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Below-Replacement Fertility in East Asia: Patterns, Factors, and Policy Implications

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Below-replacement fertility in East Asia: Patterns, Factors, and Policy Implications

Noriko Tsuya, Minja Kim Choe, and Wang Feng

Introduction

This paper examines the patterns, factors, and policy implications of ongoing fertility decline to below replacement levels in East Asia, focusing on Japan, South Korea (referred to as "Korea" hereafter for linguistic simplicity), and mainland China. While many Western countries (and some countries in other parts of Asia) have also experienced or been experiencing below-replacement fertility, the decline in East Asia is notable in its rapid pace and sheer magnitude.

After cutting its fertility by more than half in one decade from 4.5 per woman 1947 to 2.1 in 1959, Japan's fertility started to decline to below-replacement levels in the mid-1970s, thereby reaching the "lowest-low" level—a TFR of 1.3 per woman according to Kohler, Billari, and Ortega (2002)—in the early 2000s. Korea experienced one of the most spectacular declines ever recorded, with its fertility falling without hiatus from very high (a TFR of 6.0 per woman) to a below-replacement level (1.6 per woman) from the early 1960s to mid-1980s. In 2005 Korea's fertility dropped to 1.1 per woman, the lowest in the world. Though may not be as well publicized and recognized as in the cases of Japan and Korea, after a dramatic decline from very high to a little above the replacement level from the early 1970s to 1980s, China's fertility has also entered its below-replacement era in the early 1990s. By 2005, its fertility reached around 1.5 per woman.

While the timing, tempo, and scale of the fertility transitions differ among these three East Asian countries, dramatic reductions in their fertility to well below-replacement levels will result in extremely rapid population aging and foreshadow dramatic population decline. With a proportion of population aged 65 and above at 20 percent in 2000, Japan is currently one of the most aged countries in the world, and its population aging is projected to accelerate further, reaching 41 percent in 2055 (National Institute of Population and Social Security Research 2009: 30–31). Japan's population also started to decline in 2005. With the pace of the decline projected to accelerate during the first half of the current century, the population is estimated to shrink by 30 percent from approximately 128 million in 2005 to 90 million in 2055. If a very low fertility of 1.3 per woman were to persist, Korea's population will also age rapidly—quadrupling from 9 percent to 36 percent from 2005 to 2050—and start shrinking in size in 10 years (United Nations 2007). China's population is projected to start declining as soon as in 2023, less than 15 years from now (United Nations 2007). Its proportion of the elderly will also triple from 11 percent in 2007 to 31 percent by the middle of the 21st century.

The similarities among these three East Asian countries in comparison to other parts of the world in the process of fertility decline and the important differences among the three motivate our study. In this paper, our main objectives are to provide a systematic summary and comparison of the three countries in their fertility decline

processes, to discuss the implications of below-replacement fertility in this region, and to speculate the economic, social, and cultural factors that may account for the similarities as well as differences.

After an overview of shared cultural backgrounds, economic transformations, and policy context of the three countries under consideration, we first examine the fertility trends and changes in the age patterns of fertility. We then examine changes in the age patterns of women's marriage and marital fertility, the two major direct determinants of fertility in populations where childbearing outside marriage is negligible. Next, we examine the social and economic factors associated with fertility and nuptiality changes, such as education, women's employment, and gender relations at home. The paper concludes with a summary of findings and discussions of policy implications.

Backgrounds and Policy Context

Japan, Korea, and China share the Confucian cultural heritage, which places heavy emphasis on obligations to family and society, leaving little room for self-interest (Tsuya and Bumpass 2004; Tsuya and Choe 1991). Because the ultimate goal of their traditional family systems was the biological or social continuation of the family line, the most important obligation, especially for women, was to marry and have children. The traditional patrilineal family systems also imposed a complex set of well-defined hierarchical relations among family members along the gender (males over females), generational (parents over children), and birth-order (first-born over later-born) lines. Under such systems the gender division of labor was rigidly defined with strong normative orientations about separated gender roles. This has in turn served as the basis for the persistence of unequal gender relations at home in East Asian countries (Choe 2006; Tsuya 2009a; Tsuya and Bumpass 2004; Tsuya, Bumpass and Choe 2000).

Although the timing is different, Japan, Korea, and China have all experienced or are experiencing extremely rapid economic growth. Starting in the mid-1950s, Japan's per capita real GNP grew at a phenomenal pace, quadrupling in constant prices every 10–15 years (Nakamura 1981; World Bank 1991, 1997; Tsuya and Bumpass 2004). Korea's rapid economic growth began in the mid-1960s, with its per capita GNP also quadrupling in constant prices every 10–15 years until the mid-1990s. Consequently, Korea's per capita real GNP increased 12–fold between 1960 and 2005 (Choe and Retherford 2008), thereby transforming the country from one of the poorest in the world to a member of the OECD club. China has also experienced a period of phenomenal economic growth and the fastest increase in the standards of living in its history since the mid-1980s (Wang 2009). Aided by its shift from planned economy to market economy and the increasing economic globalization, China's real GDP almost quadrupled from 1985 to 2000 (National Bureau of Statistics of China 2004). In 2007 the three East Asian countries combined produced nearly 15 percent of the world’s GDP (CIA 2009). The rapid economic growth of the three countries preceded and progressed hand in hand with their fertility declines, making them forerunners of the "fertility revolution in Asia" (Leete and Alam 1993).

The dramatic fertility declines in Korea and China were facilitated, at least in

part, by their strong family planning programs. As an integral part of its economic planning, the Korean government launched the national family planning program in 1962, aiming to reducing the levels of unwanted fertility and the number of children couples desired (Choe and Park 2006; Choe and Retherford 2008). Encouraged by its success during the 1960s and 1970s, the family planning program was strengthened in 1981–1982 by elevating and expanding its goals—all of which were to be met by 1988—including reduction of the TFR to the replacement level, reducing ideal family size to two children, and lowering the population growth rate to 1 percent per year (Choe and Retherford 2006). The program even went so far as to promote the one-child family. One of the most frequently cited population slogans between 1982 and 1988 was "Even two were too many" (Park 2005). Consequently, these ambitious policy goals were accomplished on time, or even ahead of time, with achievement of the replacement fertility in 1983, an average family size of two in 1985, and 1-percent annual population growth in 1988 (Cho 1996). Due in large part to these accomplishments, and also alarmed by rising sex ratio at birth (Choe and Park 2006; Park and Cho 1995), the "fewer than two" policy was abandoned in 1988. In 1996 the Korean government abolished the entire family planning program, replacing it with a new population policy with an emphasis on the quality and welfare of the population (Choe and Retherford 2008). Finally, in 2004 Korea's population policy began to turn toward pronatalistic directions (Choe 2008).

China's national family planning program began in earnest in 1971 by the launching of the *wan xi shao* policy, which advocated later marriage, longer birth intervals, and fewer children (Goldstein 1996). Convinced that the country's economic development and ability to modernize depend to a great extent on its success in curbing population growth, in 1979 the Chinese central government introduced a radical population policy, the heart of which is the one-child family policy (Arnold and Liu 1986; Goldstein 1996). Enforcement of the policy was tightened up in 1981 in urban areas and in 1982 in rural areas (Greenhalgh 1986; Short and Zhai 1998). Although the one-child policy was relaxed in the mid-1980s through the "open-a-small-hole" shift which enabled rural couples in some areas of the country whose first child was a girl to have a second child (Feeney and Yuan 1994; Greenhalgh 1986; Zeng 1989), it was tightened up again in 1988 (Retherford et al. 2005), followed by further tightening during the 1990s (Scharping 2003a, 2003b, 2007). Despite the achievement of below-replacement fertility in the 1990s, its negative demographic and socioeconomic consequences such as escalating imbalanced sex ratio, and high political costs (Wang 2005), the one-child policy remains effective in China today and requires close to two-thirds of all couples to have one child (Gu et al. 2007).

Trends of Fertility Changes

From shortly after World War II to the late 1950s, Japan experienced a sharp downturn in its fertility. In a span of a little over one decade, the birth rate was cut by more than one-half from a TFR of 4.5 children per woman in 1947 to 2.0 in 1957 (see Figure 1a). This rapid fertility decline is thought to have facilitated Japan's rapid economic growth from the mid-1950s to the early 1970s (Nakamura 1981: 49–63). For nearly two decades since the late 1950s, fertility stayed at a level of 2.0 to 2.2 children per woman

until 1974, when it began to decline again.[1] Since the mid-1970s, Japan's fertility has been declining to well below replacement, reaching 1.50 per woman in 1992. Since then, the TFR has never recovered to 1.5 per woman (see Figure 1b). Rather, it continued to decrease further to around 1.3 in the early 2000s, reaching 1.26 in 2005, the lowest level ever recorded in its history (National Institute of Population and Social Security Research 2009: 50–51).

<Figures 1a and 1b about here>

Japan's fertility changes can therefore be divided into three phases: (1) rapid decline in the early postwar years (from the late 1940s to the late 1950s); (2) stabilization at around the replacement level from the late 1950s to the mid-1970s; and (3) decline to below replacement levels since the mid-1970s, resulting in "lowest-low" fertility (a TFR of 1.3 per woman) since the early 2000s. Although the pace of this continuous decline to below-replacement levels was slower than that of the earlier postwar decline, its demographic and socioeconomic consequences are much important and serious because it foreshadows further acceleration of Japan's already rapid population aging and its rapid population decline that has begun in 2005 (National Institute of Population and Social Security Research 2009: 30–31).

In Korea high fertility had persisted with a TFR being approximately 5.5 to 6.0 children per woman until the country started to experience rapid economic development in the early 1960s (see Figure 1a). In 1962 Korea's ambitious national planning program was also launched (Choe and I. Park 1989; Choe and K. Park 2006). As a result, Korea's fertility took a dramatic downturn. Fertility rate dropped by almost two-thirds in two decades from a TFR of 5.9 in 1963 to 2.1 in 1983. Unlike Japan, however, Korea's fertility continued to decline at a very rapid pace to below-replacement levels without a pause, reaching 1.6 per woman in 1986 (see Figure 1b). This phenomenal fertility decline coincides with the period of the country's rapid economic growth and social change, suggesting the strong two-way interactions between the fertility transition and socioeconomic transformations of the country, which was aided at least in part by the expansion of the national family planning program during 1981–1988 (Choe and Park 2006; Choe and Retherford 2008). The TFR was stabilized at the level of around 1.6 to 1.7 per woman until it started to slip again in the mid-1990s, reaching 1.08 per woman in 2005, the lowest level ever recorded not only in the country's history but also in the world (excluding countries/territories with a small population size).

Hence, Korea's postwar fertility transition can also be divided into three phases: (1) phenomenal and continuous declines from the early 1960s to the mid-1980s during which fertility was cut by almost three-fourths; (2) stabilization at the level of 1.6 to 1.7 children per woman from the mid-1980s to the mid-1990s; and (3) a resumption of decline from the mid-1990s to "lowest-low" fertility of 1.3 in the early 2000s. Were a TFR of 1.3 to continue, Korea's population would start to decline in 2019, and population aging would also accelerate with the proportion aged 65 and above jumping from 9 percent in 2005 to 36 percent in 2050 (United Nations 2007).

[1] Drop in the TFR in 1966 is due to a Year of Fire Horse (*Hinoe-uma*). Influenced by the Chinese zodiac, *Hinoe-uma* is traditionally viewed as unsuitable to have a daughter.

