Woman Reserved Seats and Female Status in Taiwan

NTU Brownbag Seminar

Yu-Hsin Ho

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Introduction

Taiwanese women have a relatively well socioeconomic status:

- Gender Inequality Index: top 1 among Asian societies
- > 40% female legislators: close to Scandinavian countries

What factors contributed to these achievements?

Woman Reserved Seats in Taiwan

- Implemented since 1946, at national legislators and county councilors elections
- For every 4 political seats (or 5 before 1999), 1 seat is reserved for female candidates.
- 14% ~ 25% female councilor for constituencies with ≥ 4 seats
- Elected man with lowest vote share get replaced by unelected woman with highest vote share.

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One approach to explain this phenomenon is Taiwan's special political institution. That is, the reserved seats for woman candidates.

This reservation design is quite unique even in the scope of global democracies. As far as we know, although Japan and Korea has similar reservation design but only for candidates, few countries actually practiced mandatory female quota on elected representatives.

This paper

Examine the casual relationship between female political representativeness and son preference

- A changing and prominent phenomenon of Taiwanese society
- An indicator for more general gender attitudes

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Essentially, our goal of this paper is to identify the casual relationship between female political representativeness, which is partly driven by women reserved seats, and gender attitudes toward female.

Specifically, we chose a important aspect of gender attitudes that is son preference. The reason is that it's an chaning and prominent phenomenon of Taiwanese society which is still common in these years. And it's serving as an indicator for more general gendr attitudes of parents toward their next generation.

So our treatment is more woman being elected into office, and the outcome is change of son preference in parent's birth decisions.

Data on Political Representativeness

- Councilor election result from Central Election Committee
- Election years: 1994, 1998, 2002, 2006

Treatment: % Female Elected

$$\% \text{ Female Elected}_{td} = \frac{\#\text{ Female Elected}_{td}}{\#\text{ Total Seats}_{td}}$$

for year t, constituency (electoral district) d

- Omitted variable bias: Cultural norm that has less son preference and less bias toward female politician.
- Instrumental variable approach is used to deal with endogeneity.

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Now we can discuss the data we used for treatment variable.

We used the electoral result of elections from 1994 to 2006, total of 4 terms.

And the treatment is defined as proportion of female councilors.

The unit of treatment observation is per year t and constituency d. There will be multiple constituencies in each county.

However, this treatment might suffer from omitted variable bias. For example, some places may have more gender equal cultural norm that promotes women into office and having less son preference in the same time. And we cannot control for it.

Thus, instrumental variable approach is used to deal with this kind of endogeneity.

Instrumental Variable Design

Source of Exogenous Variation: Woman Reserved Seats

Define instrument as

$$\% \text{ Reserved Seats}_{td} = \frac{\text{\# Reserved Seats}_{td}}{\text{\# Total Seats}_{td}}$$

which is determined by population size.

Utilizing local variation in population between constituencies gives us exogenous variation in reserved seats and female elected.

