The Dark Side of Mating Competition

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September 24th, 2014

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INTRODUCTION

➔Human beings compete all the time, i.e. for jobs and for mates.

➔Economists have placed a great emphasis on the positive side of competition on market efficiency, while ignoring the dark side of competition.

INTRODUCTION

➔Competitions require extra efforts, which often result in stresses.

➔ Stressful experiences are shown to negatively affect both physical and mental health (see Thoits (2010) for a recent review).

➔We hypothesize that over-competitive environment may harm health in the long run.

➔ However, it is difficult to empirically study the long-term health impact of excess competition because it is impossible to run randomized control trials for human beings on such experiments.

INTRODUCTION

➔ We take advantage of a powerful large-scale natural experiment in Taiwan (the retreat of about one million solders, mostly young men, to Taiwan in the late 1940s) to study the health and mortality cost of mating competition.

➔Reproduction is one the utmost important objectives of any species, including human beings. When the balance of males and females is broken, mating competition will intensify among the gender with excess supply (for males in the case of Taiwan).

➔Now more than 60 years have passed, we are in a good position to study the long-term health and mortality consequence of mating competition in Taiwan.

INTRODUCTION

➔ The study on Taiwan can help shed light on the long-term health impact of China's one child policy (OCP).

➔ Due to a combination of factors (OCP, son-preference culture, and availability of ultra-sound gender-identification technology), sex ratios have become increasingly skewed (six men compete for five women in the marriage age). There are about 30 millions of excess men.

➔ Are there any negative long-term health consequences on men exposed to the extreme mating competition in mainland China?

HISTORICAL BACKGROUND

➔It all begins with the civil war during 1945-1949 in China.

➔KMT retreated to Taiwan with 0.6~1.25 million of followers; men outnumbered women by 4 to 1 (Francis 2011).

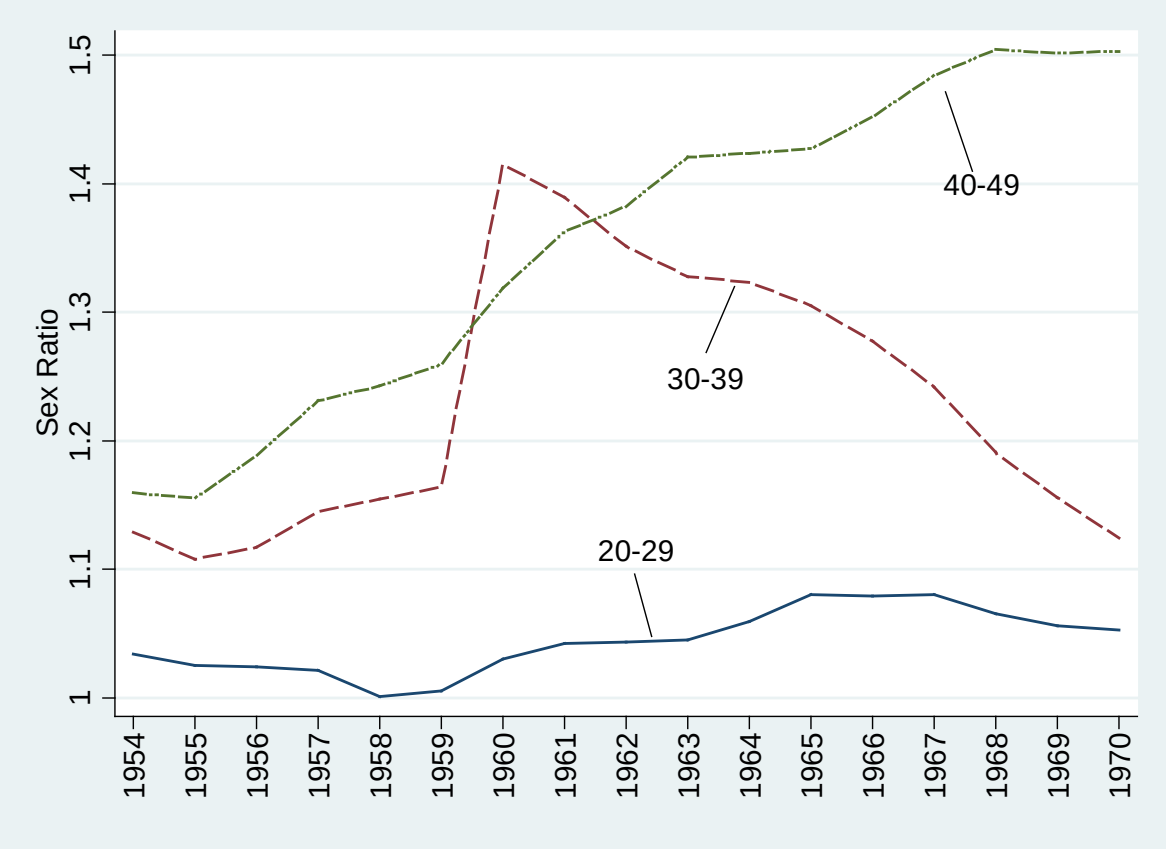
➔Local population was merely 6 million.

