The 30th International Population Conference
Session 125 Gender, Family, and Marriage Across Contexts

Date & Time
Wednesday, 16th July 2025, 15:30 – 17:00
Venue
The Brisbane Convention & Exhibition Center

Marriage Squeezes in Korean and Japanese Regions

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Objectives

- To analyze trends and regional disparities in marriage squeeze in South K orea and Japan.
- Focus on the age combination of first-marriage couples.
- Construct a comparable index of marriage squeeze (S) for ages 15–49 usin g identical methodology and data sources (Population Census and Vital St atistics).
- Compare national and regional trends for Japan (1975–2021) and Korea (1991–2021).
- Target population includes the entire population (including foreigners) in:
  - 15 Si-Do in Korea
  - 47 Prefectures in Japan

Research Question

- Did Korea experience a pronounced increase in the marriage squeeze only after the 201 0s, when cohorts affected by the skewed sex ratio at birth reached their late 20s?

→Yes & No.

- Can marriage squeeze be regarded as a contributing factor to fertility decline, and do re gional patterns of marriage squeeze resemble those of fertility?

→Yes & No.

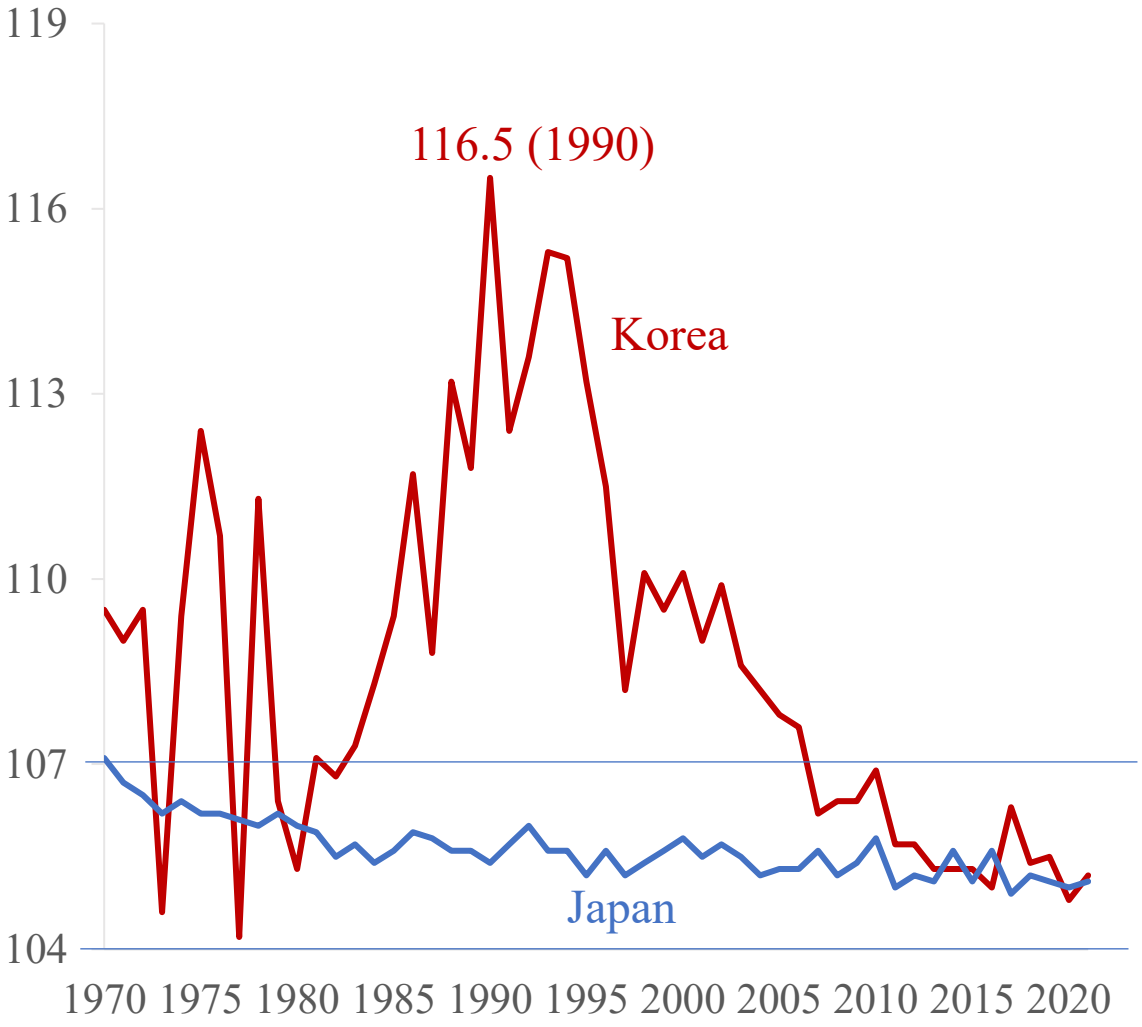
Background: Three Structural Drivers of Male Marriage Squeeze in Korea and Japan

- Sex Ratio at Birth
  Japan: No distortion in sex ratio at birth.
  Korea: Sex ratio exceeded 110 from the mid-1980s to early 1990s. These cohorts entered t heir late 20s after 2010.

- Fertility Decline
  Japan: Fertility transition occurred in the late 1940s to early 1950s; its impact reached the marriage market around the early 1980s.
  Korea: Fertility transition occurred in the 1970s to early 1980s; its impact on the marriage market appeared about 20 years later than in Japan.

- Female-Skewed Internal Migration
  Japan & Korea: Female migration from non-metropolitan to metropolitan areas has been more active than male migration. This trend became particularly pronounced after the 2000s.

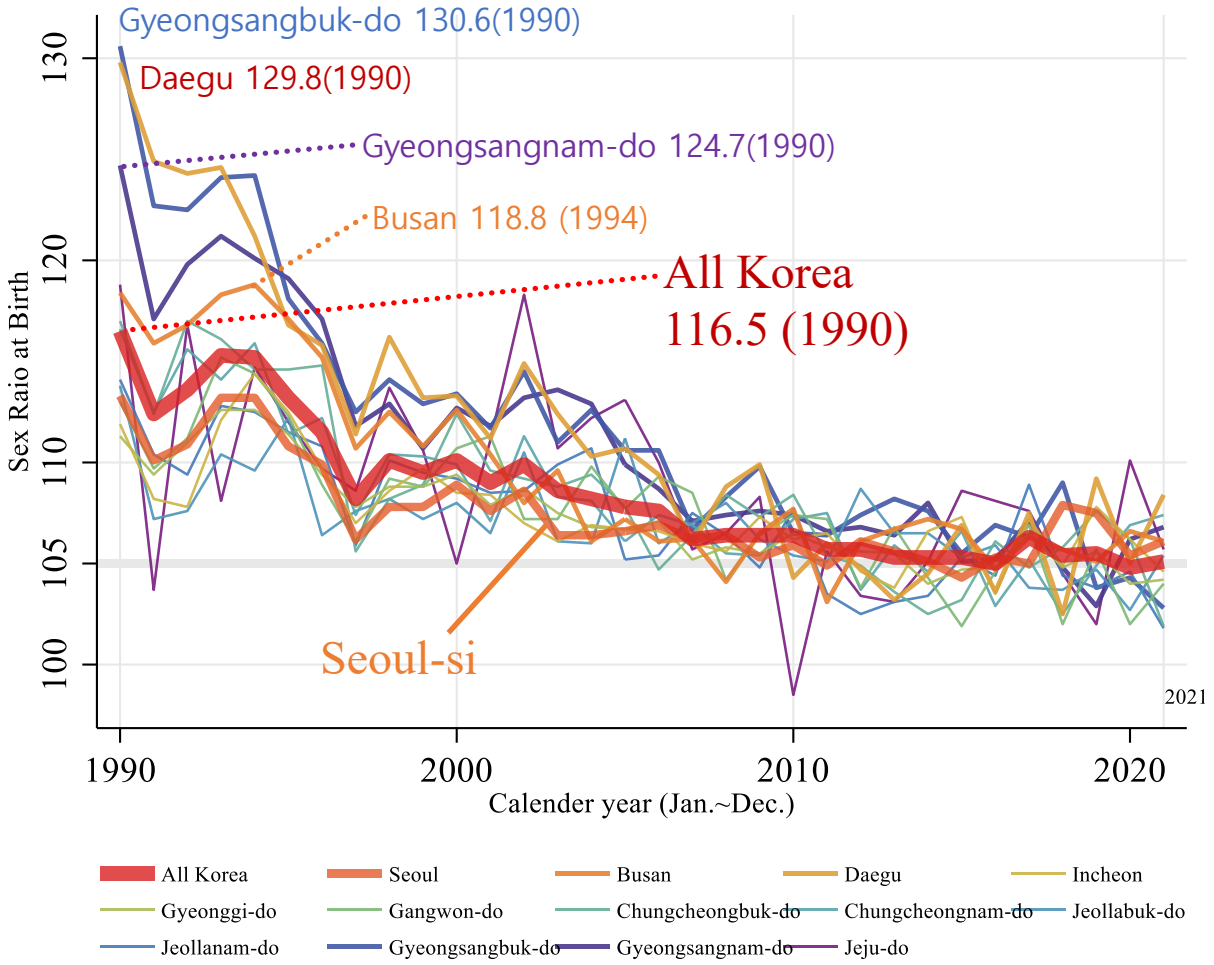
Sex Ratio at Birth in Korea and Japan: 1970–2021