Similar to Korea, fertility in China before 1970 was in general high with the TFR in the vicinity of 5 to 6 births per woman, with the exception of the temporary sharp decline during 1958–1961 famine years followed by a sharp compensatory baby boom in 1963 (see Figure 1a).[2] Concomitant with the launching of the *wan xi shao* (later, longer, fewer) campaign, China's fertility began a dramatic downturn in 1971. In one decade, fertility declined by almost one-half from a TFR of 5.4 children per woman in 1971 to 2.5 in 1981. The TFR then became stable during the 1980s at the level of roughly 2.5 births per woman with some fluctuations.[3]

After the relative stabilization during the 1980s, China's fertility is widely believed to have begun a decline to below-replacement levels in the early 1990s.[4] According to surveys and the 2000 census, China's TFR was 1.8 per woman in 1990 and 1.2 in 2000 (National Bureau of Statistics of China 2002; Guo 2003; Zhang 2003). Their accuracy, especially the figure in 2000, has been heavily debated, however. Because of considerable underreporting of births in the surveys and censuses, the government considers the TFR in 2000 to be about 1.8 children per woman (Scharping 2003a, 2003b). On the other hand, many researchers have argued that, even taking considerable underreporting into account, the TFR of 1.8 per woman is too high (e.g. Cai 2008; Gu 2008; Guo 2003; Retherford et al. 2005). According to Zhang (2003, 2004), for example, the actual level of China's TFR in 2000 was estimated to be between 1.5 and 1.6 per woman.

There are several reasons underlying the underreporting of births in China, which became more serious in the 1990s. Since the one-child family policy was announced in 1979, Chinese population statistics have suffered from underreporting of "out-of-quota" births (Retherford et al. 2005). A related problem contributing to this underreporting is that China's household registration system (*hukou*), which is used to help identify households to be enumerated in the census, has weakened considerably during the transition from a planned economy to a market economy (Scharping 2003b, 2007). The problem has been exacerbated by a massive migration from rural to urban areas during the 1990s. The existence of this large "floating population" makes it easier for these migrants to underreport births, and it also made census enumeration much more difficult in 2000 than in 1990 (Zhang 2003). Furthermore, in recent years out-of-quota births are widely underreported not only by individual couples who try to

[2] Because of the lack of reliable statistics for the 1950s to the 1970s, we use the estimates by Coale and Chen (1987) for the period before 1975.

[3] An upturn in 1982 no doubt resulted, at least in part, from the new marriage law of 1980, which relaxed the later-marriage component of the "later-longer-fewer" policy in 1971. For details, see Choe et al. (1996), Goldstein (1996), and Riley (2004).

[4] Because an achievement of below-replacement fertility seemed extraordinary at that time in a country at China's level of economic development (and probably because of its share population size), this attracted a good deal of attention and analysis (e.g. Feeney and Yuan 1994; Yu and Yuan 1996; and Zeng 1996). Nevertheless, in all surveys conducted in the 1990s, China's fertility has never been found to be above the replacement level (Guo and Chen 2007).

avoid punishment but also by local cadres whose performance evaluation is linked directly to achievement of target fertility for their local area, in accordance with the "one vote down" cadre responsibility system instituted in 1991 (Merli 1998; Murphy 2003; Scharping 2003a, 2003b, 2007; Zeng 1996). Under this system, failure to perform adequately in any one of policy areas including achieving target fertility can result in a large reduction in wages or even a dismissal.

Although China's official fertility statistics since 1980 are therefore clearly underreported and the problem became more serious in the 1990s (Wang 2005), it is beyond any doubt that China's fertility declined to below-replacement levels by the early 1990s. According to a series of estimates by the National Bureau of Statistics of China (NBSC) and East-West Center (2007), which we consider to be one of the more reliable, China's TFR dropped precipitously from 2.4 children per woman in 1990 to 1.8 in 1991, and then to 1.4 in 1996, bottoming out at 1.2 in 1999 (see Figure 1b).[5] Since 2000 the birth rate is estimated to be at around 1.4 to 1.5 per woman.

While fertility for China as a whole began to decline in the early 1970s as discussed above, evidence suggests that large fertility differentials between urban and rural areas emerged in the early 1960s. While the TFR levels had been very similar—roughly at 5 to 6 per woman from 1950 to 1958 and down to roughly 3 to 4 during the famine years in 1959–1961, distinctive gap between urban and rural areas appeared in 1961 and continued to widen during the 1960s, due primarily to sharp fertility decline in urban areas (Coale and Chen 1987): the TFR in urban China dropped to 3.2 children per woman in 1970 whereas it remained at 6.3 children for rural Chinese women. After 1970, rural fertility began to decline very rapidly and the decline in urban fertility continued apace, resulting in a TFR of 1.2 for urban China and 2.6 for rural China in 1980. Thus, similar to Japan and ahead of Korea by almost one decade, below-replacement fertility is likely to have been achieved in urban China in the mid-1970s.

Distinctive urban-rural differences persisted throughout the 1980s to early 2000s. In 1990 the TFR is estimated to be around 1.5 per woman in urban China whereas it was around 2.5 per woman in rural China (National Bureau of Statistics of China and East-West Center 2007).[6] Fertility in both urban and rural China declined further to approximately 0.9 and 1.4, respectively, in 2000. In the early 2000 the TFR in rural China is estimated to have a modest upturn to around 1.6 per woman in 2005 while

[5] The TFR figures on China that this paper draws on are not totally adjusted for this considerable underreporting. Since it is almost impossible to completely account for underreporting, however, this study draws on the data estimated by the NBSC and East-West Center (2007) for the period 1975–2000. As for the period 2001–2004, we interpolated the estimate of 2000 and an estimate for 2005, which is provided personally by Jiajian Chen. This estimate by Chen is also derived by the birth history reconstruction method. For specifics of the method, see Retherford et al. (2005).

[6] The rate for urban China in 1990 is the weighted average of the rates of cities and towns, which are estimated by National Bureau of Statistics of China and East-West Center using the birth history reconstruction method (2007).

it remained at around 0.9 in urban China (National Bureau of Statistics of China 2001, 2006).

Hence, China's fertility transition can be divided into three phases: (1) dramatic declines from the early 1970s to the early 1980s during which fertility was cut by almost one-half; (2) relative stabilization roughly at a level of 2.5 children per woman during the 1980s; and (3) a resumption of rapid declines to below-replacement levels in the 1990s during which fertility was reduced from around 2.4 per woman to 1.5 per woman. While large urban-rural differentials persist, fertility in urban China declined to below-replacement levels in the 1970s, and resumed a further decline to the levels close to, or even below, the "lowest-low" fertility of 1.3 in the 1990s. Were a TFR of 1.3 to 1.5 per woman to persist, China's population would start to decline in between 2020 and 2025 (United Nations 2007).

Changes in the Age Patterns of Fertility

We next examine changes in the age pattern of fertility underlying the different phases of fertility transitions in the three East-Asian countries under study that we saw in the previous section. Table 1 presents changes in the age-specific fertility rates in these countries in the "key" years of their fertility transitions.

<Table 1 about here>

We can see from the table that during the period of Japan's rapid postwar fertility decline (1947–1960), fertility among women age 30 and above declined dramatically while declines in the rates of younger women are, though clear, more modest (see also Figure 2a). This clearly indicates a shift from a classic pattern of prolonged childbearing to one of deliberate stopping of childbearing well before the onset of natural sterility (menopause). We can also notice that the age patterns of fertility are almost identical between 1960 and 1975. Since the levels of fertility are also very similar with around 1.9 to 2.0 per woman, this suggests that during the period of stabilization of fertility from the late 1950s to mid-1970s, the age pattern of childbearing did not change much in Japan. In clear contrast, the fertility decline to below-replacement levels since the mid-1970s (1975–2005) involved *increases* in fertility of women in their thirties, suggesting the increasing delay of marriage and childbearing.

<Figure 1a about here>

Similar to changes in Japan from 1947 to 1960, fertility of Korean women age 30 and above declined dramatically (even more dramatically than did in Japan in the early postwar years) from 1960 to 1980, during which the TFR was reduced from 6.0 to 2.8 per woman (see Figure 2b). During the same period, the rates of women below age 30 also dropped considerably although the degree of the decline was not as large as those of their older counterparts. This suggests a shift from a pattern of prolonged childbearing to one of intentional curtailment of childbearing at younger ages. The age pattern of early stopping became even more salient during 1980–1985, during which the TFR dropped to a below-replacement level of 1.7—a decline of 1.1 per woman in mere

5 years. This suggests that Korea's phenomenal fertility decline from high to below-replacement levels was achieved primarily by extremely rapid increases in deliberate curtailment of childbearing at young ages.

<Figure 2b about here>

While the TFR was stable at around 1.7 per woman during the next 10 years (1985–1995), the age pattern of fertility among Korean women changed remarkably during that period: fertility of women age 20–24 declined substantially whereas the rates of women age 25–39 *increased* with the upturn among women age 30–34 being especially notable. This suggests a shift from an early curtailment of childbearing among married women at young ages to one of delayed marriage and childbearing. While Korea's fertility continued to decline further to and below the "lowest-low" levels, this age pattern became even more evident, thereby suggesting further increases in delayed marriage and childbearing.

Turning to China, we can see from Figure 2c that fertility declined dramatically at all ages except for the youngest and oldest age groups (15–19 and 45–49) from 1970 to 1980 during which the TFR plummeted from 5.8 to 2.7 per woman. The declines among women age 30–39 are especially large although the decline among women age 20–24 is also very notable. A comparison of Figures 2a to 2c implies that, before the onset of its fertility transition, Chinese women tended to marry and start having children earlier than their Korean and Japanese counterparts, as fertility of Chinese women age 20–24 in 1970 is higher than the corresponding rate of Korean women in 1960, and much higher than that of Japanese women in 1947. This pattern of early marriage and early childbearing was weakened from 1970 to 1975, during which the TFR declined to below-replacement levels. This suggests that both delayed marriage and strong curtailment of childbearing at younger ages were at work during the transition from high to relatively low (but still above the replacement level) fertility.

<Figure 2c about here>

The age pattern of China's fertility shifted to one of an earlier beginning and an earlier stopping of childbearing in the 1980s during which the level of fertility was relatively stable at roughly 2.5 per woman. Fertility of women below age 25 *increased* while the rate of women age 25 and above decreased. This change in the age pattern is due, probably in large part, to policy changes that occurred in succession during the decade. The marriage law of 1980 relaxed the later-marriage component of the *wan xi shao* (later-longer-fewer) policy dating back to 1971 (Goldstein 1996). Before 1980, the policy stipulated a minimum age at marriage for women of 23 years in rural areas and 25 years in urban areas, whereas the 1980 law specified a minimum of 20 years throughout the country (Choe et al. 1996; Riley 2004). This no doubt resulted in the increase in fertility of women in their early twenties. On the other hand, the one-child policy was tightened up in 1981 in urban areas and in 1982 in rural areas (Greenhalgh 1986; Short and Zhai 1998). Following the "open-a-small-hole" policy shift in 1984, which allowed rural couples in some areas of the country to have a second child if their first child was a girl (Feeney and Yuan 1994; Greenhalgh 1986; Luther, Feeney, and Zhang 1990; Zeng 1996), enforcement of the one-child policy was tightened up again in

1988 (Retherford et al. 2005). Thus, enforcement of the one-child policy became in general stricter during the 1980s, resulting in the declines in fertility among women age 25 and above. The age pattern of early beginning and early stopping remained largely unchanged during the 1990s and early 2000s, during which fertility declined rapidly to below replacement levels, owing at least in part to further tightening of the one-child policy during the 1990s (Scharping 2003a, 2003b, 2007).

