Title:

The Impact of Marriage Squeeze on Age at First Marriage in China

Extended Abstract:

China's one-child policy, implemented in the late 20th century, resulted in significantly skewed sex ratios at birth, particularly from the early 1990s onwards. These cohorts began entering the marriage market in the early 2010s. During the same period, a marked trend of postponing the age of first marriage was observed, occurring at a more rapid pace than in the previous decade. Thus, this paper hypothesizes that the marriage squeeze, a demographic phenomenon resulting from gender imbalance, has substantially contributed to the delay in marriage age in China. **While existing literature predominantly attributes the delay in marriage to factors such as economic growth and the expansion of higher education since 2000, this study shifts focus to the demographic perspective, marriage squeeze created resulting from sex ratio imbalance.**

Using China's population census and sampling survey data, we first examined patterns of marriage squeeze measured by matching sex ratio by province. The results showed that the degree of gender imbalance in marriage market had been intensifying from 2010 to 2020 and spreading geographically, which indicated that males were facing serious marriage squeeze.

Subsequently, we tested the marriage squeeze hypothesis at provincial-level using multilevel survival analysis, and sure enough **provincial-level marriage squeeze level had significant negative impacts on individual risk of first marriage for both sexes**. Holding other factors constant, for every 1 unit increase in the degree of marriage squeeze, the individual risk of first marriage decreases by 4.73% for the full sample, 5.16% for males and 3.44% for females (as shown in Table 1).

Table 1 Shared frailty models for factors affecting age at first marriage

Variable	(1) The full sample	(2) The male sample	(3) The female sample	(4) Gender interaction term
Marriage Squeeze	-0.0485***	-0.0530***	-0.0350***	-0.0436***
	(0.0034)	(0.0052)	(0.0042)	(0.0039)
Gender (reference category = female)				
male	-0.3423***			0.6144
	(0.0620)			(0.3885)
Gender * Marriage Squeeze (reference category = female)				
male				-0.0107**
				(0.0043)

Ethnicity (reference category = Han Chinese)				
National minority	-0.0108	0.1855	-0.0786	-0.0133
	(0.1239)	(0.1756)	(0.1622)	(0.1238)
Educational attainment (reference category = primary and below)				
Junior high school	0.1927*	0.2392	0.0652	0.1803
	(0.1132)	(0.1676)	(0.1614)	(0.1132)
High school/secondary school	0.2300*	0.5065***	0.0296	0.2308*
	(0.1185)	(0.1753)	(0.1647)	(0.1184)
Bachelor's degree/college	-0.1488	0.1343	-0.4091**	-0.1507
	(0.1203)	(0.1761)	(0.1677)	(0.1202)
Graduate and above	-0.4800**	-0.2831	-0.6572**	-0.4908**
	(0.1940)	(0.2691)	(0.2855)	(0.1938)
Total income last year (in logarithm)	0.0027	-0.0072	0.0036	0.0021
	(0.0050)	(0.0146)	(0.0055)	(0.0050)
Political affiliation (reference category = non-Communist Party member)				
Communist Party member	-0.0386	-0.0121	-0.1196	-0.0359
	(0.0972)	(0.1284)	(0.1557)	(0.0973)
Rural/urban residence (reference category = rural)				
Urban	-0.2906***	-0.0907	-0.4125***	-0.2858***
	(0.0840)	(0.1368)	(0.1095)	(0.0838)
Number of properties	0.0716**	0.0486	0.0805*	0.0647**
	(0.0306)	(0.0461)	(0.0412)	(0.0306)
Year of birth (reference category = born before 1980)				
Born 1980-1989	2.7948***	2.8257***	2.8435***	2.7934***
	(0.1463)	(0.1906)	(0.2445)	(0.1464)
Born 1900 and after	4.9791***	5.2559***	4.9134***	4.9714***
	(0.1833)	(0.2584)	(0.2828)	(0.1834)
Year of first marriage (reference category = 2008-2010)				
2011-2013	-0.4822***	-0.4761***	-0.5807***	-0.4820***
	(0.0805)	(0.1171)	(0.1032)	(0.0803)
2014-2016	-1.1073***	-1.1899***	-1.3230***	-1.1151***
	(0.1130)	(0.1523)	(0.1375)	(0.1124)
2017-2018	-2.0866***	-2.3495***	-2.4703***	-2.0790***
	(0.1730)	(0.2384)	(0.2144)	(0.1724)
Migration experience (reference category = not migrated or first marriage before migration)				
First marriage after migration	0.0160	0.0577	-0.0052	0.0082
	(0.0758)	(0.1144)	(0.1037)	(0.0759)
Human Development Index	-8.8164***	-6.4768***	-5.0142***	-8.6363***
	(1.4147)	(1.5376)	(1.1149)	(1.3955)
Sample size	2534	1334	1200	2534
No. of groups	28	28	28	28
θ	0.2349***	0.1904***	0.0802***	0.2250***
	(0.1058)	(0.0825)	(0.0441)	(0.0996)