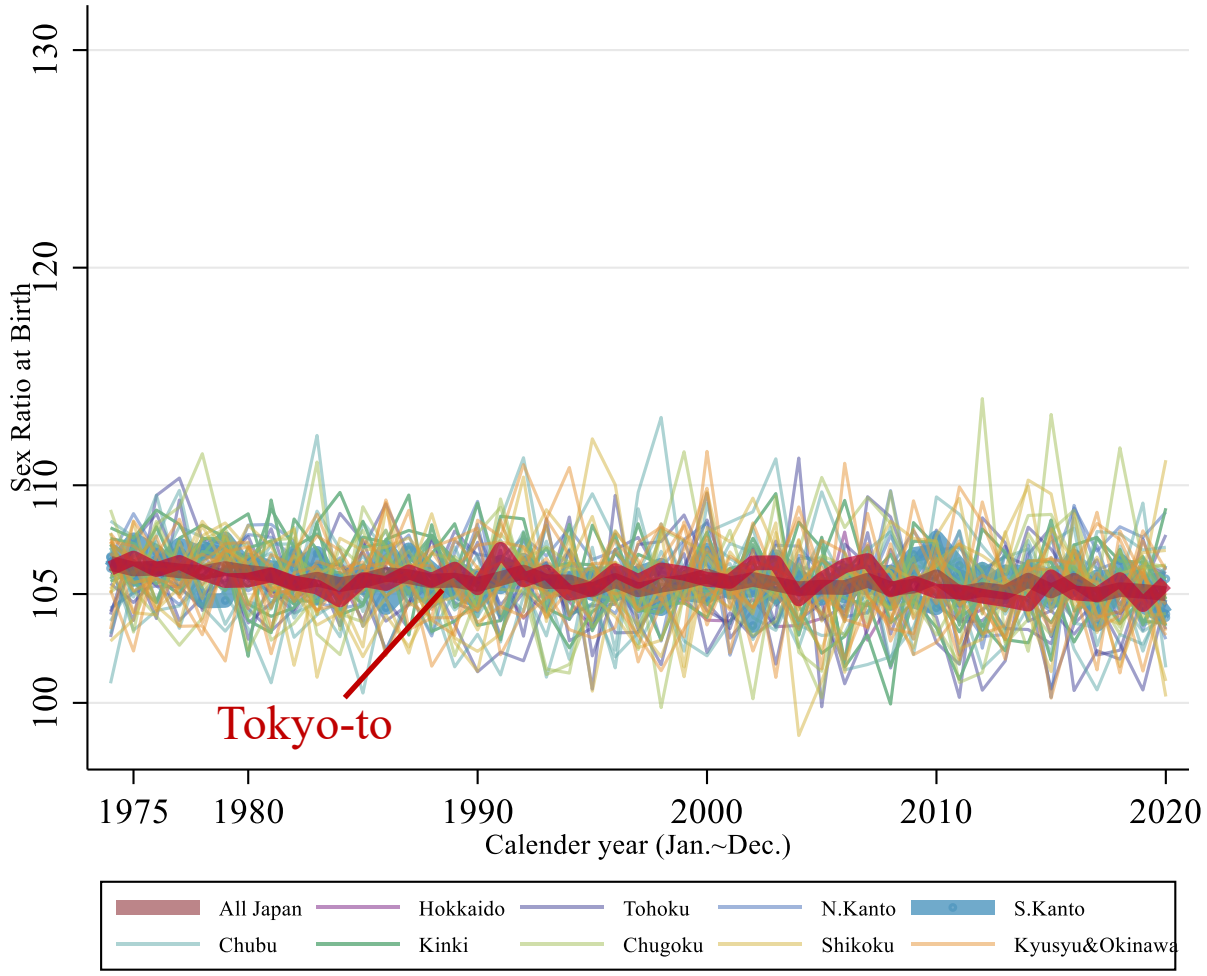
- In Korea, the sex ratio at birth began to skew in the 1970s, peaked at 116.5 in 1990, and ret urned to natural levels by around 2006.
  In Japan, the sex ratio at birth has remained w ithin the natural range throughout the period.
- A high sex ratio at birth leads to male surplus or female shortage in the marriage market, res ulting in an imbalance in the sex ratio among the never-married population.
- Due to demographic momentum, these effects persist for decades, influencing the composition of local marriage markets long after birth.