We next look at urban/rural differences in changes in the age pattern of fertility in China. The age-specific fertility rates in urban China in 1970 shows a clear sign of deliberate curtailment of childbearing well before the onset of menopause, whereas the corresponding rates in rural China shows the pattern of very early and prolonged childbearing (see Table 2 and Figures 3a). From 1970 to 1980, during which the TFR declined to well below-replacement levels, fertility declined steeply among urban women at all ages, due primarily to the implementation of the later-longer-fewer policy in 1971. During the 1980s the age pattern of fertility then shifted precipitously to one of early childbearing coupled with strong curtailment at relatively young ages of early thirties, owing to the 1980 marriage law, on one hand, and the enforcement and subsequent tightening-up of the one-child policy during the decade, on the other. Notably, fertility of urban women in their early twenties declined dramatically in the 1990s (despite that the marriage law of 1980 which allowed women to marry at age 20 was still effective), suggesting the onset of delayed marriage and childbearing in urban China in the 1990s. Consequently, the shape of the age-specific fertility in urban China in 2000 came to resemble those of Japan in the mid-1990s and Korea in the early 2000s. This in turn implies that the grip of China's strong family planning policies have become unraveled under phenomenal economic growth and rapid social development during the 1990s in urban areas of the country.

<Table 2 and Figure 3a about here>

On the other hand, as shown in Figure 3b, fertility of rural Chinese women declined dramatically at all ages during the 1970s with decreases among women age 30 and above being especially notable. This suggests a shift of the age pattern of fertility to one of early stopping, due primarily to implementation of the later-longer-fewer policy in 1971. Fertility of women age 20–24 shot up during the 1980s while fertility of the older women (especially those in their late twenties) continued to decline, owing no doubt to the 1980s marriage law and the launching and subsequent tightening up of the one-child policy. While the overall level of fertility went down to below-replacement levels during the 1990s, the age pattern of early starting and early stopping remained in that decade and still remains in the early 2000s, thereby suggesting the persistent effect of the one-child policy in rural China today.

<Figure 3b about here>

In summary, the findings in this section suggest that different phases of the postwar fertility transitions in the three countries under consideration were different in character and associated with different demographic determinants. Japan's declines to below-replacement fertility and further to the "lowest-low" fertility were due primarily to the increasing delay of marriage and childbearing. One the other hand, Korea's

phenomenal fertility decline to below-replacement levels was achieved largely by the increasing curtailment of childbearing (among married women) at younger ages while the decline to and below the "lowest-low" level was due mostly to the increasing delay of marriage and childbearing. China's decline to below-replacement fertility was accomplished primarily through very early stopping of childbearing although delayed marriage also played a role. Further, a clear sign of the increasing delay of marriage and childbearing is seen in urban China in the 1990s and afterwards.

Demographic Factors of Fertility Change

In this section we examine the two major demographic factors of fertility changes—age patterns of marriage and marital fertility—in Japan, Korea, and China, by looking at changes in the proportion of women never-married by age and changes in period parity progression ratios. Since there is little out-of-wedlock childbearing in the three countries (the proportion of non-marital births has been less than 2 percent in Japan and Korea) (Korea National Statistics Office 2009; National Institute of Population and Social Security Research 2009: 67; Walther 2006), these two demographic factors account for almost all changes in the levels of fertility.

(1) Changes in the age patterns of marriage

An examination of changes in the age pattern of women's marriage provides evidence that decreasing marriage has played a major role in Japan's fertility decline to below-replacement levels. As the first panel of Table 3 shows, after some declines during the earlier postwar fertility transition, the proportions never-married among Japanese women in their twenties and thirties were relatively stable until the mid-1970s, when they started to increase precipitously. The proportion of never-married women age 20–24 increased from 69 percent in 1975 to 89 percent in 2005. The increase for women age 25–29 was sharper, from 18 percent in 1975 to 59 percent in 2005. The corresponding rate of decrease in marriage for women in their thirties was even larger, from 8 to 32 percent for women aged 30–34 and 5 to 18 percent for women aged 35–39. Further, the celibacy rate, indicated by proportion never-married at age 50, shows a sign of increase in recent years: while it was less than 2 percent in early postwar years, it is 7 percent in 2005. This suggests an increasing departure from the traditional Asian pattern of universal marriage in Japan in recent years.

<Table 3 about here>

The proportion never-married also rose very rapidly among Korean women in their twenties from the early 1960s to mid-1980s, during which the country's fertility took phenomenal downturns from high to below-replacement levels (see the second panel of Table 3). The proportion for women age 20–24 more than doubled from 34 percent in 1960 to 72 percent in 1985. The increase for women age 25–29 was larger, from mere 3 percent in 1960 to 18 percent in 1985. While Korea's fertility continued to plummet to the "lowest-low" level in the late 1980s to the early 2000s, the proportion never-married increased further among women in their twenties, and started to show notable signs of increases among women in their thirties. The proportion single rose to 94 percent for women age 20–24 and to 59 percent for women age 25–29 in 2005,

whereas the proportion started to climb up from mere 4 percent in 1985 to 19 percent in 2005 for women age 30–34 and from mere 2 percent to 8 percent for women age 35–39 in the same period. Put differently, under the regime of extremely low fertility, the proportion single among Korean women at prime reproductive ages increased at an unprecedented pace: almost 3 times from 1985 to 2005 among women in their late twenties, and almost 5 times among women in their early thirties.

Unlike Japan, however, the celibacy rate among Korean women remains minimal. This in turn suggests that while women's (and men's) marriages are increasingly delayed, universal marriage still remains intact in Korea, although we cannot totally deny a possible 'spill over' of the increasing delay of marriage among younger age groups to older age groups (40–49), which would lead to increases in the celibacy rate.

In China, although we cannot be definitive as we do not have data to cover the period prior to 1982, we can see from the third panel of Table 3 that while the proportion never-married decreased modestly from 1982 to 1990 for women in their twenties, likely owing to the 1980 marriage law, the proportion of never-married women in their twenties increased notably from 1990 to 2005. It rose from 41 percent in 1990 to 57 percent in 2005 among women age 20–24 and from 4 percent to 13 percent among women age 25–29 in the same period. Compared to their Korean and Japanese counterparts, however, these increases in the proportion single among Chinese women at peak reproductive ages are much smaller and limited. Furthermore, the proportion for women age 30 and above remains virtually zero. This suggests that the traditional pattern of relatively early and universal marriage still persists in China today.

When we focus on urban China, however, we can see a more pronounced sign of the onset of delayed marriage. In 2005 the proportion never-married among women age 20–24 is 72 percent in urban areas whereas the corresponding proportion for all of China is 57 percent (National Bureau of Statistics of China 2006). The proportion single for women age 25–29 is 20 percent in urban areas versus 13 percent for China as a whole in the same year.

In summary, these findings clearly indicate the increasing delay of marriage and rising non-marriage among Japanese women (and men) at reproductive ages since the mid-1970s. Delayed marriage is even more pervasive and proceeding at a much quicker pace in Korea although there is no, at least not yet, clear sign of increases in non-marriage. In the Asian context, where marriage has traditionally been universal and most women have typically married by their mid- to late twenties (Smith 1980), the increasing postponement or avoidance of marriage among Japanese and Korean women are indeed remarkable, and exerts profound demographic and socioeconomic impacts. In contrast, the age pattern of women's marriage has been largely unchanged in China although there is a sign of the onset of delayed marriage in recent years, especially in urban China.

(2) Changes in marital fertility

We next turn to an examination of fertility within marriage, the second major factor of

fertility change in these Asian countries, based on period parity progression ratios (PPPRs). A parity progression ratio is the proportion of women of specified parity (a specified number of children ever born) who go on to have at least one more child (i.e. who eventually progress to the next parity). From reconstructed birth histories, each PPPR is calculated by the period life table method from duration-in-parity-specific probabilities of progressing to the next parity for a particular calendar year (for details, see Choe and Retherford 2008; Retherford et al. 2005).

Table 4 shows the PPPRs for Japan from 1950 to 2000, Korea from 1960 to 2000, and China from 1975 to 2000. In the table, women's own birth is denoted as *B*, and women's marriage as *M*, while first to subsequent births are denoted using Arabic numerals. Thus, *B–M* denotes the transition from women's own birth to first marriage; *M–1* indicates the transition from women's marriage to first birth, and *1–2* refers to the transition from first to second birth. In some cases (Korea in the entire period under consideration and China before 1990) the *B–M* and *M–1* transitions are combined into *B–1* because of the lack of reliable marriage timing data.

<Table 4 about here>

We can see from the first panel of Table 4 that while the PPPRs from *B* to *M* and from *M* to *1* (thus from *B* to *1*) do not show notable changes in Japan in the period of 1950–1960, the progression ratios from *1* to *2*, from *2* to *3*, and from *3* to *4* decreased by 10 percent, 20 percent, and 54 percent, respectively, during the same period. This suggests that Japan's decline from moderately high fertility to the replacement-level fertility in the early postwar years was due primarily to the increasing curtailment of childbearing among married women with two or more children. It became increasingly more likely for Japanese wives to stop having children at two, instead of going onto have three or four, in these early postwar years.

On the other hand, the PPPRs from *B* to *M* and from *M* to *1* (consequently the PPPR from *B* to *1*) declined considerably in Japan from 1975 to 2000. Although not as much as the declines in the progression ratios from *B* to *M* and from *B* to *1* (which were 15 percent and 22 percent, respectively), the PPPR from *1* to *2* also dropped by 10 percent from 1985 to 2000. Meanwhile, the progression ratios to the higher parities rose under the increasing selectivity of women with large families. This in turn implies the increasing heterogeneity of marital fertility under the slippage of fertility to the lowest-low level in Japan in recent years. Altogether, these findings suggest that Japan's fertility decline to below-replacement levels was due primarily to delayed marriage (and increasing non-marriage) although recent increases of wives who stop childbearing at only one child have also played a role.

In Korea we see that while the PPPRs from *B* to *1* and from *1* to *2* stayed virtually unchanged during 1960–1980, the progression ratios from *2* to *3*, and *3* to *4* both dropped dramatically—33 percent and 55 percent, respectively—during the same period (see the second panel of Table 4). This suggests that Korea's fertility decline from very high to a little above the replacement level from the early 1960s to the early 1980s was achieved mainly by dramatic increases in curtailment of childbearing among married women after their second or third child.

Then, in the span of mere 5 years from 1980 to 1985 during which the level of overall fertility took a nose dive from 2.8 to 1.7 per woman, the PPPRs decreased substantially at all the parities (including progression to marriage) with the declines at higher birth orders especially dramatic. As Korea's fertility continued to decline to even lower levels after 1985, the PPPR to marriage became increasingly lower, on one hand, and the progression ratios to third and fourth births declined even more, on the other. These findings suggest that Korea's fertility declines to below-replacement and then to the lowest-low levels were due in part to the increasing delay of marriage, and in part to large increases of married women who stop having children at two. By 2000 the proportion of Korean wives going onto have their third child dwindled to a mere 12 percent.

Turning to China, we see from the third panel of Table 4 that the PPPR from *B* to *1* increased slightly during 1975–1990 while the corresponding PPPRs to second and higher births decreased dramatically: 29 percent for the PPPR from *1* to *2*, 49 percent for the PPPR from *2* to *3*, and 53 percent for the PPPR from *3* to *4*. Although we cannot be definitive because of the lack of the data covering the years before 1975, this suggests that the dramatic decline in China's fertility from very high to somewhat above the replacement level was achieved mostly by the rapid spread of curtailment of childbearing among married women after having their first or second child, owing no doubt to the later-longer-fewer policy and the one-child policy. The PPPRs from *B* to *M* and *M* to *1* (thus from *B* to *1*) remained largely unchanged during 1990–2000 while the corresponding PPPRs to second and higher-order births decreased even more dramatically than in the previous decades. This implies that the dramatic decline in China's fertility to below-replacement levels was achieved primarily through the increasing likelihood of married women to stop having children after first birth under the tightening-up of the one-child family policy.