➔Soldiers accounted for more than .5 million, which were mostly in early 20s.

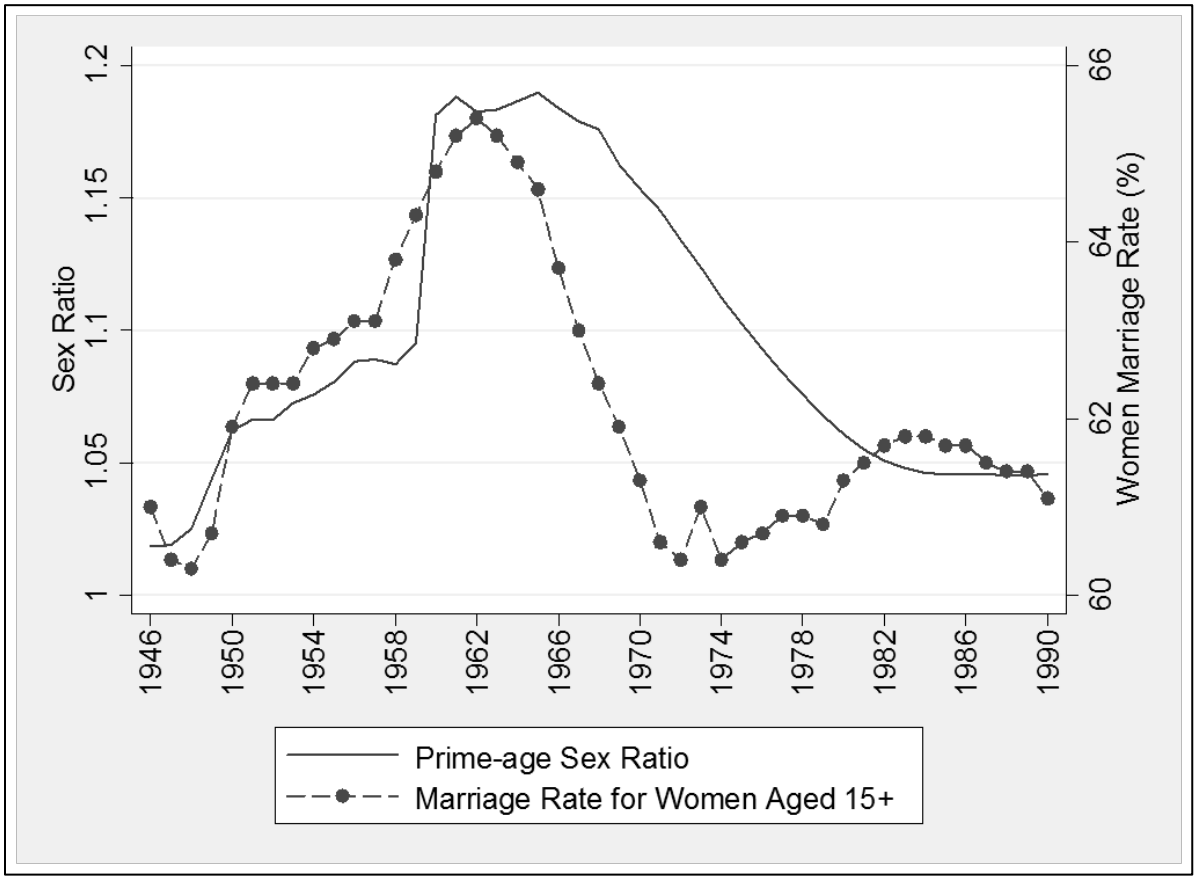
➔Soldiers were generally not allowed to marry until 1959.