Sex Ratio at Birth in Korean and Japanese Regions

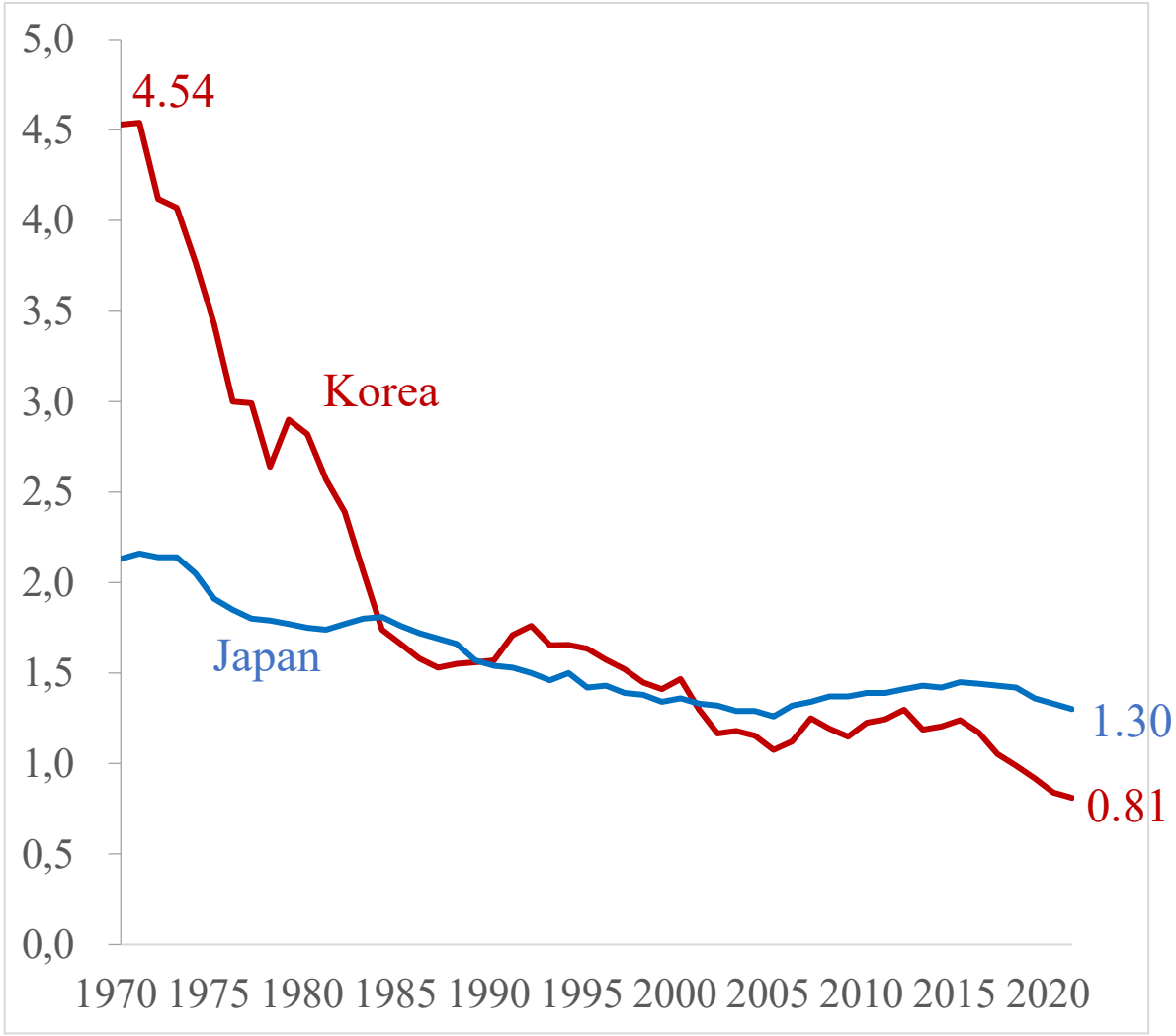
15 Si-Do of Korea: 1990–2023



47 Prefectures of Japan: 1975–2023



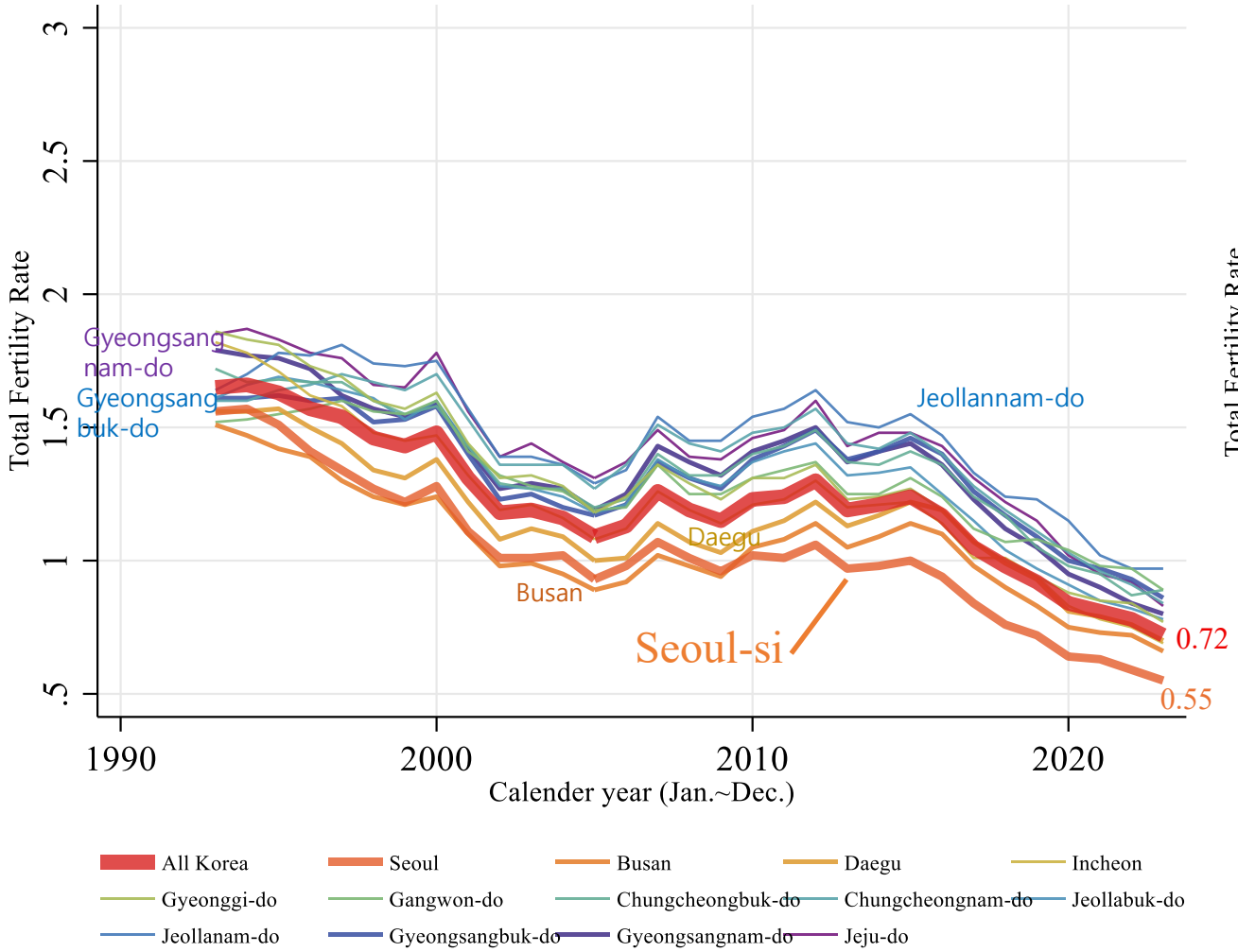
Total Fertility Rate in Korea and Japan: 1970–2021



- Korea's total fertility rate (TFR) fell below the replacement level in the early 1980s and has continued to decline since. Japan followed a similar trajectory starting in the mid-1970s.
- In 2018, Korea's TFR dropped below 1.0—an unprecedented level globally.
- Motivation for this study: The demographic structure of the marriage market—specifically, the marriage squeeze—has been largely overlooked as a key driver of ultra-low fertility.