We have seen above general changes in family building patterns of married women and how they were associated with fertility declines of the three countries. We next examine more closely changes in the pattern of family formation among married women during the fertility transition to below-replacement levels in the three countries by looking at annual changes in the PPPRs. As the first panel of Figure 4 confirms, the PPPR from *B* to *1* among Japanese women began to decline notably in the mid-1970s, owing largely to decreases in marriages. The corresponding PPPR for Korean women also shows a clear sign of decline in the early 1980s, and the decline accelerated in the 1990s, again owing primarily to declining marriage. In contrast and as expected, the PPPR to *1* remains close to one in China.

<Figure 4 about here>

The progression from first to second birth follows quite different trajectories. Japan's PPPR from *1* to *2* stayed at roughly 85 percent with some fluctuations (with a clear exception of 1966, a Year of Fire Horse) until it started to decline gradually at the end of the 1980s, reaching around 77 percent in 2000 (see the second panel of Figure 4). After being stable at roughly 95 percent, Korea's PPPR from *1* to *2* dropped precipitously in the early 1980s to mid-1990s, owing presumably to the launching in

1982 of the "fewer than two" policy to increase the proportion of women with only one child, which lasted until 1996 (Choe 2008; Choe and Retherford 2008). Although recovered somewhat afterwards, Korea's PPPR from *1* to *2* stayed at around 85 percent since the late 1990s. In clear contrast, and as expected, China's PPPR from *1* to *2* plummeted during the early 1980s (see the third panel of Figure 4). It then rose somewhat in the mid-1980s when enforcement of the one-child policy was relaxed (Greenhalgh 1986; Luther, Feeney, and Zhang 1990), but resumed its decline in the late 1980s (Feeney and Yuan 1994; Retherford et al. 2005).

The progression from second to third birth also follows different trajectories. Following a drop to around 30 percent in the late 1970s, Japan's PPPR from *2* to *3* increased modestly to around 35–37 percent during the 1980s (see the third panel of Figure 4). In contrast, after staying at above 90 percent until the early 1970s, Korea's PPPR from *2* to *3* declined spectacularly to below 20 percent in the late 1980s, followed by stabilization at this low level. China's PPPR from *2* to *3* followed a pattern similar to its progression ratios from *1* to *2*, except that it was already declining in the late 1970s, largely as a consequence of the later-longer-fewer policy. Its steep downward movements continued afterwards, except for the mid-1980s when the one-child policy was relaxed. However, as expected, the upward blip in the progression ratio to third birth is much less distinctive compared to the corresponding upsurge in the progression ratio to second birth.

Socioeconomic Factors of Fertility Change

(1) Education

To explore the socioeconomic factors underlying the fertility transitions in Japan, Korea, and China, we first examine changes in educational attainment of young women, as compared to their male counterparts. Increasing educational attainment of young women is a major factor of Japan's fertility decline to below-replacement levels since the mid-1970s, causing delayed and fewer marriages (Raymo 1998, 2003; Tsuya and Mason 1995) and lowering marital fertility (Tsuya 2009b). Rising levels of education is also a contributing cause of Korea's rapid fertility to below the "lowest-low" level during 1995–2005 (Choe and Retherford 2008). Although it may not be a major force as it is in Japan and Korea, education is also playing a role in China's fertility decline to below-replacement levels in the 1990s, as fertility differentials by women's education tend to be large. Regardless of how measured, by 1996–2000 the TFR was close to 1.0 among women with high school or college education (Retherford et al. 2005).

The upper panel of Table 5 shows changes, by sex, in the percentages of Japanese *population age 18* going onto junior college and 4-year college (university), and the lower panel of the table shows changes, by sex, in the percentages of *high-school graduates* in Korea advancing to junior college and 4-year college. Because the formal education systems of both countries are competitive and tracked with strong age barriers, people rarely have the luxury of alternating their commitments between education and other activities, such as employment. Economic and social disadvantages accrue for those who do not succeed in a series of structured 'contests' at specific time points in their educational careers or even at the entrance to the labor market (Tsuya and

Choe 2004). As a result, in the two countries advancement to higher education and entry to the workforce tend to occur mostly within a narrow span of life course, in one's late teens and early twenties.

<Table 5 about here>

From the upper panel Table 5, we can see that the rate of educational advancement beyond high school increased dramatically for women between 1970 and 1975, which is just before the onset of fertility decline to below-replacement levels. In the same period, high school education also became virtually universal (Tsuya 2008). Although a similar leap in the advancement rate to university is seen for males in this same period, the male advancement rate shows moderate declines and stagnation after 1975 to the mid-1990s. Furthermore, whereas the female advancement rate to junior college peaked at around 25 percent in the mid-1990s, the rate of women advancing onto university has continued to increase rapidly and steadily, reaching 39 percent in 2006.

We can also see from the lower panel of Table 5 that, after being relatively stable at around 20 to 30 percent until 1990, the proportion of Korean female high-school graduates advancing to higher education shot up from 32 percent in 1990 to 50 percent in 1995, reaching as high as 81 percent in 2005. Because the base populations of the two sets of educational advancement rates are different between Japan (which is based on population age 18) and Korea (on high-school graduates), we cannot specifically compare the levels of advancement rates between the two countries. To make them comparable, we therefore apply to the advancements rates of Korean women the country's gross female enrollment ratio in high school in each of the years under consideration (Korea National Statistical Office 1998, 2006). According to this approximation, the proportion of Korean women at high-school enrollment ages advancing to higher education increased from 6 percent in 1975 to 12 percent in 1980, and further to 21 percent in 1985—more than 3-fold increase in mere 10 years. The pace of the increase accelerated even more thereafter, rising from 41 percent in 1995 to 58 percent in 2000, reaching 75 percent in 2005.[7] Thus, it is highly likely that the rate of entry to higher education among young Korean women has caught up and surpassed the corresponding rate of their Japanese counterparts during the late 1990s to early 2000s. The educational advancement of young Korean women during the last three decades is nothing but spectacular and, to our knowledge, unprecedented in the recent history of the world.

For China, we do not have comparable data on women's educational advancement rates, or even school enrollment ratios dating back sufficient years to compare with Japan and Korea. The shift from planned economy to market economy, which began in the late 1970s to early 1980s and accelerated during the 1980s and 1990s, resulted in rapid increases in school fees and living costs (Hannum and Park 2007). This no doubt affected school enrollment and advancement in various ways.

[7] The gross enrollment ratio of Korean females in high school are 33 percent in 1975, 56 percent in 1980, 62 percent in 1985, 77 percent in 1990, 82 percent in 1995, 89 percent in 2000, and 93 percent in 2005 (Korea National Statistical Office 1999: 222, 2006: 278).

Nonetheless, educational attainment among young Chinese women seems to be increasing in recent years. Gross enrollment ratio in higher education of both sexes increased rapidly from 6 percent in 1999 to 13 percent in 2002 and further to 20 percent in 2005 (UNESCO Institute of Statistics 2008). Given little gender differentials in the tertiary enrollment ratio (in 2005 it was 19 for women and 20 for men), we can consider that at least since the late 1990s to early 2000s, the level of enrollment in higher education among young Chinese women is rising rapidly.

Accordingly, although the timing and magnitude of increases are different, the proportion of young women with higher education increased rapidly in all three countries under consideration. As shown in the top panel of Table 6, attainment of higher education among young Japanese women continued to improve through the postwar years with the gains in the 1970s and 1980s being especially dramatic. The proportion of Japanese women aged 20–24 with higher education increased from 6 percent in 1960, to 17 percent in 1970, and to 40 percent in 1980, reaching 59 percent in 2000. The corresponding proportion for women aged 25–29 rose from mere 4 percent in 1960 to 10 percent in 1970, and then to 26 percent in 1980, reaching 51 percent in 2000.

<Table 6 about here>

Achievement of higher education among young Korean women also increased very rapidly, even more rapidly than their Japanese counterparts, with an accelerating pace in recent decades. The proportion of women aged 20–24 with higher education rose phenomenally from mere 5 percent in 1966 to 28 percent in 1985. It then jumped to 51 percent in 1995 reaching 74 percent in 2005 (see the middle panel of Table 6). The corresponding proportion for women age 25–29 increased from 3 percent in 1966 to 15 percent in 1985 and further to 38 percent in 1995, reaching 65 percent in 2005.

Although the spread of higher education among young Chinese women is still much more limited compared to their Japanese and Korean counterparts, we can see a sign of rapid increase in women's attainment of higher education in China. As shown in the bottom panel of Table 6, after rising slightly from mere 1 percent in 1982 to 2 percent in 1990, the proportion of women age 20–24 with higher education jumped to 8 percent in 2000 and reaching 14 percent in 2005. The corresponding rate for women age 25–29 increased from 6 percent in 2000 to 12 percent in 2005.[8]

Altogether, these findings suggest that the educational opportunity structure for young women has improved dramatically in these East Asian countries, facilitating the rapid prevalence of higher education among women at prime marriage and childbearing ages. We can further verify the effects of women's education on marriage, computing the singulate mean age at marriage (SMAM) by women's education in 1990 and 2000. Overall, women's education is associated positively with their age at marriage (see Table 7). The SMAM for Japanese women with 4-year college or higher education was 28.1 in 1990 whereas the corresponding SMAM was 25.9 for high-school educated

[8] Higher education in China includes 2- and 3-year colleges (sometimes also called "short-cycle colleges"), 4-year colleges, and universities. Many colleges and universities also offer graduate programs.

women (which was and still is the largest category). While SMSM went up substantially at all educational levels in Japan during the 1990s, educational differentials in nuptiality became wider. In 2000 SMAM for women with at least 4-year college education was 30.1 versus 27.3 for their high-school educated counterparts. That is, from 1990 to 2000, SMAM increased by 2.0 years for Japanese women with the highest level of education while it rose by 1.4 years for women with high school education.

<Table 7 about here>

In Korea SMAM also increased at all the educational levels, and educational differentials in women's age at marriage became larger. The SMAM for women with 4-year college or more education was 27.3 in 1990 whereas the corresponding rate for women with high-school education was 25.2 (i.e., a difference of 2.1 years). The gap increased to 3.0 years during the 1990s: in 2000 SMAM for women with the highest level of education was 28.5 versus 25.5 for their high-school educated counterparts. Educational differentials in SMAM in China are even larger. In 1990 SMAM for women with more than high school education was 25.6 whereas it was 22.2 for women with junior high school education (a difference of 3.4 years). But the gap was narrowed to 2.5 years in the 1990s because SMAM increased for women with junior high school education over time but it stayed the same for women with college education. Hence, we interpret these findings on changes in educational differentials in SMAM to imply that the effects of women's education on marriage were strong and probably increased during the 1990s in both Japan and Korea. Although we do not see a sign of increase over time, the nuptiality effects of women's education remains strong in China.

(2) Women's employment

How are these gains in educational attainment among East Asian women related to their employment? Table 8 shows that the labor force participation rates by women's age in Japan from 1960–2005 and in Korea from 1965–2005.[9] To ease interpretation, we also plotted the rates for the key years of fertility changes in the two countries. We can see from Table 8 and Figure 5a that the labor force participation rates for Japanese women age 25–34—peak reproductive ages in the country—increased sharply after the mid-1970s. Although a precipitous drop in labor force participation is still seen for women of this age group, sustaining the well-known M-shaped age pattern of women's employment in Japan, it has become much less notable. This suggests that while there is still a tendency for Japanese women to exit the labor force upon the birth of their first child and reenter once the last child enters school (Brinton 1988), such a tendency is weakening considerably in recent years, due at least in part to the increasing delay of marriage. Furthermore, although not as dramatically as for women aged 25–34, the labor force participation rate for women in their late thirties and forties also rose substantially during the same period, indicating that employment of married women at childrearing ages has prolonged.

