# Marriage Squeezes in Korean and Japanese Regions

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This study examines the regional differentials and the evolutional patterns of marriage squeezes as a critical demographic factor for ultra-low fertility in Japan and the Republic of Korea. We tackle two related questions: (1) whether Korean cohorts born between the mid-1980s and the 1990s who suffered an abnormal sex ratio at birth face a salient aggravation of marriage squeezes only after the 2010s when they became age twenties, and (2) whether a marriage squeeze in a local marriage market induces low fertility or whether regional patterns of marriage squeezes correlate with low fertility. The answers to both questions are Yes and No.

We compare Japan and Korea because of their similarities and moderate differences in fertility decline patterns. Japanese fertility rates started a rapid decline in the late 1940s. TFR turned to the below replacement in 1974 and decreased to 1.26 in 2005 but stayed around 1.26–1.45. In the 1970s, Korean TFR began to decline to achieve the replacement level by 1983 and steadily fell to the historically lowest level of 0.72 in 2023. Korean fertility transition was 20–30 years delayed from the Japanese case, but the decline was much faster, and the Korean fertility level showed one of the lowest in the world in the late 2010s. Meanwhile, the Korean sex ratio at birth from the mid-1980s to the early 2000s deviated from the natural level and marked 116.5 in 1990. while Japanese sex ratios at birth never deviated from the natural level of around 105.

In a society where out-of-wedlock births are exceptional, like in Japan and Korea, marriage is a main demographic factor causing ultra-low fertility. The continual fertility decline below the replacement causes marriage squeezes of males because Japanese and Korean husbands are 2-3 years older than wives on average, and cohorts of younger wives are smaller due to fertility declines. At the same time, imbalanced sex ratios of the never-married males to females cause a further fertility decline. This demographic mechanism of the interaction between a fertility decline and a marriage squeeze must play a salient role in the below replacement reproduction in both countries. In addition, the Korean males who were born under abnormal sex ratios were supposed to suffer the marriage squeeze after the 2010s when the birth cohorts attained a prime age for marriage. So, the interplay suggests a more profound drop in Korean fertility after the 2010s and predicts that fertility would stay at the lowest level until the completion of the cohorts born in the abnormal sex ratios.

Marriage is a local phenomenon whose geographical space is generally limited to a population movement for daily life and migration. Nation-wide imbalances in sex ratios of the never-married populations do not necessarily describe the tightness of local marriage markets, especially when a sizeable young population moves from rural to urban as in Japan and Korea: in 2020, about 50% of the total population resides in Seoul metropolitan area (Gyeonggi-do including Seoul and Incheon) and about 29% lives in the Tokyo metropolitan area (Tokyo-to and the surrounding three prefectures). In general, when the male's out-migration rate from rural areas is higher than the female's, migration mitigates the male marriage squeeze in rural areas and worsens male deficits in urban areas. Precisely, marriage squeezes in each local area depend on migration patterns, including combinations of origin and destination, sex ratios of migrants, and the gender differences in the timing (age) of migration. A quantitative evaluation of how population concentration in metropolitan cities like Seoul and Tokyo affects the marriage squeezes of the city and other regions is needed.

Nonetheless, related literature mainly focuses on the effect of the Korean abnormal sex ratios on the marriage market (e.g., Kim Doo-Sub 2008[1]; Rallu 2006[2]) or the effect of baby boomers (born in 1947–49) and the following rapid fertility transition of Japan (Anzo 1985[3]). There are a few quantitative evaluations for the period after fertility falls below replacement from the comparative perspective between Japan and Korea. To our knowledge, no study compares the Japanese and Korean regional marriage markets.

## The method

We utilize the marriage squeeze index, $S$, of Schoen (1983)[4]. It relies on the period marriage table estimates and measures the degree of either male deficit (female surplus) if $S<0$ or female surfeit if $S>0$. We calculate the index for the 47 regions (Prefectures) and overall Japan from 1975 to 2021 and compute it for the 13 regions (Si-do) and Korea from 1991 to 2021. The index represents marriage squeezes of the total population, including foreigners.