Total Fertility Rate in Korean and Japanese Regions

15 Si-Do of Korea: 1993–2023



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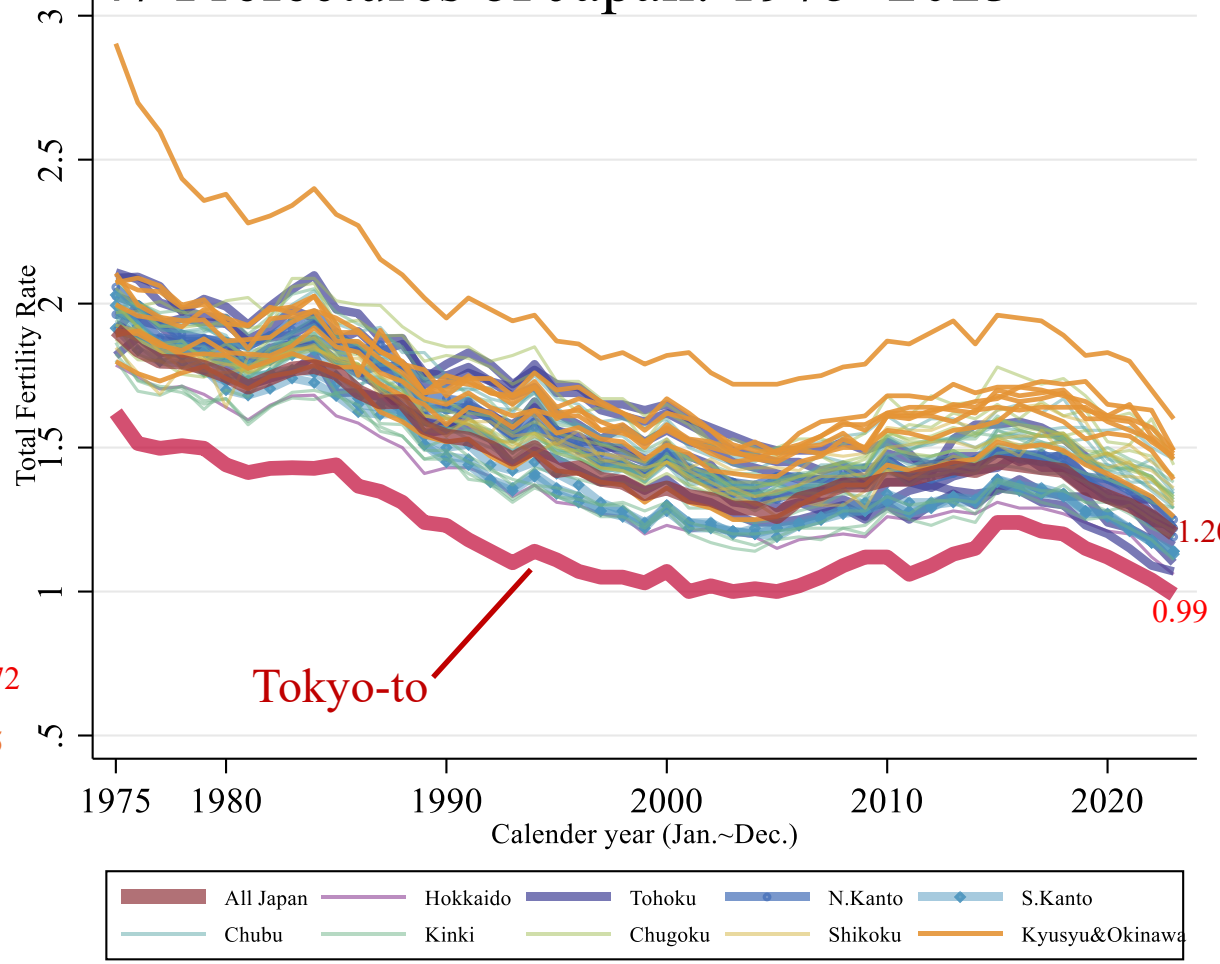
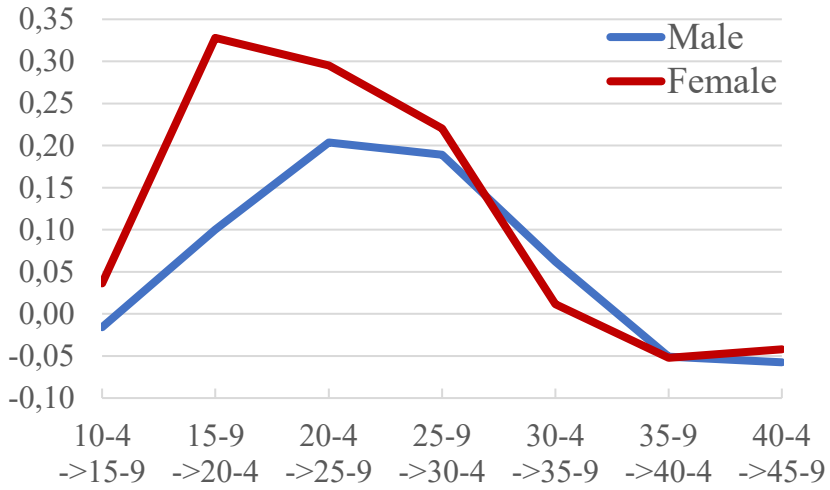
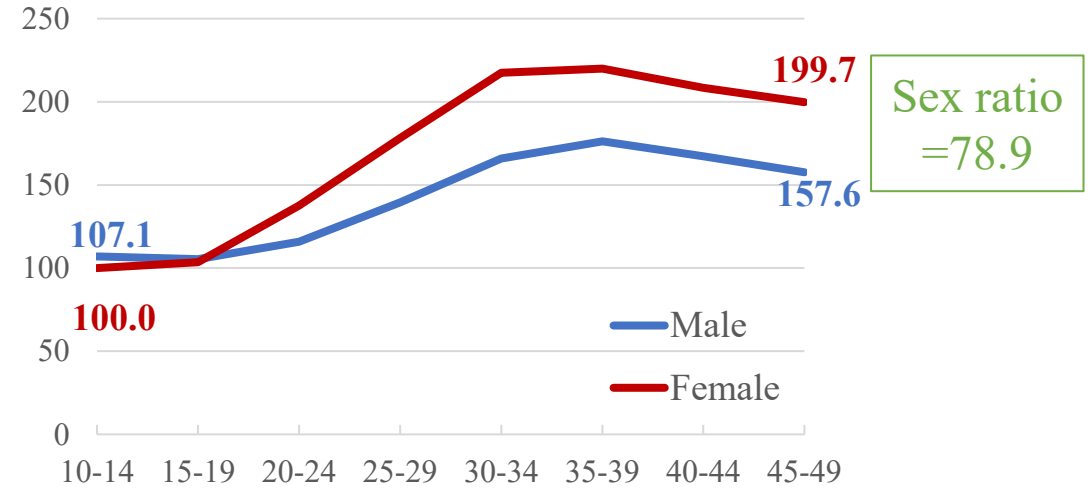


Residual Sex Ratio of the Population: A Calculation Example from Seoul, 2015–2020

Net-migration rates in Seoul: 2015–2020



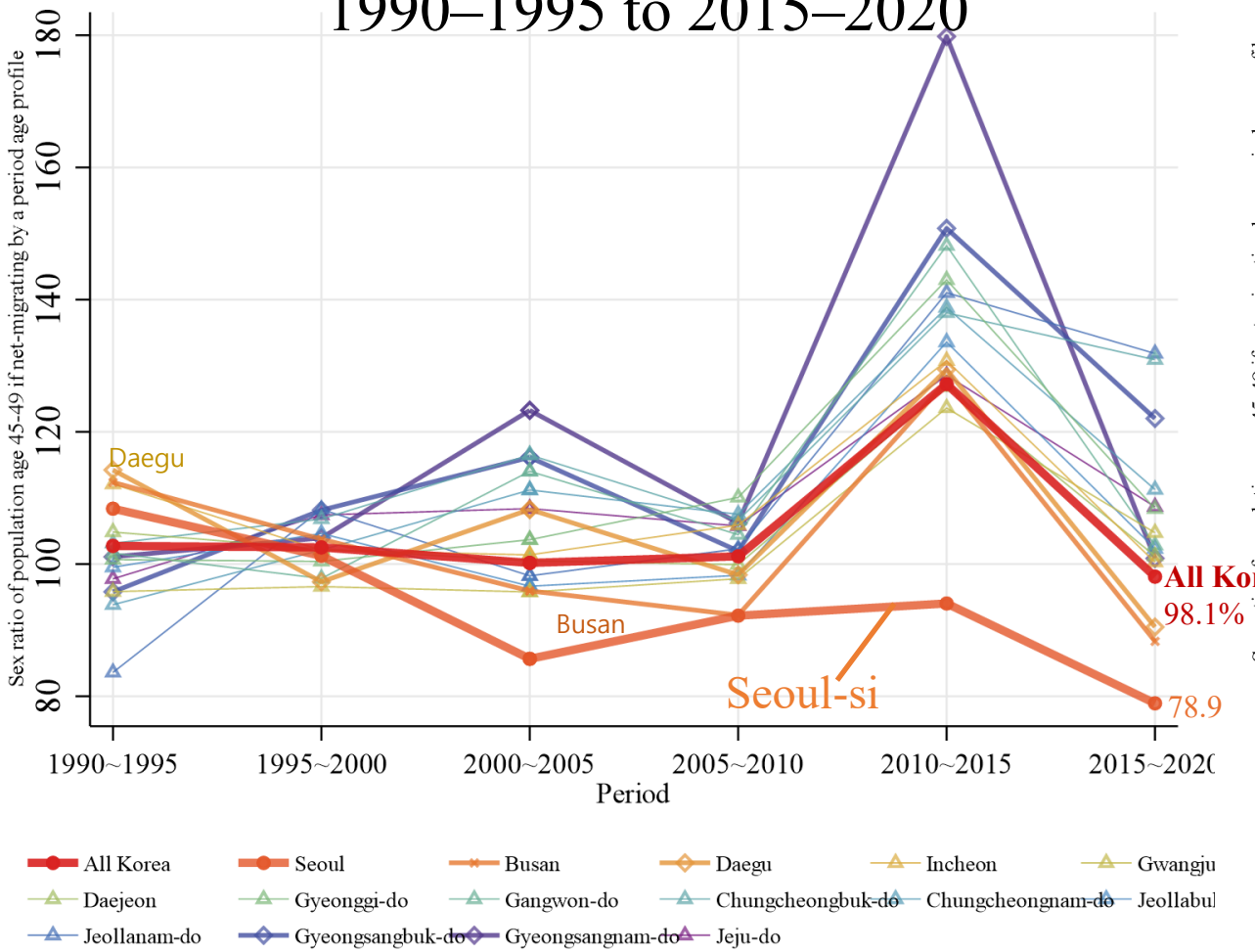
Simulated Age-Specific Population Based on 2015–2020 Net Migration Pattern