[9] We do not discuss women's employment in China in this section because of fundamental differences in the nature and meaning of work and in the mechanism of the domestic labor market between China and the other two countries.

<Table 8 and Figure 5a about here>

In Korea, as shown in Figure 5b, the labor force participation rates for women age 20–24 rose dramatically from 1975 to 1990, and the rates for women age 25–29 increased even more dramatically (more than doubled) from 1980 to 2005, although the M-shaped profile of women's labor force participation still remains in the country. Combining our findings on the sharp increases in educational attainment of Korean women in recent decades, this suggests that as education of young Korean women at prime marriage ages rose very quickly, their labor force participation also increased very rapidly. A rapid proliferation of young Korean women (and men) going onto higher education in turn made it increasingly more difficult for them to find employment commensurate with their education and career expectations (Choe and Retherford 2008; McDonald 2007). Because of economic globalization and the Asian economic crisis in the late 1990s, the misfit between the educational composition of labor force entrants and occupational composition of available jobs has likely been widened in recent years. This has resulted in an increasing number of young women who are delaying marriage or, if they do get married, delaying childbearing with hopes to find a job suited to their education. Marriage and childbearing, which usually entails a certain amount of time out of the labor market, young Korean women are likely putting off family formation while searching for suitable employment in the increasingly competitive labor market.

<Figure 5b about here>

(3) Gender relations at home

As we saw above, attainment of higher education among young women in Japan and especially in Korea has increased dramatically. Higher education of young Chinese women also shows a clear sign of increase in recent years. Paid employment of Japanese and Korean women at prime reproductive ages has also increased sharply. These improvements in the socioeconomic status of women likely provide an array of previously unavailable life options outside the home and, at the same time, providing a window on values that compete with women's domestic roles. In this context we next look at the gender division of household labor in the three countries under study.

As shown in Table 9, although rising somewhat in recent years, Japanese men's contributions to domestic labor have remained very low and the gender imbalance in the division of household tasks is still very clear. The average household-task hours of Japanese men aged 15 and above are merely 4–5 hours per *week* (only 33–39 minutes per day) although their share in domestic labor doubled from 7 percent in 1986 to 15 percent in 2006, owing not only to increases in men's hours but also to decreases in women's hours.[10] We also see similarly low domestic contributions among Korean men: the average time spent by men on housework and childcare was about 4 hours per *week* in 2004, and their share in domestic labor was 15 percent, which is exactly the same as in Japan in 2006. This implies the strong influences of Confucian familial cultural backgrounds on gender relations at home, with traditional gender roles

[10] Due to differences in the definition of domestic labor, the data for 1976 and 1981 are not exactly comparable to those for 1986 and afterwards.

prevailing in the face of rapidly changing economic roles of women in these East Asian societies.

<Table 9 about here>

Although we do not have nationally representative data on time spent by men and women on housework and childcare in China, evidence suggests that the gender gap in household task allocation is smaller in China, compared to Japan and Korea. According to a study on time-use patterns in rural China in the early 1990s (IFAD 1995), though differing by age, education, and geographical areas, men's contribution to non-market (largely domestic) activities was 34 percent versus 66 percent for women. Drawing on data from 1991 and 2000 large-scale surveys in urban China, it was found that wives were responsible for more than 70 percent of household tasks traditionally gender-typed as female (Shu, Zhu, and Zhang 2005). Gender division of labor in the Chinese home where men shoulder roughly one-third of housework—which is almost par with many Western countries in the late 1990s and early 2000s (Tsuya 2009a)—seems to be much more balanced, compared to Japan and Korea. However, they also found a substantial *increase* in wives' share of housework from 1991 to 2000, thereby suggesting that housework has become more gendered in urban China during the 1990s (Shu, Zhu, and Zhang 2005). This in turn implies that, while unleashing unprecedented economic growth, China's shift from planned economy to market economy may have undermined gender relations at home, superseding the principles of equal exchange and equal participation between the sexes.

Like many Western countries, there has been a rapid increase in paid employment of married women in Japan since the 1970s and in Korea since the 1980s, evidence of which we saw in the previous subsection. Unlike Western countries in which men's contributions to domestic chores has increased considerably and, as a consequence, the gender gap in household task allocation has narrowed substantially (Tsuya 2009a), the addition of economic roles to women's domestic roles does not seem to have been offset by notable changes in men's contributions to household tasks in both East Asian countries. Although more egalitarian than Japan and Korea, gender relations in the Chinese home also seems to be moving away from equality under the rapid development of market economy in recent years. The persistence of unequal gender relations at home (or declining gender equality at home), on one hand, and increasing economic opportunities and rapidly changing expectations toward gender roles, on the other, are making it increasingly more difficult for women to balance their economic and family roles. This in turn may facilitate further decreases in marriage and childbearing in these East Asian countries.

Conclusion and Policy Implications

Japan's fertility decline to below-replacement levels was brought about primarily by increases in delayed marriage and non-marriage. As overall fertility continued decline to even lower levels, marital fertility also began to decline, due mainly to declines in progression to second child. Korea's spectacular fertility decline from very high to well below-replacement levels was achieved largely by increases of married women who stopped having children after their second child although decreases in marriage also

contributed substantially to the fertility decline to the lowest-low level in recent years. China's dramatic decline to below-replacement fertility was achieved primarily through curtailment of childbearing among married women after first or at most second child. Furthermore, similar to Japan and Korea in recent years, there is a sign of the increasing delay of marriage and childbearing in urban China since the 1990s. Increasing economic opportunities among young women in the face of persistently unequal (or increasingly more unequal) gender relations at home are thought to have played an important role in the fertility declines to below-replacement levels in these East Asian countries.

Concerned gravely about continuous slide in fertility (and the resulting rapid population aging and population decline), and convinced that a main factor driving its fertility to such low levels is the increasing incompatibility between women's economic and domestic roles, the Japanese government has formulated various policies and programs especially since the early 1990s (Tsuya 2005, 2008). The government launched a series of policies and programs—the Angel Plan of 1994, the New Angel Plan of 1999, the Plus-One Plan of 2002, and the Support Plan of 2004—that were designed to help couples/parents accommodate their work and domestic responsibilities by providing more childcare services and encouraging the workplace to become more family friendly. The government also enacted the Maternity and Childcare Leave Law in 1992 and revised it in 1995 and 2005. Launched originally in 1972, the child allowance scheme has been expanded notably since 2000 (Tsuya 2005). In part in response to the widespread recognition of the social and demographic consequences of unequal domestic gender relations, in 1999 the government also enacted the Basic Law for a Gender-equal Society, to promote gender equality not only in workplace but also in the home. So far, however, these policy actions and programs appear to have been largely ineffective in the sense that the strains and pressures on women (especially on working mothers) have not yet been alleviated and Japan's fertility has remained very low. Given the serious, long-term demographic consequences of the persistence of very low fertility, however, we have no choice but to strengthen policy and society-wide efforts to help women and couples reconcile work and family responsibilities.

Korea's phenomenal fertility decline is thought to have been facilitated by its ambitious and strong family planning policies. Launched in the early 1960s, they were expanded during the 1980s, achieving phenomenal success in cutting its fertility and changing normative orientations toward reproduction (Cho 1996; Choe and Park 2006; Choe and Retherford 2008). As the country's fertility continued to slide to very low levels, however, the government abandoned its strong population control policy. However, it did not occur until the mid-1990s by which Korea's fertility declined to well below replacement levels. Alarmed by the slippage of fertility to even lower levels in the late 1990s and early 2000s, the Korean government switched their population policy toward pronatalistic directions, emphasizing the need to improve the *population* quality and welfare (Choe 2008). Given the increasing difficulty that many Korean women—both single and married alike—face in making their economic aspirations and necessities compatible with marriage and family life, however, it is more important to take policy actions to improve the quality and welfare of individual Korean *families*. For this, it is necessary to formulate policies to make its rigidly structured labor market more flexible and family friendly (Choe, Bumpass, and Tsuya 2004). It is also important to provide more childcare services and maternity and childcare leave to working

mothers and fathers. Such policy actions need to be taken quickly, as if there is a lesson to be learned from Japan's experiences in recent years, it takes long-term consorted efforts for family policies to have any effects.

As we saw in this paper, what make China distinctive from Korea (and not to mention Japan) are the strong effects that the country's population policies have exerted on marriage and fertility behaviors. Although the increasing shift toward market economy in recent decades has altered the Chinese society in many ways, the country's political system is still quite different from those of Korea and Japan, thereby rendering the state pervasive power and a prominent role in shaping family formation behaviors of the Chinese people (Wang and Mason 2008). As China's fertility continued to slip to very low levels in recent years, however, the costs associated with the one-child policy has become apparent and are rising, including rapid increases of the elderly without adequate government or family support, rising distortion in sex ratios of births, and deterioration of the government's birth-reporting system (Wang 2005, 2009). Though an argument has been made by the majority of Chinese demographers that China needs to act quickly to phase out its one-child policy, and accumulated evidence suggests that lifting the one-child policy would not lead to the resurgence of uncontrollable population growth (e.g. Kaufman 2003; Merli and Smith 2002; Wang 2005), such a shift in government policy has not yet to occur. China, in this sense, could well benefit from learning the experiences of its East Asian neighbors: from Korea on how to shift policy quickly and from Japan on how difficult it is to induce people to increase childbearing once fertility has dropped to a very low level.

East Asia's fertility declines have posed a challenge to different academic and policy fronts. Fertility transitions amid limited economic growth and the persistence of traditional gender roles in many parts of Asia have challenged the demographic transition theory, which was formulated based largely on the historical European experiences (Caldwell 1993, Kwon 1993, Mason 1997, Lee and Wang 1999). East Asia's decent into below-replacement fertility now offers another opportunity to explore the economic, social, and cultural forces that are shaping reproductive behavior in other parts of Asia and beyond.

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Table 1. Fertility Rates (per 1,000 Women) by Age: Japan 1947–2007, South Korea 1955–2008, and China 1965–2005

Country & year	15–19	20–24	25–29	30–34	35–39	40–44	45–49	TFR[a]
Japan								
1947	15	168	270	235	157	57	6	4.54
1950	13	161	236	174	104	36	2	3.66
1955	6	112	181	112	49	13	1	2.37
1960	4	106	181	80	24	5	0	2.00
1965	3	112	203	86	19	3	0	2.14
1970	4	96	208	85	20	3	0	2.03
1975	4	106	188	69	15	2	0	1.91
1980	4	77	182	73	13	2	0	1.75
1985	4	62	178	85	18	2	0	1.76
1990	4	45	140	93	21	2	0	1.54
1995	4	40	116	95	26	3	0	1.42
2000	6	40	100	94	32	4	0	1.36
2005	5	37	85	86	36	5	0	1.26
2007	5	37	88	92	41	6	0	1.34
Korea								
1955	39	240	288	245	184	82	14	5.46
1960	35	249	323	273	204	96	16	5.98
1966	22	213	310	219	136	59	9	4.95
1970	19	193	320	205	106	46	13	4.53
1975	14	178	263	146	58	21	5	3.47
1980	13	141	244	107	31	9	2	2.83
1985	10	119	159	41	9	2	1	1.67
1990	4	83	169	51	10	2	0	1.59
1995	4	63	177	70	15	2	0	1.65
2000	3	39	151	84	17	3	0	1.47
2005	2	18	92	82	19	2	0	1.08
2008	3	18	86	102	27	3	0	1.19
China[b]								
1965	53	284	309	257	194	96	12	6.02
1970	39	278	308	252	179	83	10	5.75
1975	25	189	242	154	94	47	9	3.79
1980	12	162	212	92	41	17	4	2.69
1985	26	185	161	61	22	9	2	2.33
1990	24	198	163	65	25	6	2	2.41
1995	15	139	99	35	10	3	1	1.51
2000	6	126	101	35	8	2	1	1.40
2005	8	127	111	47	13	3	1	1.54

Notes: a–Number of children per woman calculated from current rates by single years of age for Japan and Korea.

b–Estimated by the own-children method for 1960–1970, and by the birth history reconstruction method which is an extension of the own-children method for 1970–2005.