In order to enhance the comparability between countries with distinct statistical systems, we implement the demographic concept as rigorously as possible. The calculation of the index requires the age-specific occurrence-exposure rate of the marriage mainly based on two types of data: (1) for the denominator, the mid-year never-married population of males and females by single-year of age, and (2) for the numerator, the number of annual

[1] Kim, D. S. (2008). "Recent rise and decline in sex ratio at birth in Korea: Revisited and revised," *Population and Society*, 4(2): 59–89.
[2] Rallu, J. L. (2006). "Female deficit and the marriage market in Korea," *Demographic Research*, 15(article 3): 51–60.
[3] Anzo, S. (1985). "Measurement of the Marriage Squeeze and its Application," *Journal of Population Studies (Jinkogaku kenkyu)*, No.8: 1–10.
[4] Schoen, R. (1983). "Measuring the Tightness of a Marriage Squeeze," *Demography*, 20(1): 61–78.

marriages by the age combination of grooms and brides for the reproductive age. Although Schoen analyzed marriage squeezes of the unmarried population, including those divorced and widowed, we focus on the first marriage of husbands and those of wives because of the availability of the data for the denominator. The never-married populations are available only in the decennial population census. Hence, we conduct the intercensal estimates by region, single-year birth cohort, and sex. The estimation is based on the population counts of the never-married at the beginning of the period by age at the time of the survey (October 1 in Japan and November 1 in Korea). It considers the never-married deaths, the first marriage registration, and the net migration by the cohort of single-year of age at the time of the censuses. For the numerator, we use micro-data of the vital statistics of Japan and Korea to tabulate the marriage registrations annually (January–December) by the mid-year age corresponding to the never-married population estimates.

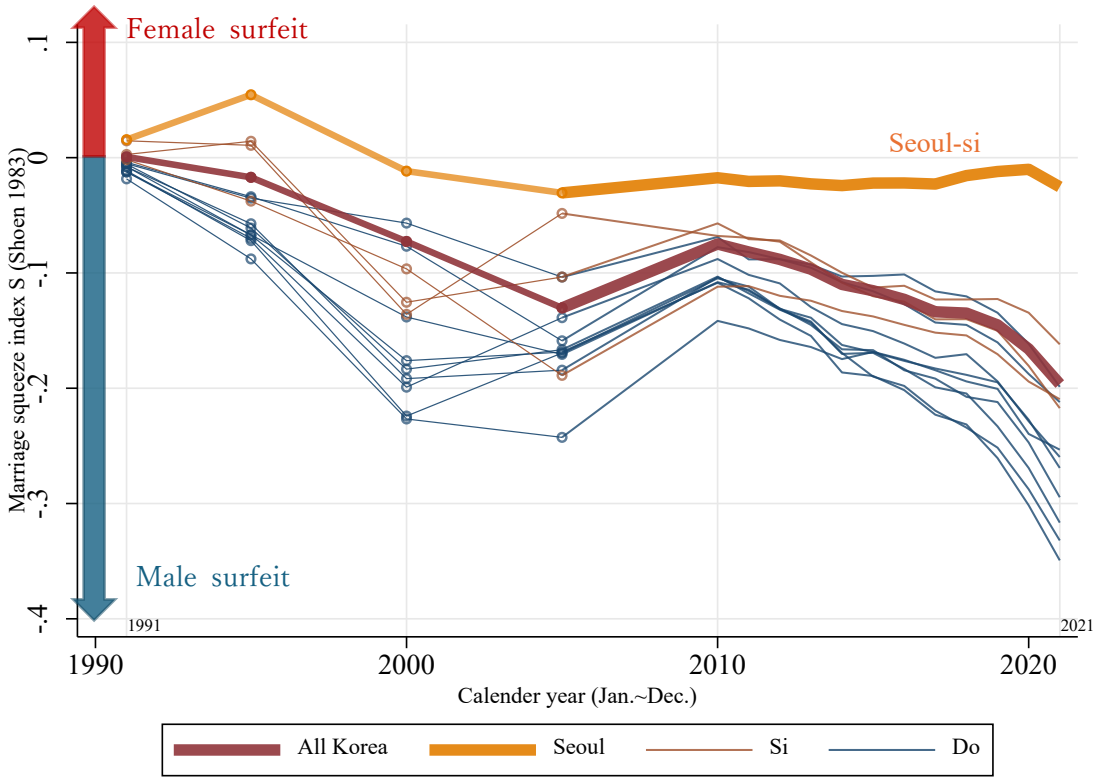
## The results

Figure 1 depicts the evolution of the marriage squeeze indices of Korean regions in panel (a) and Japanese prefectures in panel (b). For the first research question, panel (a) shows the marked expansions of the male surplus after the 2010s. However, the marriage squeezes of Korean males worsened before the 2010s from no imbalances of the never-married populations in 1991 to a 13% surplus of males in 2005. Moreover, the male deficit in Seoul is relatively tiny and slightly improved after 2005. Also, we see more than 10% of Japanese males' marriage squeezes in the mid-1980s and after the mid-2000s. The marriage squeezes of males in both countries are closely related to the fertility declines of both countries.