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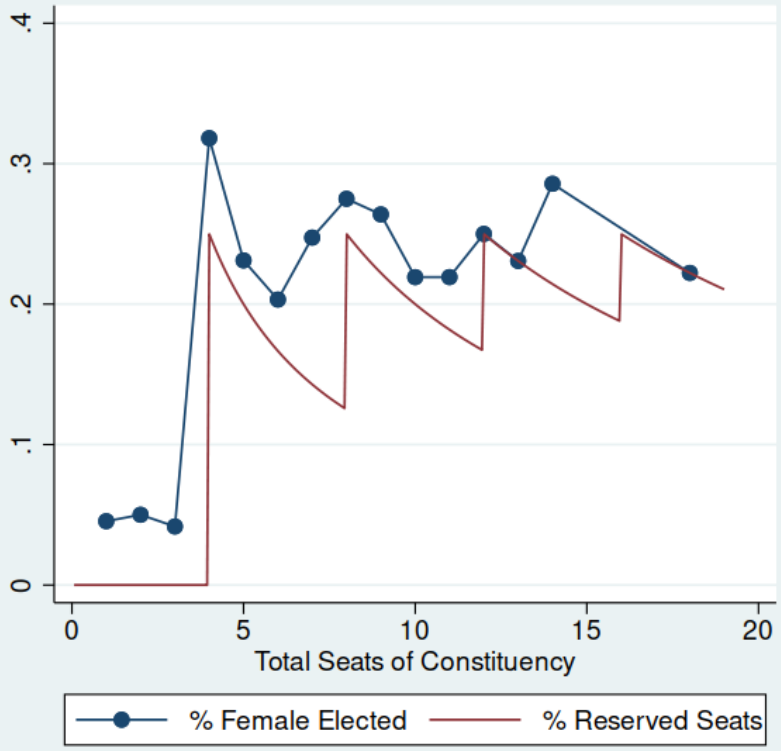
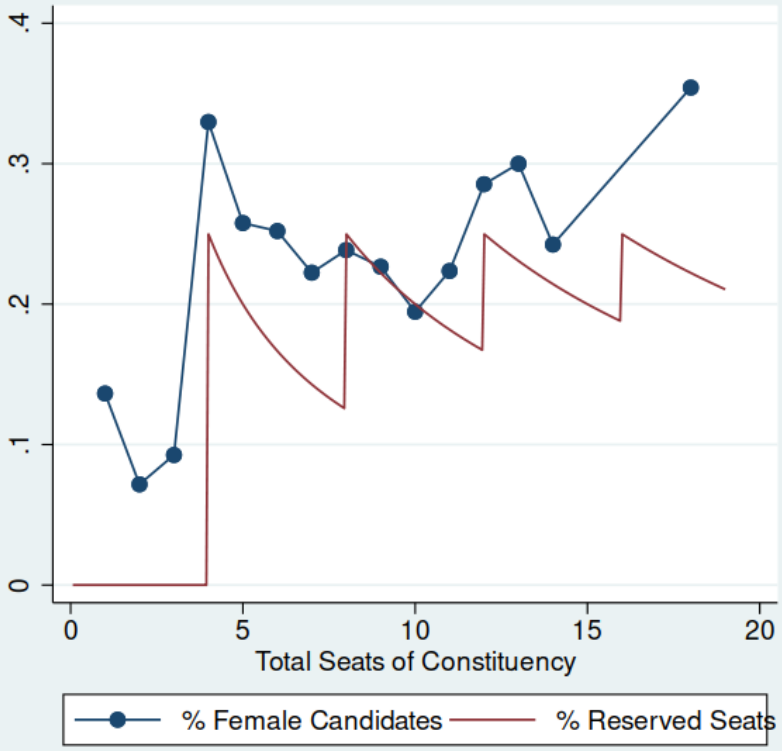
The instrument we're using is proportion of reserved seats, which is defined as number of reseved seats over number of total seats.

This instrument is determined by population size of constituency, which is predetermined and almost exogenous.

By comparing constituencies with slightly lower population size and slightly higher population size, we get exogenous variations in proportion of reserved seats while holding all else equals.





- IV highly correlated with % female elected.
- However, IV correlated not only with female elected but also candidates.
- 1st stage and reduced form estimates are presented throughout this paper.

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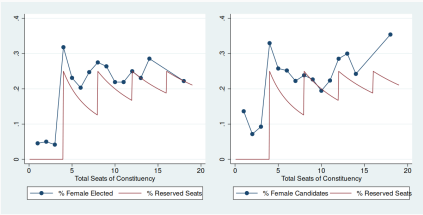

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Left-hand side of this figure plots the percent of female elected and proportion of reserved seats, conditional on total seats of constituencies.

You can see that for constituencies with total seats of 1 to 3, there's no reserved seats for woman. Once the total seats increases to 4 because of larger population, 1 seat is reserved which is 25% of total seats. This proportion gradually decreases until one more seat is reserved at total seats of 8.

Blue line indicates the proportion of female elected. For constituencies with total seats of 1 to 3, there's only 5% woman councilor on average. However, once total seats grows to 4 and having 1 seat reserved, there's more than 30

The problem is that our IV is not only correlated with our treatment but also proportion of female candidates which might simultaneously affect our outcome. Have a look at right-hand side of this figure, we can see that for female candidates proportion it shows similar pattern as female elected proportion. Highly correlated with IV. And when candidates are running their campaign

Outcome

Propensity of having 3rd child

$$\text{Child3}_{itcd} = 1\{\text{3rd child is born at time } t\}$$

for mother i, living in county c, constituency d

- An indicator for son preference
  - Strong son preference at 3rd child
  - Mothers with 2 daughters would like to have 3rd child
- Data gathered from MOI birth record
  - Panel data from 1994 — 2006, each observation linked to most recent electoral result with 1 year lag
  - Sample consists of mothers with 2 children, not yet having 3rd

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Now we can define our outcome variable as propensity to have 3rd child for mothers with 2 children.

It's an indicator variable which equals one if a mother i is having her 3rd child born in time t. Since we know where the mother currently lives, we can link to electoral data based on her residency.

The propensity to have 3rd child serve as a reliable indicator for son preference due to two observations.