Sources: National Institute of Population and Social Security Research (2009: 50–51); before 1970, Coale, Ansley, Lee-Jay Cho and Noreen Goldman (1980) *Estimation of Recent Trends of Fertility and Mortality in the Republic of Korea*. Washington, DC: National Academy of Sciences; for 1970 and afterwards, Korea National Statistics Office, *Annual Report on the Vital Statistics*, various years; before 1975, Coale, Ansley J. and Chen Sheng Li (1987) "Basic data on Fertility in the Provinces of China, 1940–82," *Papers of the East–West Population Institute* No. 104; for 1975 to 2000, National Bureau of Statistics of China and East–West Center (2007) *Fertility Estimates for Provinces of China 1975-2000*, Beijing: China Statistics Press; for 2005, personal communication with Jiajian Chen at the East-West Center.

Table 2. Age-specific Fertility Rates (per 1,000 Women) and Total Fertility Rates by Urban/Rural Residence: China 1965–2005

	1965	1970	1975	1980	1990[a]	2000	2005
Urban							
15–19	23	11	4	1	10	2	3
20–24	209	172	73	37	132	63	65
25–29	234	242	170	154	114	81	79
30–34	145	136	77	43	33	21	29
35–39	91	59	21	4	10	5	7
40–44	48	20	6	1	3	1	2
45–49	6	2	1	0	1	0	1
TFR	3.78	3.22	1.76	1.20	1.51	0.86	0.93
Rural							
15–19	59	45	24	9	25	9	9
20–24	299	297	211	178	208	144	148
25–29	328	321	247	205	166	91	104
30–34	284	282	152	71	62	33	50
35–39	217	209	103	33	22	7	13
40–44	105	96	50	13	8	2	2
45–49	14	12	7	3	3	1	1
TFR	6.53	6.31	3.97	2.56	2.47	1.43	1.64

Notes: Estimated by the own-children method for 1960–1970, and by the birth history reconstruction method which is an extension of the own-children method for 1970–2000.

a–The rate for urban China in 1990 is the weighted average of the rates of cities and towns, which are estimated by the birth history reconstruction methods.

Sources: For 1965–1980, Coale, Ansley J. and Chen Sheng Li (1987) "Basic data on Fertility in the Provinces of China, 1940–82," *Papers of the East–West Population Institute* No. 104; for 1990, National Bureau of Statistics of China (NBSC) and East–West Center (2007) *Fertility Estimates for Provinces of China 1975-2000*, Beijing: China Statistics Press; for 2000, NBSC, Department of Population and Labor Statistics (2001) *China Demographic Yearbook 2001*, Beijing: China Statistics Press; ——— (2006) *China Demographic Yearbook 2006*, Beijing: China Statistics Press.

Table 3. Percentage of Women Never-Married by Age: Japan 1950–2005, South Korea 1955–2005, and China 1982–2005

Country & year	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50
Japan								
1950	97	55	15	6	3	2	2	1
1955	98	67	21	8	4	2	2	2
1960	99	68	22	9	6	3	2	2
1965	99	68	18	9	7	5	3	3
1970	98	72	18	7	6	5	4	3
1975	99	69	21	8	5	5	5	4
1980	99	78	24	9	6	4	4	5
1985	99	81	31	10	7	5	4	4
1990	98	85	40	14	8	6	5	4
1995	99	86	48	20	10	7	6	5
2000	99	88	54	27	14	9	6	6
2005	99	89	59	32	18	12	8	7
Korea								
1955	85	21	3	1	0	0	0	0
1960	93	34	3	0	0	0	0	0
1966	96	52	8	1	0	0	0	0
1970	97	57	10	1	0	0	0	0
1975	98	68	15	3	1	0	0	0
1980	98	66	14	3	1	1	0	0
1985	99	72	18	4	2	1	0	0
1990	100	81	22	5	2	1	1	1
1995	99	83	29	6	3	2	1	1
2000	99	89	40	11	4	3	2	1
2005	100	94	59	19	8	4	2	2
China								
1982	96	46	5	1	0	0	0	0
1990	95	41	4	1	0	0	0	0
2000	99	56	9	1	1	0	0	0
2005	99	57	13	2	1	0	0	0

Sources: National Institute of Population and Social Security Research (2009: 55); Kwon, Tai Hwan et al. (1975) *The Population of Korea*. Seoul: Seoul National University; Korea National Bureau of Statistics, *Population and Housing Census Report*, various years; State Statistical Bureau, People's Republic of China (1985) *1982 Population Census of China (Results of Computer Tabulation)*. Beijing: Statistical Publishing House; National Bureau of Statistics of China (1993) *Zhongguo Shehui Tongji Ziliao 1993 (Social Statistics Report of China 1993)*. Beijing: China Statistics Press; ——— (2002) *Tabulations on the 2000 Population Census of the People's Republic of China*. Beijing: China Statistics Press; ——— (2007) *Tabulations on the 2005 National 1% Population Sample Survey of China*. Beijing: China Statistics Press.

Table 4. Period Parity Progression Ratios (PPPRs): Japan 1950–2000, South Korea 1960–2000, and China 1975–2000

Country	Year	PPPR (per 1,000)						
		B to M	*M to 1*	*B to 1*	*1 to 2*	*2 to 3*	*3 to 4*	*4+ to 5+*
Japan	1950	960[a]	973	--	940	587	645	627
	1955	940	949	--	841	598	537	349
	1960	958	939	900	842	472	299	243
	1965	970	943	915	864	368	217	210
	1970	972	941	915	872	362	198	252
	1975	953	931	887	861	299	132	227
	1980	928	917	851	855	307	129	207
	1985	919	909	835	861	361	144	215
	1990	878	881	774	828	363	142	180
	1995	853	855	729	796	352	160	204
	2000	807	857	691	770	324	161	195
Korea	1960	--	--	960	953	917	872	--
	1965	--	--	950	967	933	886	--
	1970	--	--	969	960	914	829	--
	1975	--	--	963	947	792	548	--
	1980	--	--	943	935	616	395	--
	1985	--	--	912	849	237	150	--
	1990	--	--	902	803	172	148	--
	1995	--	--	867	865	175	124	--
	2000	--	--	798	835	187	87	--
China	1975	--	--	963	966	849	707	510
	1980	--	--	977	934	648	467	333
	1985	--	--	991	667	466	373	312
	1990	995	989	986	686	432	334	335
	1995	987	983	968	441	227	200	238
	2000	977	988	972	378	156	169	260

Notes: Figures are estimated by reconstruction using data from the population censuses.

Sources: Bureau of Statistics, Japan Ministry of Communication and Internal Affairs (formerly Japan Management and Coordination Agency), *Population Census of Japan*, various years; Korea National Statistical Office, *Population and Housing Census Report*, various years; National Bureau of Statistics of China and East–West Center (2007) *Fertility Estimates for Provinces of China 1975-2000*, Beijing: China Statistics Press.

Table 5. Percentages of Population Age 18 Going onto Junior College or 4–year College by Sex in Japan 1955–2005, and Percentages of High School Graduates Advancing onto Higher Education by Sex in South Korea 1965–2005

Country & year	*Females*			*Males*		
	Total	Junior college[c]	4-year college	Total	Junior college[c]	4-year college
Japan[a]						
1955	5	3	2	15	2	13
1960	6	3	3	15	1	14
1965	11	7	5	22	2	21
1970	18	11	7	29	2	27
1975	33	20	13	44	3	40
1980	33	21	12	41	2	39
1985	35	21	14	41	2	39
1990	37	22	15	35	2	33
1995	48	25	23	43	2	41
2000	49	17	32	49	2	48
2005	50	13	37	53	2	48
Korea[b]						
1965	32	6	26	30	4	27
1970	25	3	22	24	2	22
1975	20	3	17	21	1	20
1980	22	8	14	24	5	19
1985	34	12	21	38	12	26
1990	32	13	19	33	11	22
1995	50	18	32	52	16	37
2000	65	22	44	70	23	47
2005	81	24	57	83	23	60

Notes: a–Numbers for high school are the percentages of junior high school graduates advancing onto high school within a given year, and the numbers for junior college and 4-year college are the percentage numbers in a given year are the percentages of new entrants to university and junior college among the population age 18 in that year.

b–Numbers are the ratios of students advancing to higher education among high school graduates of that year, excluding those who graduated from high school before the year.

c–Including advanced professional training school (*kōsen*) in Japan, and teacher training college in Korea.

Sources: Japan Ministry of Education, Culture, Sports, Science and Technology (2009) *Monbu Kagaku Tokei Yōran Heisei 21-nendo-ban (Statistical Abstract of Education and Science 2009)*, Tokyo: National Printing Office; Korea Ministry of Education, *Annual Education Statistics*, various years.

Table 6. Percentages of Women Enrolled in or Graduated from Junior College or 4–Year College by Age in Japan 1960–2000 and South Korea 1966–2005, and Percentages of Women Who Have Ever Been Enrolled in Higher Education in China 1982–2005

Country & year	20–24	25–29	30–34
Japan			
1960	6	4	4
1970	17	10	7
1980	40	26	17
1990	47	43	40
2000	58	51	44
Korea			
1966	5	3	2
1970	9	5	3
1975	12	8	5
1980	16	11	8
1985	28	15	11
1990	39	27	15
1995	51	38	27
2000	66	50	38
2005	74	65	50
China			
1982	1	1	1
1990	2	2	2
2000	8	6	5
2005	14	12	8

Sources: Bureau of Statistics, Japan Management and Coordination Agency, *Population Census of Japan*, various years; National Institute of Population and Social Security Research (2008) *Latest Demographic Statistics 2008*, p.175; Korea National Statistical Office (2009) *KOSIS (Korean Statistical Information Service)* accessed July, http://www.kosis.kr/; China State Statistical Bureau (1985) *1982 Population Census of China (Results of Computer Tabulation)*, Beijing: Statistical Publishing House; ——— (1991) *10 Percent Sampling Tabulation on the 1990 Population Census of the People's Republic of China (Computer Tabulation)*, Beijing: China Statistical Publishing House; ——— (2002) *Tabulation on the 2000 Population Census of the People's Republic of China*, Beijing: China Statistics Press; ——— (2007) *Tabulations on the 2005 National 1% Population Sample Survey of China*. Beijing: China Statistics Press.