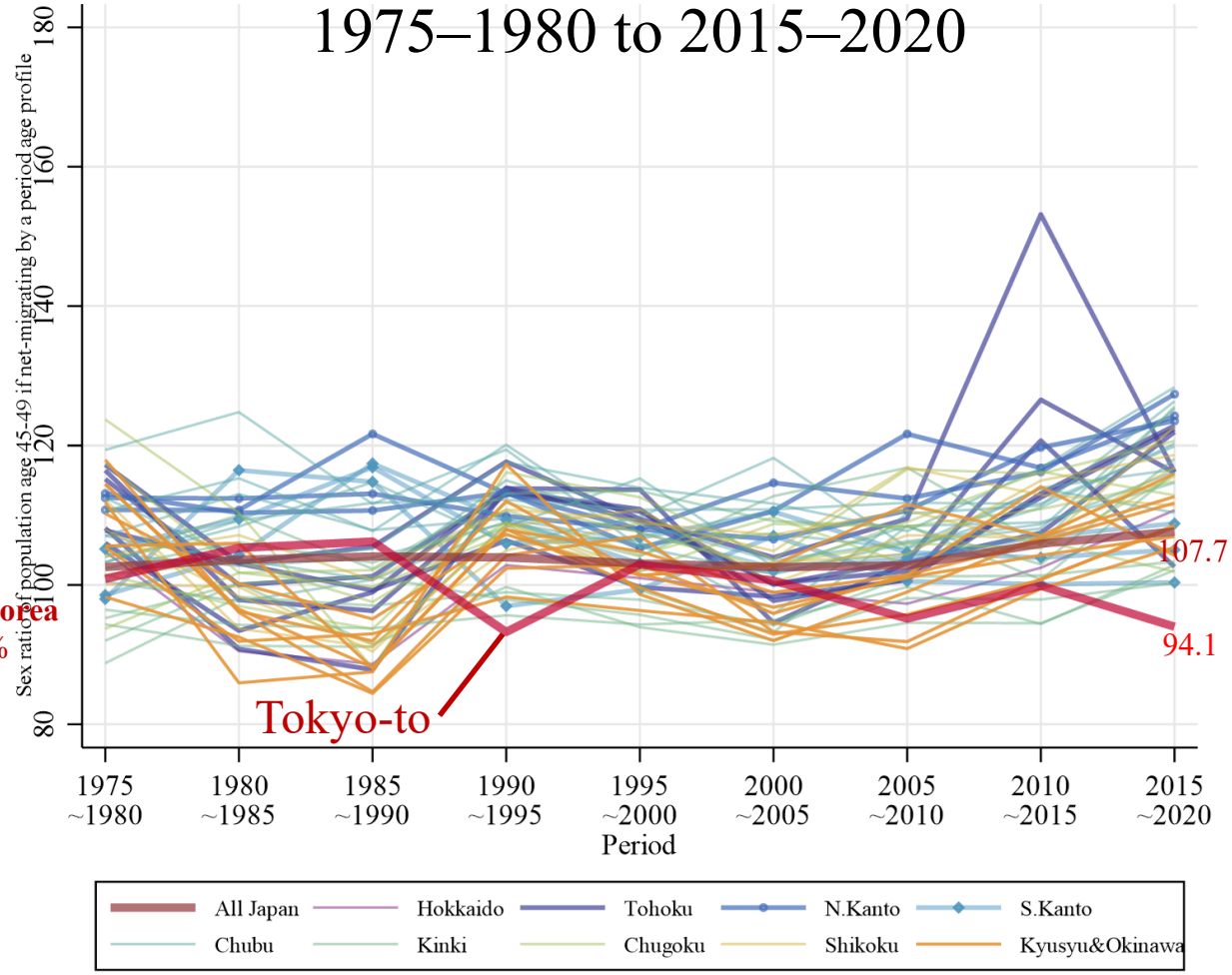
- The initial population is based on the 2015 sex ratio of the 10–14 age group (107.1), with females standardized to 100.
- Using age-specific net migration rates from 2015–2020, the cohort is projected forward from age 10–14 to age 45–49.
- At age 45–49, the simulated population is 199.7 females and 157.6 males, yielding a residual sex ratio of 78.9.
- This “residual sex ratio” quantifies how net migration during the reproductive ages affects the sex composition of the cohort, holding the initial sex ratio constant.

Sex Ratio of Age 45–49 if Males and Females Migrate Following an Age Pattern of Net-migration in a Period

15 Si-Do of Korea: 1990–1995 to 2015–2020



47 Prefectures of Japan: 1975–1980 to 2015–2020



Analytical Method

- Marriage squeeze index, S (Schoen 1983 *Demography*)

$$S = \frac{1 - \beta - (1 - \gamma)}{1 - \sqrt{\gamma \cdot \beta}}$$

where

$$\gamma = exp\left(-\sum_{y=15}^{49} {}^{f}W(\cdot, y)\right) = exp\left(-\sum_{y=15}^{49} \frac{\sum_{x=15}^{49} C(x,y)}{{}^{f}P_y}\right)$$

$$\beta = exp\left(-\sum_{x=15}^{49} {}^{m}W(x,)\right) = exp\left(-\sum_{x=15}^{49} \frac{\sum_{y=15}^{49} C(x,y)}{{}^{m}P_x}\right)$$

