	0.629	
c1976–1980	−0.377	27	0.078	0.201			0.207	0.533		
c1981–1985	−0.255	27	0.071				0.278			
High school graduation										
c1956–1960	0.000	13	0.000	0.000	0.000	0.000				
c1961–1965	−0.057	24	0.054	0.046	0.052	0.055	0.954	0.821	0.925	0.976
c1966–1970	−0.043	29	0.003	0.012	0.025	0.032	0.059	0.283	0.588	0.759
c1971–1975	−0.105	28	0.011	0.041	0.068		0.101	0.389	0.647	
c1976–1980	−0.234	28	0.041	0.119			0.175	0.507		
c1981–1985	−0.327	27	0.065				0.198			
Some college										
c1956–1960	0.000	13	0.000	0.000	0.000	0.000				
c1961–1965	−0.076	25	0.082	0.078	0.080	0.081	1.076	1.014	1.050	1.055
c1966–1970	−0.067	24	0.024	0.034	0.047	0.048	0.366	0.513	0.711	0.726
c1971–1975	−0.152	27	0.043	0.084	0.104		0.283	0.553	0.681	
c1976–1980	−0.289	27	0.064	0.185			0.222	0.640		
c1981–1985	−0.378	27	0.053				0.140			
Bachelor degree or higher										
c1956–1960	0.000	13	0.000	0.000	0.000	0.000				
c1961–1965	−0.080	25	0.097	0.082	0.084	0.085	1.214	1.032	1.055	1.064
c1966–1970	−0.067	25	0.014	0.034	0.048	0.050	0.206	0.509	0.718	0.752
c1971–1975	−0.227	27	0.053	0.121	0.163		0.231	0.534	0.716	
c1976–1980	−0.372	28	0.084	0.229			0.225	0.614		
c1981–1985	−0.482	28	0.109				0.227			

Table A-4: **Marriage *P&R* process by level of education, 1956–1960 to 1981–1985 cohorts, relational model**

Birth cohort	Postponement (P)	Age at trough	Recuperation (R) at age				Recuperation Index (RI = R/P)			
			30	35	40	45	30	35	40	45
Less than high school										
c1956–1960	0.000	13	0.000	0.000	0.000	0.000				
c1961–1965	−0.060	25	0.042	0.045	0.053	0.056	0.700	0.760	0.886	0.933
c1966–1970	−0.081	28	0.002	0.033	0.051	0.064	0.025	0.413	0.633	0.789
c1971–1975	−0.142	27	0.039	0.072	0.084		0.271	0.506	0.589	
c1976–1980	−0.127	28	0.028	0.083			0.224	0.655		
c1981–1985	−0.026	19	0.140				5.455			
High school graduation										
c1956–1960	0.000	13	0.000	0.000	0.000	0.000				
c1961–1965	−0.057	24	0.054	0.046	0.052	0.055	0.954	0.821	0.925	0.976
c1966–1970	−0.039	29	0.001	0.019	0.026	0.030	0.036	0.474	0.658	0.772
c1971–1975	−0.070	27	0.016	0.037	0.051		0.230	0.525	0.724	
c1976–1980	−0.129	28	0.030	0.078			0.236	0.602		
c1981–1985	−0.094	27	0.025				0.264			
Some college										
c1956–1960	0.000	13	0.000	0.000	0.000	0.000				
c1961–1965	−0.076	25	0.082	0.078	0.080	0.081	1.076	1.014	1.050	1.055
c1966–1970	−0.048	29	0.000	0.015	0.025	0.026	0.008	0.307	0.524	0.536
c1971–1975	−0.107	27	0.040	0.071	0.077		0.371	0.666	0.724	
c1976–1980	−0.140	28	0.025	0.104			0.179	0.744		
c1981–1985	−0.105	29	0.004				0.039			
Bachelor or higher										
c1956–1960	0.000	13	0.000	0.000	0.000	0.000				
c1961–1965	−0.080	25	0.097	0.082	0.084	0.085	1.214	1.032	1.055	1.064
c1966–1970	−0.070	30	0.000	0.035	0.047	0.048	0.000	0.496	0.668	0.691
c1971–1975	−0.169	27	0.047	0.096	0.123		0.279	0.566	0.729	
c1976–1980	−0.149	28	0.035	0.111			0.234	0.748		
c1981–1985	−0.109	28	0.026				0.235			