➔Local Taiwanese men suddenly faced an enhanced competition in the marriage market.

Imputed Sex Ratio by Cohort



Prime-Age (15-49) Sex Ratio and Women Marriage Rate



LITERATURE:

➔Stress and health:

Price et al. (1994) “The Social Competition Hypothesis of Depress”;

Gilbert et al. (2009) “The Dark Side of Competition: How Competitive Behaviour and Striving to Avoid Inferiority Are Linked to Depression, Anxiety, Stress and Self-harm.”

➔Economics of sex ratios:

Wei and Zhang (2009) on savings,

Wei and Zhang (2011) & Chang and Zhang (2014) on entrepreneurship,

Wei et al. (2012) on housing

Edlund et al. (2013) on crime.

DATA

1. *Taiwan Manpower Survey* 1978

2. *National Survey of Living Conditions* 1992-1994

3. *Mortality Data* 1982-2004

4. *Health and Living Status of the Elderly in Taiwan* 1996 & 2003

Table 1. Regressions of Labor Market Outcomes on Sex Ratio at Age 20

	Panel A: Worked Last Week		
	(1)	(2)	(3)
	Men	**Women**	**Diff**
	(mean=0.797)	(mean=0.435)	(M-W)
Sex ratio at 20	0.290***	-0.363***	0.653***
N	181,224	164,195	
	Panel B: Work Hours Last Week		
	(1)	(2)	(3)
	Men	**Women**	**Diff**
	(mean=40.353)	(mean=19.707)	(M-W)
Sex ratio at 20	17.336***	-14.252***	31.588***
N	181,224	164,195	

Notes: dependent variable in Panel A is a dummy indicating whether one worked in the week prior to survey. Dependent variable in Panel B is the total work hours in the week prior to survey. Sex ratio is the number of men per women among people of age 15-49 in the county when the respondent was of age 20. The sample consists of individuals born during 1928-1958 (age 20-50 in 1978). All regressions control for age, age square, marital status, education, household size, county-level share of prime age (20-64) population at age 20, log of prime age male population at age 20 and a full set of county dummies. Robust standard errors clustered at county level in parentheses