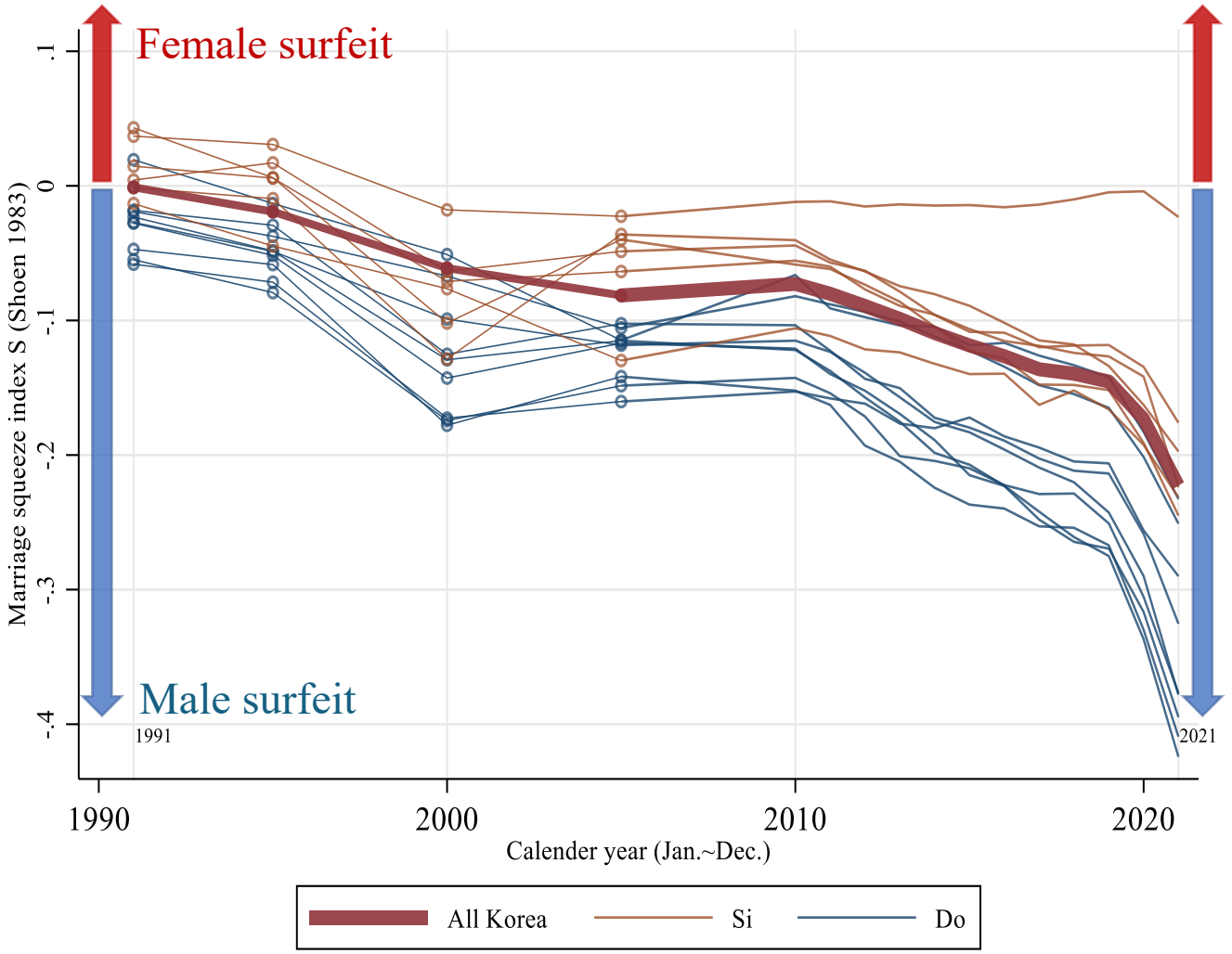
$C(x,y)$ First marriages between male of age x and female of age y

${}^{m}P_x$ Mid-year never-married male of age x

${}^{f}P_y$ Mid-year never-married female of age y

- When S deviates from zero, the lifetime marriage rates of men and women diverge, indicating a marriage squeeze.
- $1 - \sqrt{\gamma \cdot \beta}$ corresponds to the proportion married by age 50 in the absence of a marriage squeeze, where male and female rates are balanced. $1 - \beta$epresents the proportion of men married by age 50, and $1 - \gamma$ represents the proportion of women married by age 50.
- $S < 1$measures the degree of marriage squeeze faced by never-married men.
- Required Data:
  - Mid-year population of never-married men and women by age
  - Annual number of first marriages by age combination of first-time husband and first-time wife (January–December)