Table 7. Female Singulate Mean Age at Marriage (SMAM) by Educational Attainment in Japan, South Korea, and China: 1990 and 2000

Education	*Japan*		*Korea*		*China*	
	1990	2000	1990	2000	1990	2000
Less than high school	24.6	26.6	23.2	24.8	--	--
High school	25.9	27.3	25.2	25.5	--	--
Junior college	27.4	28.8	26.3	27.8	--	--
4-year college +	28.1	30.1	27.3	28.5	--	--
Less than junior high school	--	--	--	--	21.4	21.8
Junior high school	--	--	--	--	22.2	23.1
High school	--	--	--	--	23.7	24.6
More than high school	--	--	--	--	25.6	25.6

Source: Choe, Minja Kim (2005) "Changing Marriage Behavior in China, Japan, and South Korea," presentation at International Forum on Emerging Population Challenges in China and East Asia, May 16–17, Beijing.

Table 8. Female Labor Force Participation Rates by Age: Japan 1960–2005 and South Korea 1965–2005

Country & year	15–19	20–24	25–29	30–34	35–39	40–44	45–49
Japan							
1960	50	69	50	51	55	57	57
1965	38	70	47	48	58	62	63
1970	36	71	45	47	56	64	65
1975	23	67	44	43	53	60	62
1980	19	71	49	47	56	62	62
1985	17	73	54	49	58	66	66
1990	17	76	61	51	59	67	68
1995	16	74	66	53	59	67	69
2000	15	71	70	57	60	68	70
2005	16	69	73	62	62	69	73
Korea							
1965	41	39	30	34	45	49	50
1970	44	42	31	39	45	50	50
1975	37	44	29	36	49	54	54
1980	34	54	32	41	53	57	57
1985	21	55	36	44	53	58	59
1990	19	65	43	50	58	61	64
1995	15	66	48	48	59	66	61
2000	13	61	56	49	59	64	65
2005	10	63	66	50	59	66	63

Source: National Institute of Population and Social Security Research (2008) *Latest Demographic Statistics 2008*, p. 139; Korea National Statistical Office (2009) *KOSIS (Korean Statistical Information Service)*, accessed in August, http://www.kosis.kr/.

Table 9. Average Hours Spent on Housework and Childcare per Week by Sex and Men's Share in Domestic Labor: Japan 1976–2006 and South Korea 1987–2004

Country & year	Housework & childcare hours		Men's share (%)
	Women	Men	
Japan[a]			
1976	23.1	0.9	4
1981	23.7	0.9	4
1986	28.0	2.1	7
1991	27.1	2.8	9
1996	26.4	3.2	11
2001	26.3	3.9	13
2006	26.1	4.6	15
Korea			
1987	19.0	2.3	11
1990	17.6	2.1	11
2004	23.7	4.1	15

Notes: a–Due to differences in the definition of domestic labor, the data for 1976 and 1981 are not exactly comparable to those for 1986 and afterwards; figures are based on persons age 15 and above.

Sources: United Nations (1991) *World's Women 1970-1990: Trends and Statistics*, pp. 101–03; ——— (1995) *World's Women 1990: Trends and Statistics*, pp. 132–34; Korea National Statistics Office (2005) *Report on the Time Use Survey*; Japan Statistics Bureau (2007) *Summary Results of the 2006 Survey on Time Use and Leisure Activities,* Tokyo: Japan Ministry of Internal Affairs and Communications, pp. 16–17.