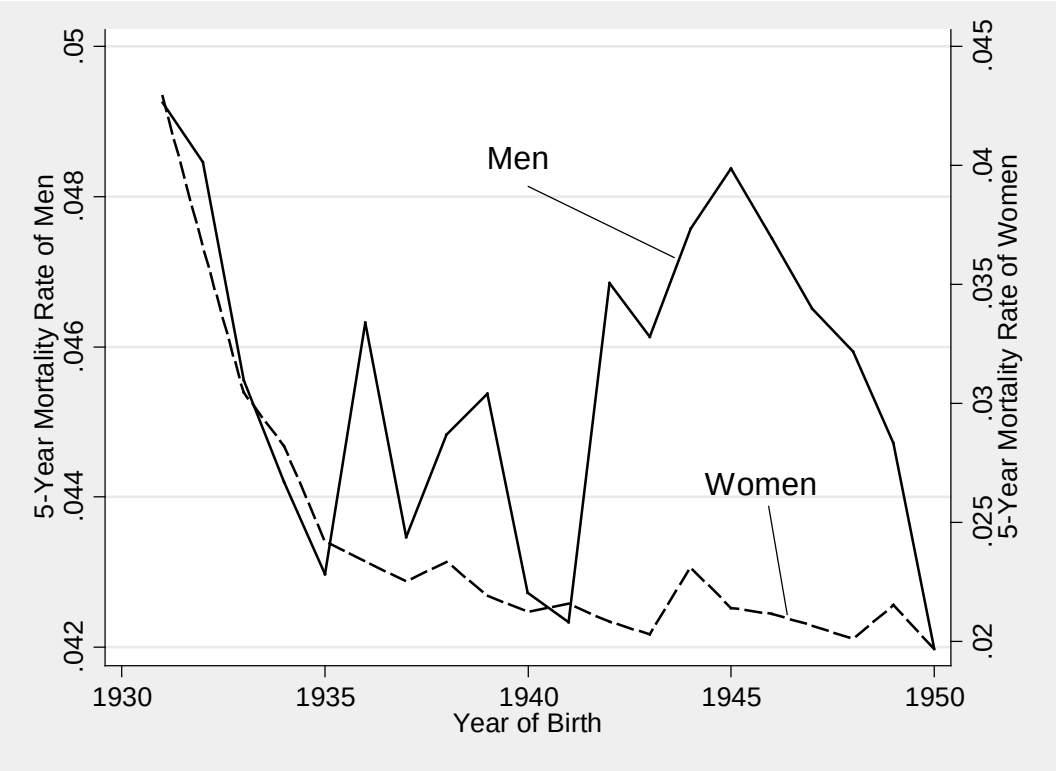
Source: Taiwan Manpower Survey 1978.

Table 2. Regression of Life Satisfaction on Sex Ratio at Age 20

	(1)	(2)	(3)
	Men	**Women**	**Diff**
	(mean=0.80)	(mean=0.83)	(M-W)
Sex ratio at 20	-0.16*	0.13	-0.29*
Married	0.04	0.07**	-0.04
N	3,445	2,311	

Notes: dependent variable is a dummy indicating that one is satisfied/very satisfied/extremely satisfied about his/her current life. Sex ratio at age 20 is measured at county level. All regressions additionally control for age, age squared, education, a full set of income dummies, county dummies and two dummies indicating 1993 and 1994 waves. In column (1), a dummy for man is included. All three waves, 1992, 1993 and 1994, are pooled. Robust standard errors clustered at county in parentheses. *, **, *** indicate significant at 10%, 5% and 1% level.
Source: *National Survey of Living Conditions* in 1992, 1993 and 1994. We restrict the sample to cohorts 1926-1960.

5-Year Mortality Rate over Age 50-54 by Cohort and Gender in Taiwan



Notes: the solid and dash line represent the 5-year mortality rate over age 50-54 respectively for men and women who were born during 1931-1950.

Regression of 5-year Mortality Rate over Age 50-54 on Sex Ratio at Age 20

	(1)	(2)	(3)
	Men	**Women**	**Diff**
	(mean=0.046)	(mean=0.024)	(M-W)
	Panel A: Current Residence		
Sex ratio at 20	0.046***	0.013	0.033**
N	420	420	
	Panel B: Residence 5 Years Ago		
Sex ratio at 20	0.031**	0.008	0.023**
N	420	420	

Notes: all estimates are derived from separate regressions. The sample consists of birth cohort 1931-1950, who were 20 during 1951-1970. Dependent variable is county level sex-cohort-specific 5-year mortality rate over age 50-54, which is defined by the total deaths over age 50-54 for each cohort divided by the cohort size at the end of age 49. Sex ratios are defined as the number of men per women among people among age ranges specified above. Sex ratios are evaluated at county level when the cohort reached age 20. In panel A, we use the current residence in the 1980 population census as the proxy for residence at age 20. In panel B, we use the residence in 1975 as the proxy for residence at age 20. All regressions additionally include a full set of cohort dummies and county dummies. In column (1), a dummy for man is included. Robust standard errors clustered at county in parentheses. ***, ** and * indicate 1%, 5% and 10% significance level.