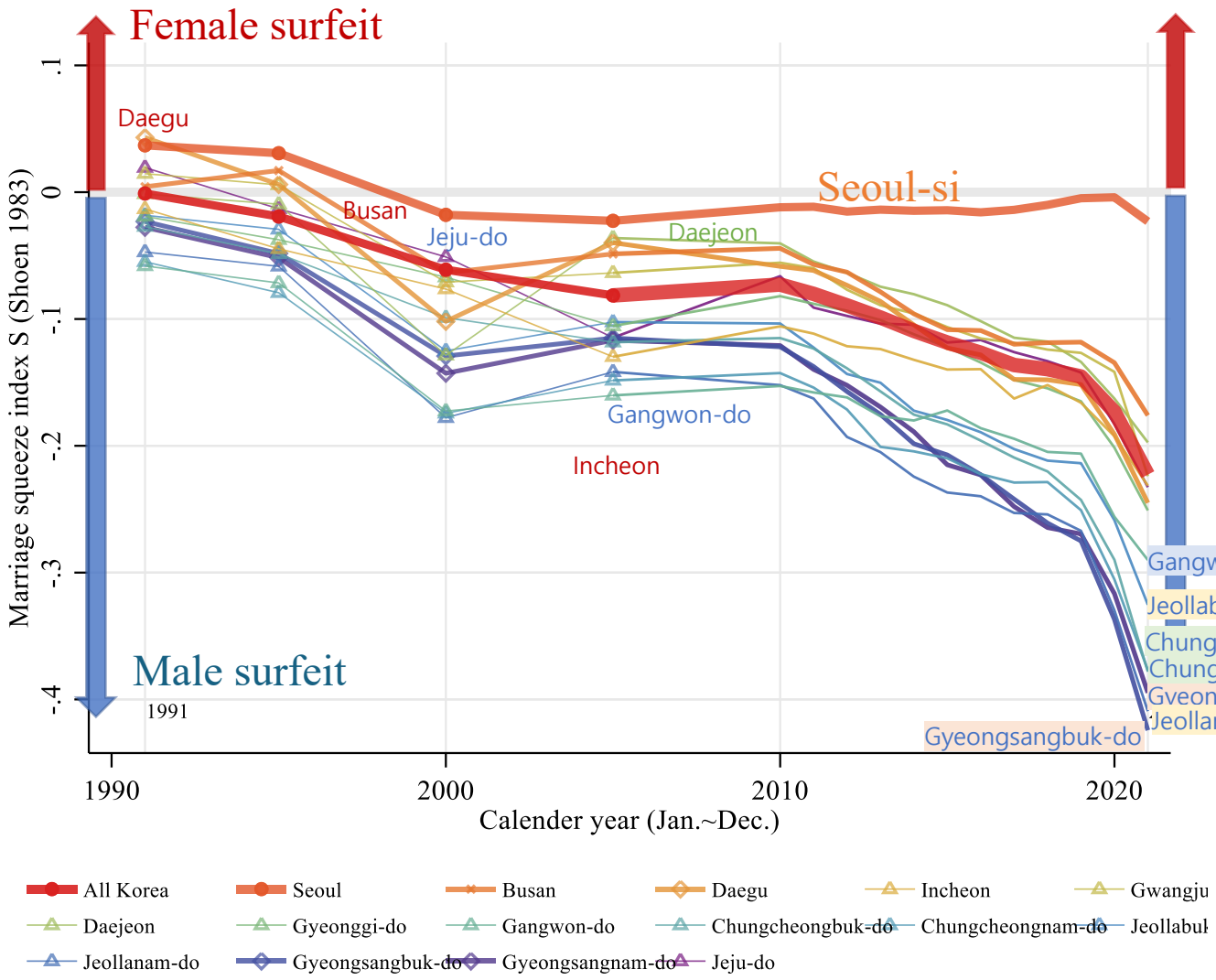
Results: Marriage Squeeze in Korea



世宗特別自治市(2012～)を忠清南道に含む．蔚山広域市(1995～)を慶尚南道に含む．

- There was little evidence of a marriage squeeze in Korea (nationwide) in 1991, but since the mid-2000s, men have become increasingly disadvantaged—by more than 8% on average.
  - The male marriage squeeze worsened from -0.1% in 1991 to -8.1% in 2005.
  - It sharply intensified from 2010 to 2021, reaching -22.3% in 2021.
- The time-series pattern of the male marriage squeeze in most of the 15 Korean provinces (Si-Do) generally follows the national trend. However, the range of values (maximum minus minimum) among the 15 regions began to widen in the late 1990s and expanded sharply after 2010 — from 10.1 percentage points in 1991, to 16.0 in 2000, 22.3 in 2015, and 40.1 in 2021.
- In periods of worsening male marriage squeeze, the changes in the nine Do (non-metropolitan provinces) were particularly severe. From 2010 to 2021, the increase in male disadvantage exceeded 25 percentage points in Gyeongsangbuk-do (-30.2pts), Gyeongsangnam-do (-27.4pts), Chungcheongbuk-do (-26.3pts), and Jeollanam-do (-25.7pts).

Seoul's Overwhelming Advantage



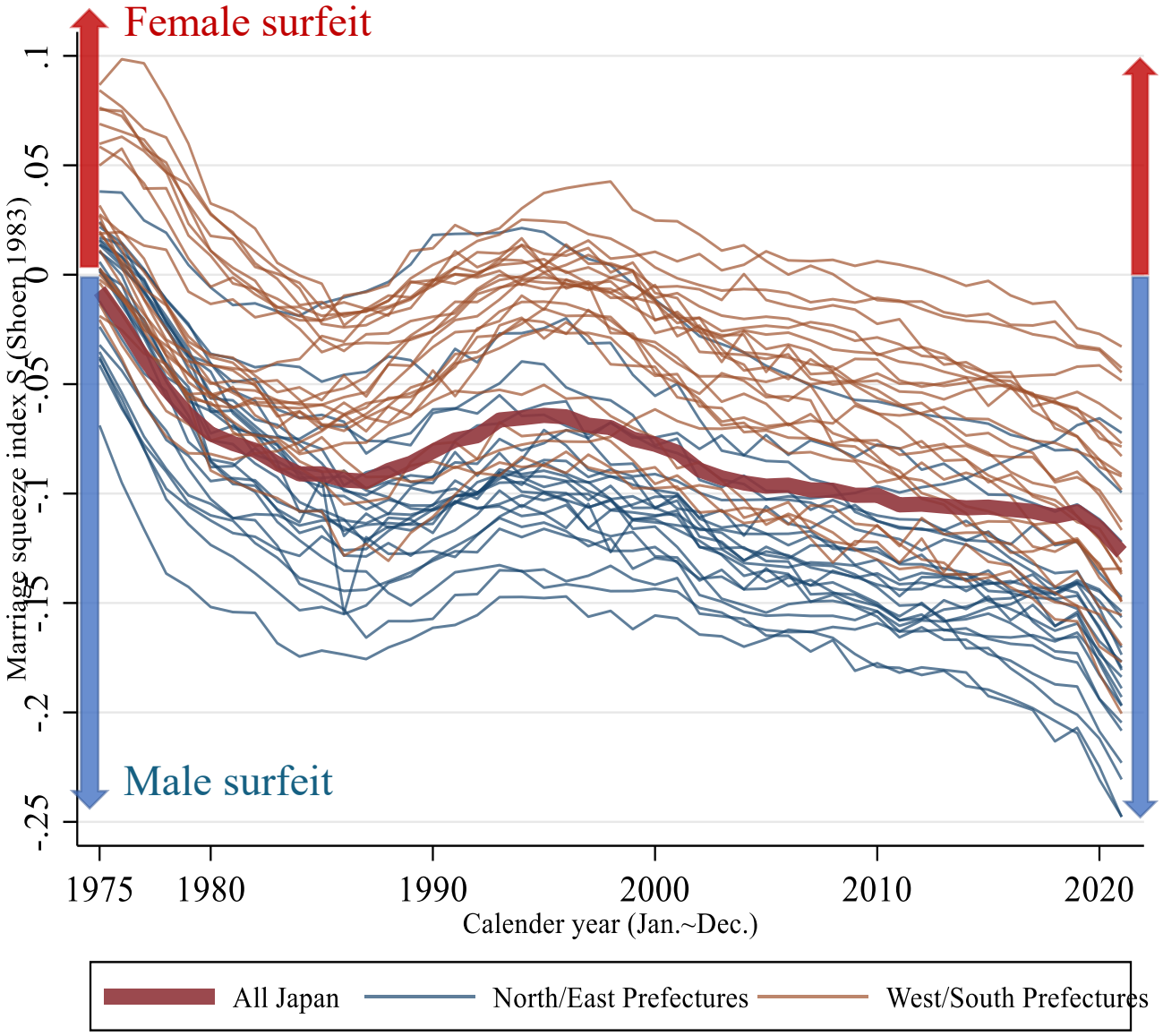
世宗特別自治市(2012～)を忠清南道に含む．蔚山広域市(1995～)を慶尚南道に含む．

- Regional disparities in the male marriage squeeze acr oss Korea's 15 provinces (Si-Do) were relatively sma ll in 1991 compared to the situation after the 2010s. However, as male marriage squeeze worsened nation wide after 2010, the deterioration outside of Seoul led to a sharp expansion in regional gaps.

- In particular, since 2010, the male marriage squeeze i n Seoul has remained stable or even slightly improve d. The country is now roughly divided into "Seoul vs. other regions."

- Until the mid-1990s, the four major cities had little or ale marriage squeeze compared to the nine Do (non-metropolitan provinces). However, in cities othe r than Seoul—namely Busan, Daegu, Gwangju, Inche on, and Daejeon—the male marriage squeeze began worsening in the 1990s to around 2000, and worsene d further after 2010.