Figure 1a. Total Fertility Rates in Japan, Korea, and China: 1947–2006

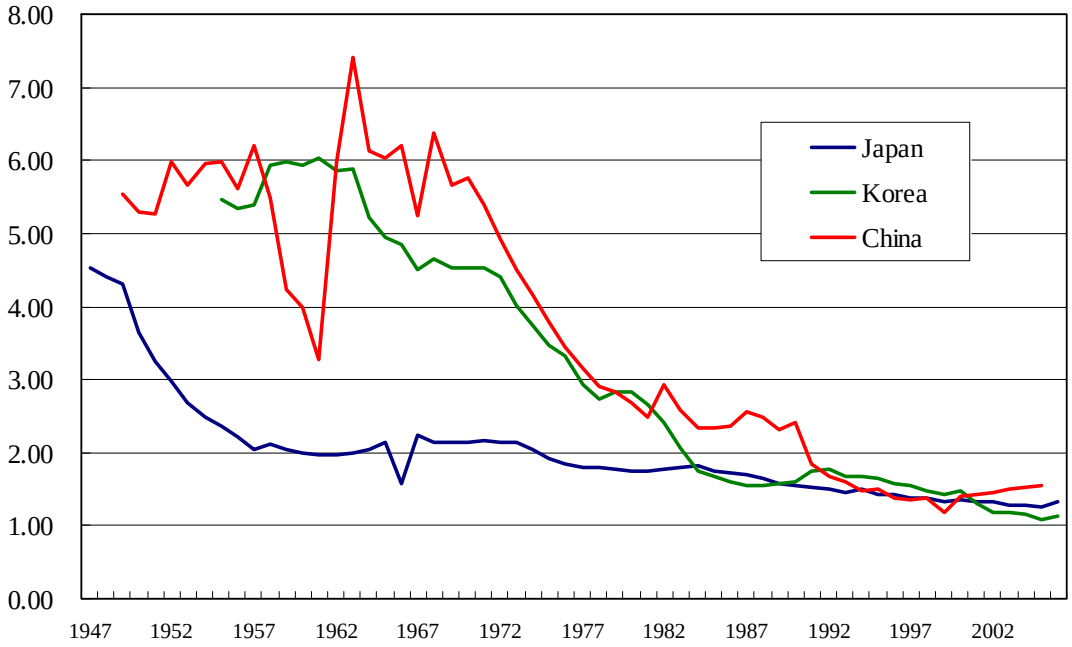


Figure 1b. Total Fertility Rates in Japan, Korea, and China: 1980–2006

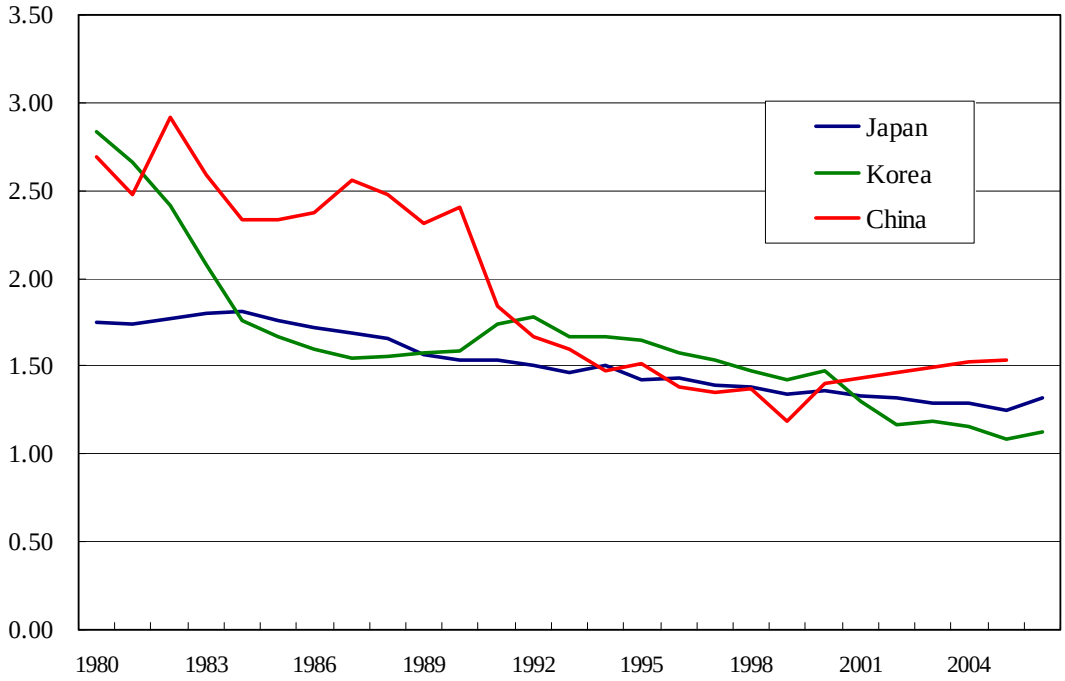


Figure 2a. Age-specific Fertility Rates: Japan 1947–2005

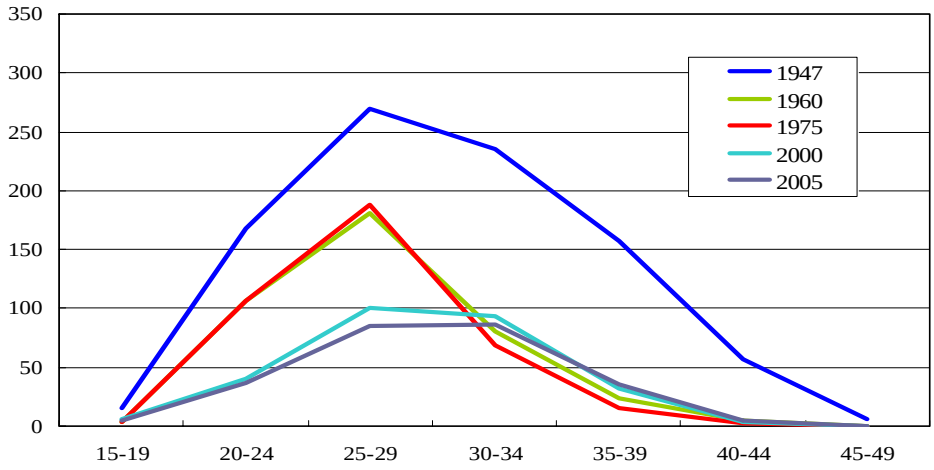


Figure 2b. Age-specific Fertility Rates: Korea 1960–2005

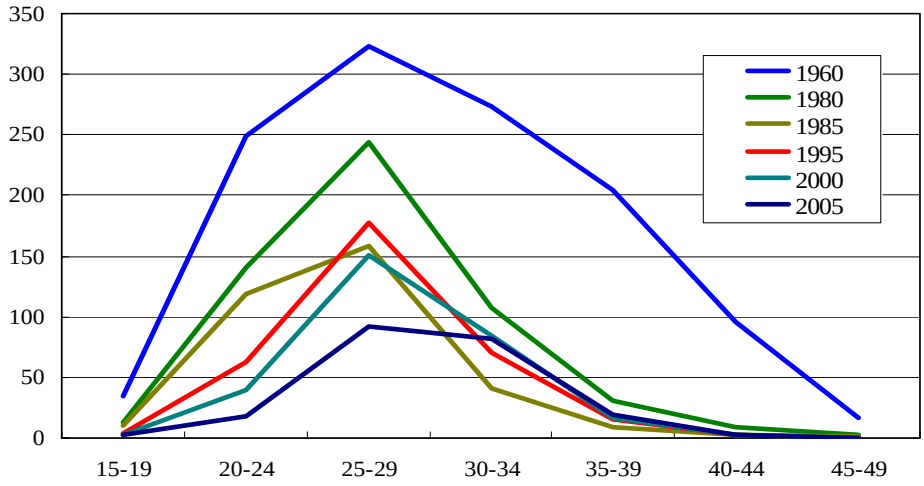


Figure 2c. Age-specific Fertility Rates: China 1970–2005

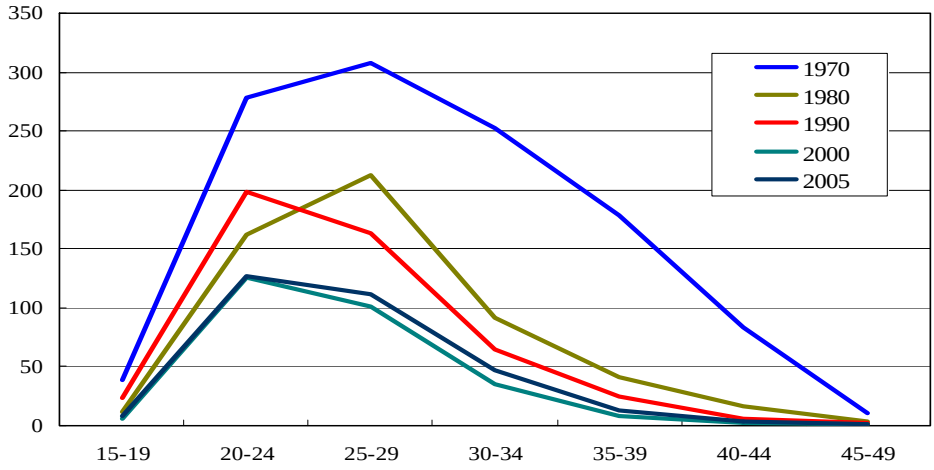


Figure 3a. Age-specific Fertility Rates: Urban China 1970–2000

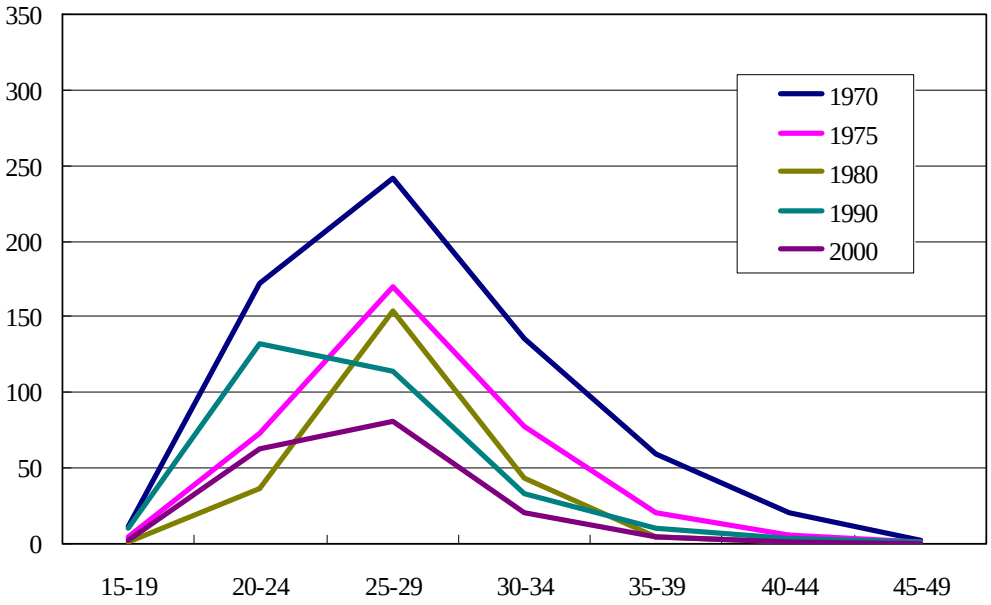


Figure 3b. Age-specific Fertility Rates: Rural China 1970–2000

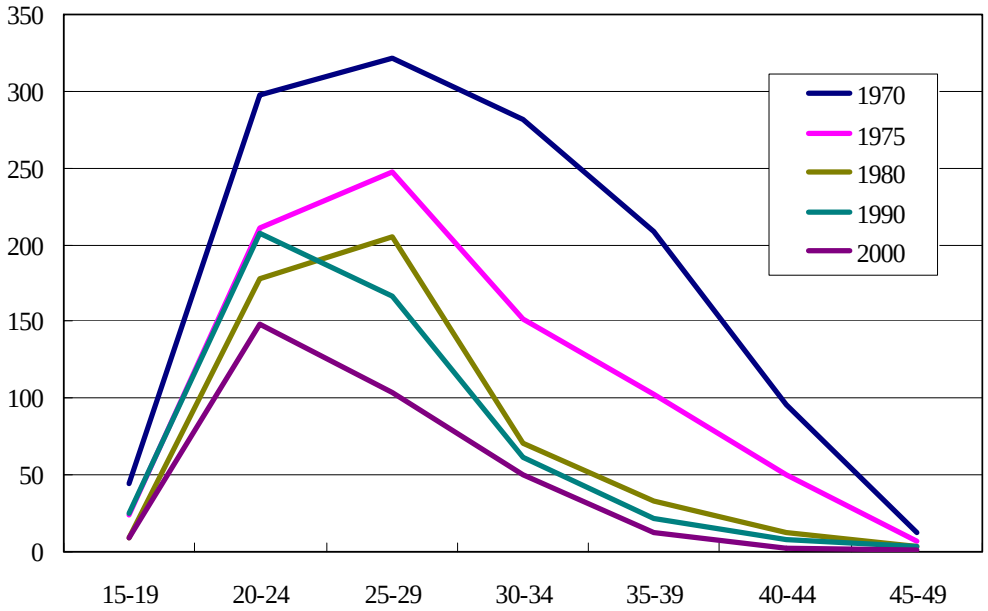
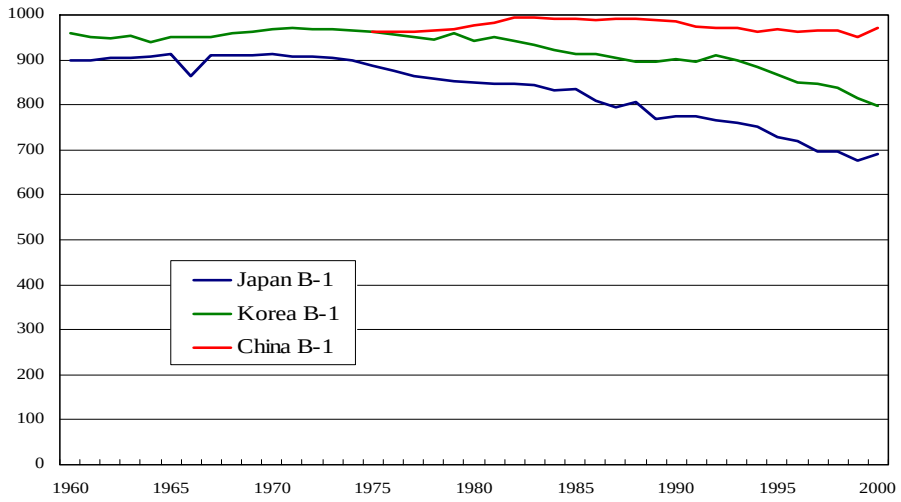
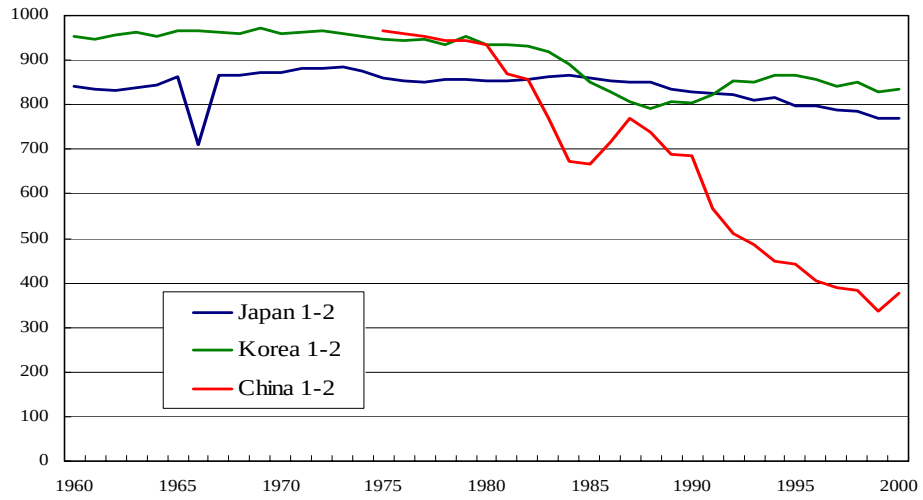


Figure 4. Period Parity Progression Ratios: Japan, South Korea, and China 1960–2000





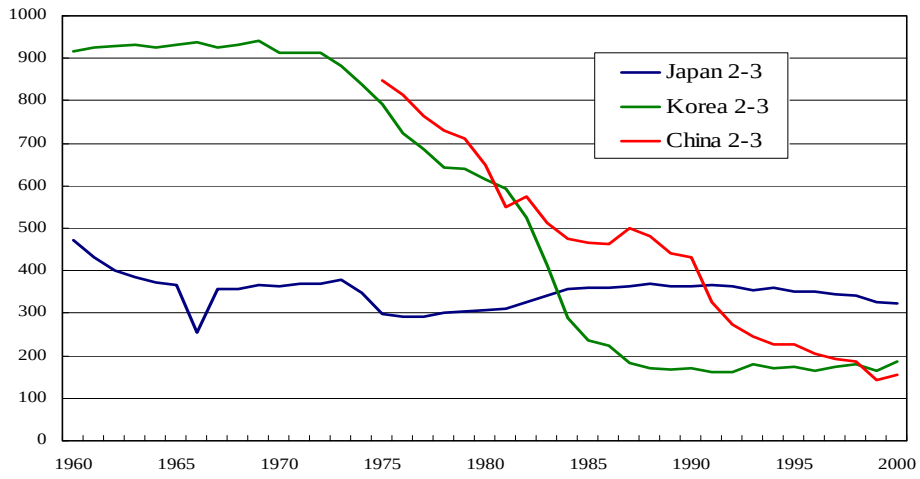


Figure 5a. Female Labor Force Participation Rate by Age: Japan 1970–2005

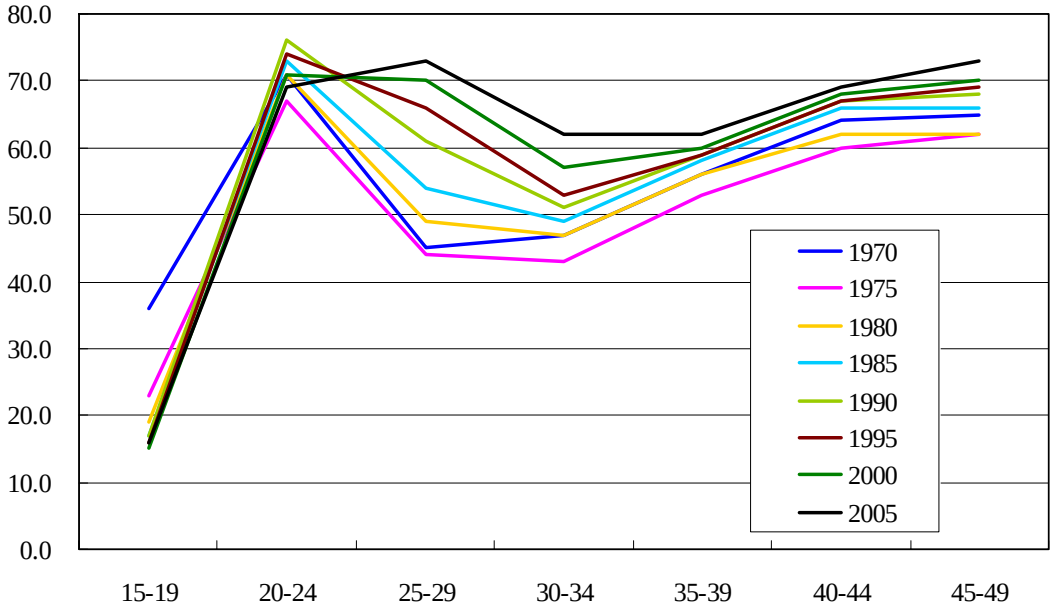


Figure 5b. Female Labor Force Participation Rate by Age: Korea 1970–2005