Note: ① When using Stata software to do the regression of the above models, the nohr option in the stcox command was selected, so the regression coefficients of the risk factors in the table are not the Hazard Ratios. The Hazard Ratio of the matching sex ratio in the Model 1 should be $e^{-0.0485} = 0.9527$, where -0.0485 is the regression coefficient in the model. Therefore, when the model regression coefficient is positive, the Hazard Ratios will be

greater than 1; when the model regression coefficient is negative, the Hazard Ratios will be less than 1. The same as below. ②*** p<0.01, ** p<0.05, * p<0.1, standard errors in parentheses.

An increase in sex ratio of marriage market affects both males and females in the marriage market, but the influencing mechanism and degree differ. This could be further explained through Dixon's (1971) Three-Component Theory of Marriage. According to Dixon, the availability, feasibility and desirability of marriage are the three main determinants of marriage entry. **For men, the "surplus" side, marriage squeeze mainly delayed their first marriage by inhibiting the availability and feasibility of marriage. Housing prices played a mediating role.** Marriage squeeze causes men to delay their first marriage both through the direct effect of reducing the availability of mates, and through the indirect effect of increasing house prices, which reduces the feasibility of marriage, since it is mainly men who are responsible for the demand for "wedding houses" in China. In some regions with serious gender imbalances in the marriage market, "being able to find a mate" and "being able to afford to marry" have become double constraints for “surplus” men to enter marriage successfully. **For women, the “shortage” side, marriage squeeze delayed their first marriage by suppressing the desirability of marriage. Educational attainment plays a moderating role in this dynamic**, as higher education levels empower women to prioritize career and personal development over early marriage, thus altering traditional expectations and timelines for marriage. Higher education, to some extent, exacerbates the impact of an increase in sex ratio imbalance on women's first marriage delay. As their education levels increase, women who already have a relatively scarce and advantageous position in the marriage market are less willing to compromise their own conditions to enter into marriage. Thus, the desirability of marriage is low for them, and thus they postpone their marriage. However, this delay effect on women's first marriage is probably to stem more from their subjective desire to pursue better partners, while for men, it is also due to the objective mismatch in the number of available partners. Therefore, the effect of an increase in sex ratio imbalance on first marriage delay for women is expected to be smaller than that for men.

After revealing the influencing mechanism, **we further explored the importance of marriage squeeze in marriage delay, especially in comparison with economic development or higher education expansion that previous research attributes to**. Results showed that among all the factors, marriage squeeze provided the greatest contribution to the explained variation, generating a partial adjusted R^2=0.53 and accounted for over two-thirds of the model’s whole explained variation (as shown in Table 2). By comparing the standardized regression coefficients, we also found that the relative importance of marriage squeeze outweighs educational level and HDI. This suggests that **gender imbalance plays a crucial role in the observed trends in marriage postponement in China.**

Table 2 Contribution of a subset of factors to adjusted R^2

Variable	Partial adjusted R^2		
	The full sample	The male sample	The female sample
Marriage Squeeze	0.530	0.603	0.393
Human Development Index (HDI)	0.330	0.318	0.258
Educational attainment	0.066	0.085	0.054
Ethnicity	0.000	-0.001	-0.001
Gender	0.053	/	/
Total income last year (in logarithm)	0.001	0.051	0.008
Political affiliation	0.001	0.000	0.012
Rural/urban residence	0.000	0.009	0.017
Number of properties	0.002	0.003	-0.001
Year of birth	0.206	0.235	0.151
Year of first marriage	0.496	0.561	0.388
Migration experience	0.000	0.000	-0.001
All Variables	0.794	0.834	0.701