For the second research question, panel (b) shows persistent regional differences in Japan. While Japan's male surfeit expanded by 12 percent points from 1975 to 2021, most of the prefectures moved along all of Japan, and the range (the difference between maximum and minimum prefectures each year) stayed around 16–22 percent points. Moreover, the male shortages are relatively mild in the Kyusyu-Okinawa regional group, which is known to maintain high fertility. Contrary to the lowest low fertility rate, the severity of the male marriage squeezes in Tokyo weakened after the mid-2000s. The increase of the male surfeit in rural areas of relatively high fertility underlies the decrease in the male surplus in metropolitan cities in both Korea and Japan. Panel (a) shows that the Korean male surfeit in rural areas worsened remarkably in the early 2000s and the late 2010s when the male surplus of overall Korea intensified. Related to the last findings, we will discuss the consequences of internal migration of the Japanese and Korean never-married populations to the regional patterns of marriage squeezes and fertility in the conference.

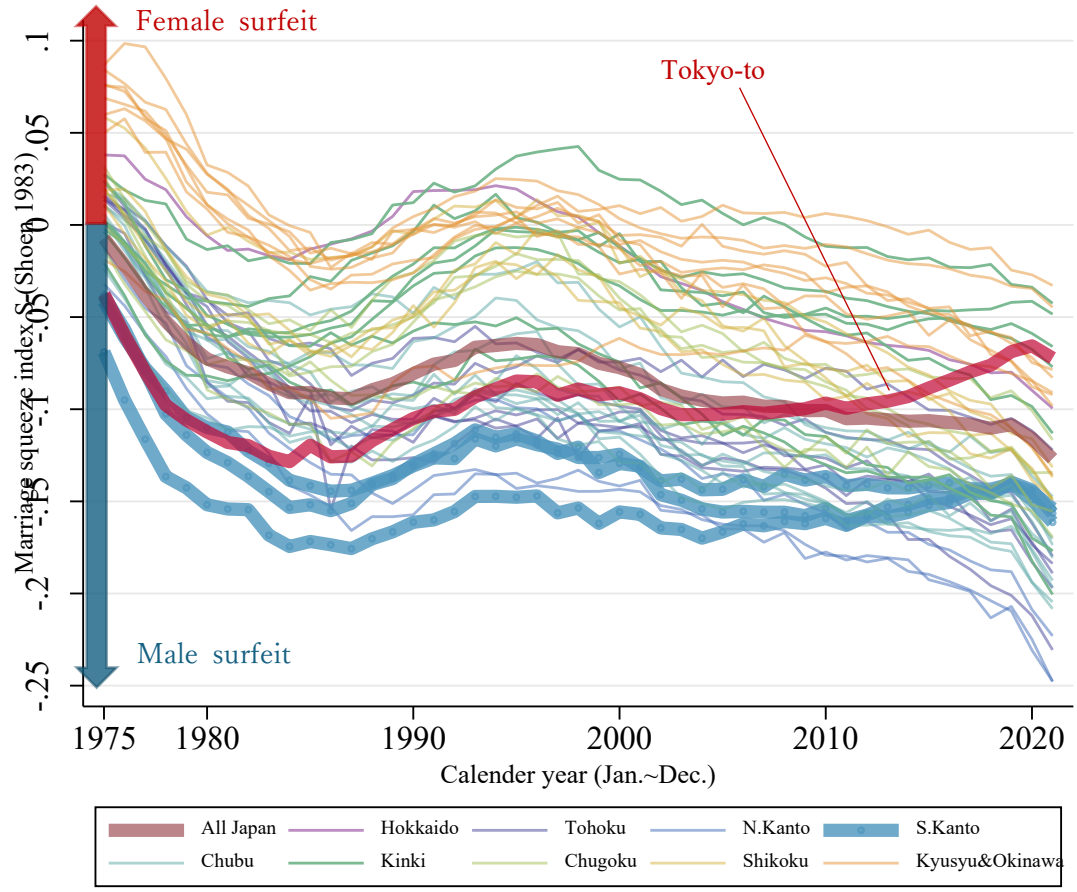
Figure 1. The marriage squeeze index (Schoen, 1983) for the Korean and Japanese regions.

(a) 13 Si-do of Korea, 1991–2021




Note: Line colors distinguish the Seoul city, the other four cities (Si), and the other nine regions (Do).

(b) 47 Prefectures of Japan, 1975 –2021




Note: Line colors distinguish the nine regional groups dividing 47 prefectures based on geographical proximity. Tokyo-to is a part of South Kanto but highlighted.