DID Regression of 5-Year Mortality Rate over Age 50-54

Male	0.0174***
Dummy for cohort 1940-1950	-0.0071***
Male* Dummy for cohort 1940-1950	0.0070***
N	840

Notes: the sample covers birth cohort 1931-1950, who were 20 during 1951-1970. Dependent variable is county level sex-cohort-specific 5-year mortality rate over age 50-54, which is defined by the total deaths over age 50-54 for each cohort divided by the cohort size at the end of age 49. The regression additionally includes a full set of county dummies. Robust standard errors clustered at county in parentheses. ***, ** and * indicate 1%, 5% and 10% significance level.

Regressions of Health Outcomes of the Elderly on Sex Ratio at Age 20

	(1) **Men**	(2) **Women**	(3) **Diff** (M-W)
	Panel A: Good/Very Good Health & All Elderly		
Sex ratio at 20	0.043	0.309***	-0.266*
N	2,081	1,980	
	Panel B: CESD & All Elderly		
Sex ratio at 20	3.752*	-4.692**	8.445***
N	1,990	1,899	

Notes: dependent variable in Panel A, C and E are a dummy equal to one if one self-reports very good or good health based on a 5-point scale ranging from very good (5) to very poor (1). In Panel B, D and F, the CESD measure is a sum of ten depression items, each of which scores from 0 to 3 with a higher value indicating higher frequency of depression. All regressions additionally control for age, age squared, ethnicity, education, marital status (only in Panel A and B), life style variables such as smoking, drinking alcohol, chewing betel nuts, frequency of exercise, a full set of county dummies and a dummy indicating the sample from the 2003 wave. Robust standard errors clustered at county in the parentheses. ***, ** and * indicate 1%, 5% and 10% significance level.
Sources: Health and Living Status of the Elderly in Taiwan, the 1996 and 2003

Regressions of Health Outcomes of the Elderly on Sex Ratio at Age 20 (cont'd)

	(1) **Men**	(2) **Women**	(3) **Diff** (M-W)
	Panel C: Good/Very Good Health & Married Elderly		
Sex ratio at 20	0.078	0.303***	-0.224
N	1,808	1,570	
	Panel D: CESD & Married Elderly		
Sex ratio at 20	3.401*	-5.745**	9.146***
N	1,736	1,510	
	Panel E: Good/Very Good Health & Married Elderly Born in Taiwan		
Sex ratio at 20	0.058	0.273**	-0.215
N	1685	1529	
	Panel F: CESD & Married Elderly Born in Taiwan		
Sex ratio at 20	3.512	-5.519	9.031***
N	1619	1476	

Notes: see the previous table.
Sources: see the previous table.

Robustness Checks Using Alternative Sex Ratios

	Life Satisfaction			*Mortality*		
	(1)	(2)	(3)	(4)	(5)	(6)
Sex ratios	**Men**	**Women**	**Diff**	**Men**	**Women**	**Diff**
	Panel A: Full sample					
M: 20-49/ W: 15-44 at age 20	-0.137	0.107	-0.243	0.032*	0.008	0.0239
M 20-39/ W: 20-39 at age 20	-0.076	0.048	-0.124	0.048***	0.018***	0.029***
M: 20-39/ W: 15-34 at age 20	-0.036	0.043	-0.079	0.046***	0.019***	0.028***
M: 15-49/ W: 15-49 at age 40	-0.178	0.115	-0.293	0.137***	0.044***	0.092**
N	3,445	2,311		420	420	
	Panel B: Only Married Individuals					
M: 20-49/ W: 15-44 at age 20	-0.093	0.056	-0.150	n/a	n/a	
M 20-39/ W: 20-39 at age 20	-0.027	0.026	-0.053	n/a	n/a	
M: 20-39/ W: 15-34 at age 20	0.006	0.021	-0.014	n/a	n/a	
M: 15-49/ W: 15-49 at age 40	-0.126	0.269	-0.395	n/a	n/a	
N	3,145	2,031		n/a	n/a	

Notes: due to lack of information, county-level mortality data cannot be restricted by marriage. Married individuals refer to individuals who are married and their spouses are still alive. Robust standard errors clustered at county in the parentheses. ***, ** and * indicate 1%, 5% and 10% significance level.