Results: Marriage Squeeze in Japan

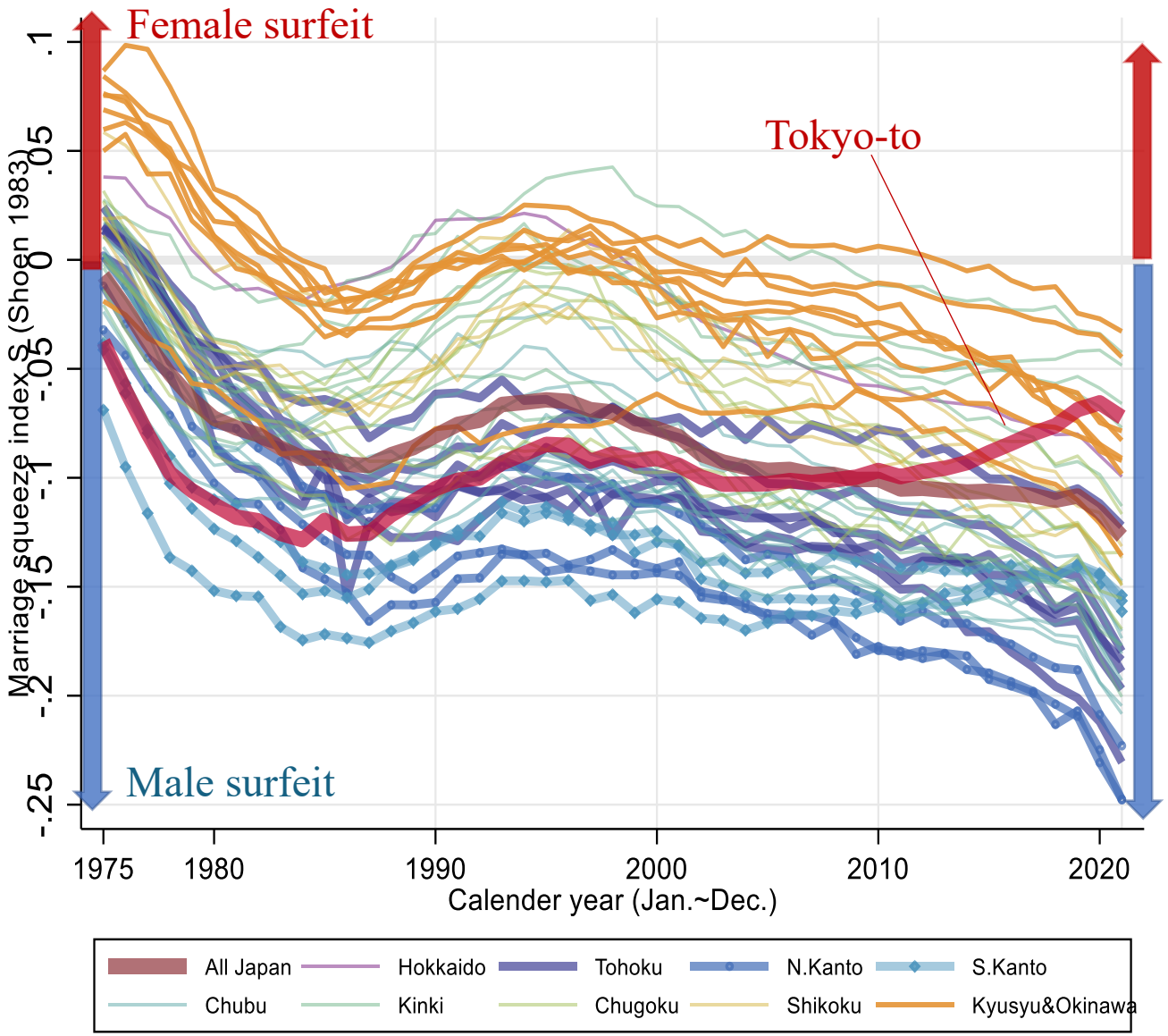


- There was little evidence of a marriage squeeze in Japa n (nationwide) in 1975, but by the mid-1980s and again after the mid-2000s, men became roughly 10% more di sadvantaged in the marriage market.
  - The male marriage squeeze worsened from -0.7% in 1975 to -9.4% in 1987.
  - It slightly eased in the 1990s, reaching -6.4% in 19 95.
  - From 2003 to 2019, it remained within the range o f -9.3% to -11.0%.

- Over the 47-year period from 1975 to 2021, the nation wide male marriage squeeze in Japan expanded by appr oximately 12 percentage points. The time-series pattern s in nearly all prefectures followed the national trend. However, the range between the maximum and minimu m S-index values across prefectures was about 16 to 22 percentage points, indicating clear regional disparities.

- The marriage squeeze for men is more severe in northe astern Japan (east of the Chubu region) than in southwe stern Japan (west of the Kinki region).

First-Marriage Disadvantage for Men in South Kanto



- In Kyushu and Okinawa—the southernmost regions of Japan—women experienced a marriage squeeze until the early 1980s. Although regional disparities within Kyushu and Okinawa widened after the 2000s, the marriage squeeze for men has remained relatively mild.
- Until the 1980s, men in the South Kanto region surrounding Tokyo experienced the most severe marriage squeeze in Japan.
- Since the mid-1980s or the 2000s, the male marriage squeeze in South Kanto has either stagnated or shown slight improvement.
- In Tokyo, the squeeze for men reversed course in the mid-1980s and has steadily improved since then (from -12.8% in 1984 to -6.6% in 2020).
- This trend is likely influenced by a notable return to city centers (“re-urbanization”) observed since the 2000s.

Summary of Findings: Similarities and Differences in the Male Marriage Squeeze between Korea and Japan

- Trends since the 2000s
  - **Korea**: The male marriage squeeze worsened significantly—from -7.3% in 2010 to -14.5% in 2019, and further to -22.3% in 2021.
  - **Japan**: The S-index remained stagnant between -9.3% and -11.0% from 2003 to 2019.
- Regional disparities
  - **Korea**: Regional gaps expanded rapidly from the 1990s to the 2000s, with Seoul emerging as the clear outlier.
  - **Japan**: A consistent pattern of more severe squeeze in northeastern Japan (east of the Chubu region) than in the southwest (west of the Kinki region); regional variation became more diverse after the 2000s.
- Capital cities: Seoul and Tokyo
  In both capitals, the male marriage squeeze has remained stable or improved since the 1990s.
  - **Seoul**: Improved from -2.3% in 2005 to -0.4% in 2020
  - **Tokyo**: Improved from -12.8% in 1984 to -10.3% in 2003, and to -6.6% in 2020

Impact of Female-Skewed Migration from Non-Metropolitan to Metropolitan Areas on the Male Marriage Squeeze

Estimated Coefficients and Statistical Significance of the Linear Regression Model: The Effect of Residual Sex Ratio on the S-Index

Period	Korea	Japan
1975–1980	–	0.076
1980–1985	–	-0.122*
1985–1990	–	-0.182*
1990–1995	0.071	-0.191*
1995–2000	0.175	-0.269**
2000–2005	-0.109†	-0.289**
2005–2010	-0.216†	-0.301**
2010–2015	-0.201**	-0.132*
2015–2020	-0.373**	-0.267**

**Statistically significant at 1% level, * 5%, † 10%.

- Migration from non-metropolitan to metropolitan area s is more active among women than men. This reduces the number of never-married women in non-metropoli tan areas while increasing their number in cities.
- When the residual sex ratio is high, the S-index becom es smaller (more negative), indicating a more severe marriage squeeze for men.
- In non-metropolitan areas with higher fertility, the outf low of women leads to a decline in the number of birt hs. In metropolitan areas, the never-married rate amon g women tends to be higher than in rural areas, which also contributes to lower fertility and fewer births.
- The demographic impact of this migration pattern has become more pronounced in Korea since the 2010s an d in Japan since the 2000s.

Comparison of Marriage Squeeze Indicators by Region Type

	Non-Metropolitan Areas	Metropolitan Areas

Research Questions Revisited

- Did a pronounced increase in the marriage squeeze occur only in Korea after the 2010s, when cohorts affected by the skewed sex ratio at birth reached their late 20s?
  →Yes & No
  ①In Korea, the male marriage squeeze worsened between 1991 and 2005—similar to Japan's experience in the 1970s to 1980s—mainly due to fertility decline.
  ②Since 2010, the male marriage squeeze in Seoul has slightly improved, while in other regions it has significantly worsened.

- Can the marriage squeeze be considered a contributing factor to low fertility, and do its regional patterns resemble those of fertility?
  →Yes & No
  ① In Kyushu and Okinawa—where fertility rates are the highest in Japan—there was a noticeable marriage squeeze for women in the late 1970s. However, since the 1980s, the male marriage squeeze in these regions has not been severe.
  ② In non-metropolitan areas with high fertility, men face a severe marriage squeeze. In contrast, in low-fertility cities like Seoul and Tokyo, the male marriage squeeze is relatively mild.

Conclusion

- Fertility decline has led to a structural reduction in cohort size, which contributes to the male marriage squeeze—not due to declining motivation, but due to demographic imbalance. Greater support is needed to improve the efficiency of marriage market matching.

- The cohorts born during the period of skewed sex ratios (mid-1980s to mid-1990s) are now entering their 30s, suggesting that the marriage squeeze among Korean men may remain severe for several more years.

- Since the male marriage squeeze is especially pronounced in urban and rural areas outside Seoul, targeted interventions are needed in these non-Seoul regions.

- Regional revitalization is a critical policy issue. While Korea is promoting regional balance through development of non-metropolitan areas, more comprehensive policy responses are required.