Robustness Checks Using Alternative Sex Ratios (cont'd)

	Good/Very Good Health			*CESD*		
	(1)	(2)	(3)	(4)	(5)	(6)
Sex ratios	**Men**	**Women**	**Diff**	**Men**	**Women**	**Diff**
	Panel A: Full sample					
M: 20-49/ W: 15-44 at age 20	0.044	0.300***	-0.256	4.076**	-4.417**	8.493***
M 20-39/ W: 20-39 at age 20	0.036	0.174*	-0.138	1.670	-2.871*	4.541**
M: 20-39/ W: 15-34 at age 20	0.072	0.203**	-0.131	2.154	-2.920*	5.074***
M: 15-49/ W: 15-49 at age 40	-0.477	-0.209	-0.268	-4.212	6.619	-10.830**
N	2,081	1,980		1,990	1,899	
	Panel B: Only Married Individuals					
M: 20-49/ W: 15-44 at age 20	0.081	0.287***	-0.207	3.816**	-5.493**	9.309***
M 20-39/ W: 20-39 at age 20	0.058	0.174	-0.115	1.677	-3.493**	5.170***
M: 20-39/ W: 15-34 at age 20	0.095	0.212*	-0.117	2.350	-3.686**	6.036***
M: 15-49/ W: 15-49 at age 40	-0.659*	-0.322	-0.337	-4.212	8.014	-12.226**
N	1,808	1,570		1,736	1,510	

Notes: married individuals refer to individuals who are married and their spouses are still alive. Robust standard errors clustered at county in the parentheses. ***, ** and * indicate 1%, 5% and 10% significance level.

Robustness Checks Using Alternative Sex Ratios (cont'd)

	Good/Very Good Health			*CESD*		
	(1)	(2)	(3)	(4)	(5)	(6)
Sex ratios	**Men**	**Women**	**Diff**	**Men**	**Women**	**Diff**
	Panel C: Only Married Elderly Born in Taiwan					
M: 20-49/ W: 15-44 at age 20	0.078	0.263**	-0.185	3.998*	-5.351**	9.349***
M 20-39/ W: 20-39 at age 20	0.045	0.150	-0.106	1.587	-3.307*	4.894***
M: 20-39/ W: 15-34 at age 20	0.095	0.191	-0.096	2.301	-3.541*	5.843***
M: 15-49/ W: 15-49 at age 40	-0.743*	-0.287	-0.456	-6.799	7.850	-14.649**
N	1,685	1,529		1,619	1,476	

Notes: married individuals refer to individuals who are married and their spouses are still alive. Robust standard errors clustered at county in the parentheses. ***, ** and * indicate 1%, 5% and 10% significance level.

Heterogeneous Sex Ratio Effects on Health Outcomes by Education

	Life Satisfaction		*Good/Very Good Health*		*CESD*	
	(1)	(2)	(3)	(4)	(5)	(6)
	Men	**Women**	**Men**	**Women**	**Men**	**Women**
Sex Ratio at 20	-0.145	0.103	-0.051	0.230**	4.064**	-4.080**
Sex Ratio at 20×(Edu=1-12 yrs)	0.007	0.018	0.079*	0.098***	-0.281	-0.741**
Sex Ratio at 20×(Edu>=13 yrs)	-0.024	0.016	0.204**	0.148***	-0.8774	-1.939***
N	3,445	2,311	2,081	1,980	1,990	1,899

Notes: the reference group is individuals with no schooling.

CONCLUSIONS

1. Mating competition does have some adverse impact on health and mortality.
2. Facing greater competition, men ended up with higher likelihoods of depression and mortality.
3. Women, on the contrary, enjoyed more bargaining power (and thus health outcome) because they had abundant men to choose from.
4. The rising incidence of mental illness in mainland China may be related to the marriage market squeeze as a result of sex ratio imbalance.