Strong son preference at 3rd child

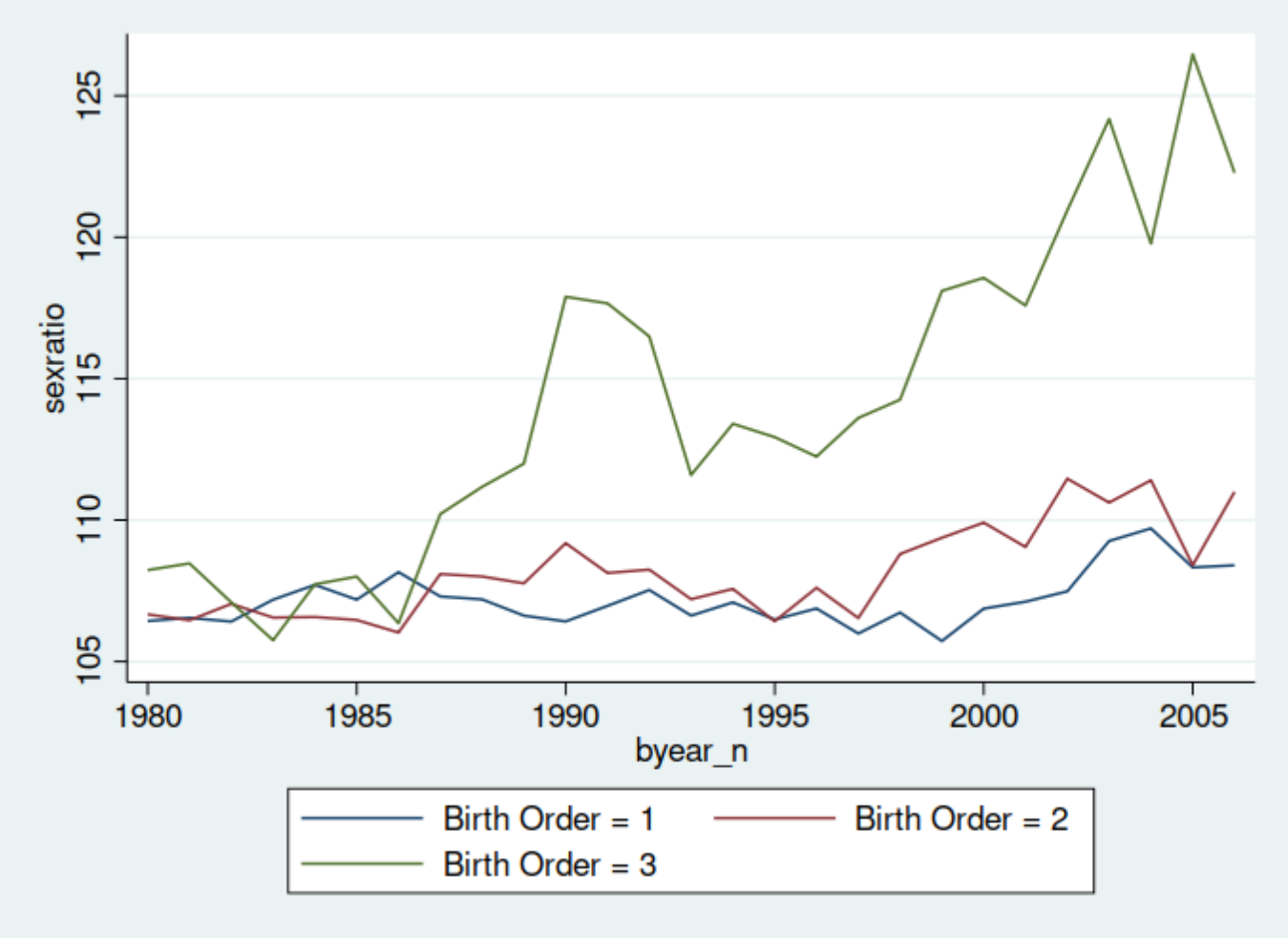

Figure 1: Time Trend of Sex Ratio, by Birth Order

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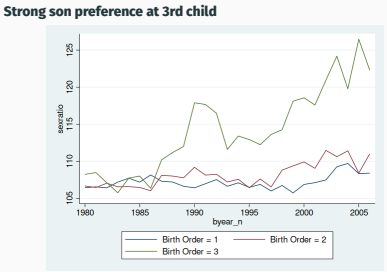

Figure 1: Time Trend of Sex Ratio, by Birth Order

First, people are displaying strong son preference at 3rd child compared to birth order of 1 or 2. This graph plots the time trend of realized sex ratio by birth order.

For 1st and 2nd child, the realized sex ratio is comparatively normal, locating at around 106 to 107. However, for 3rd child the neonatal sex ratio significantly increases since 1985 which is the time that Taiwan introduced supersonic technology and legalize sex-selective abortion.

Essentially, people are displaying their son preference strongest in their 3rd child. And this does not applies to 1st and 2nd child.

Mothers with 2 daughters would like to have 3rd child

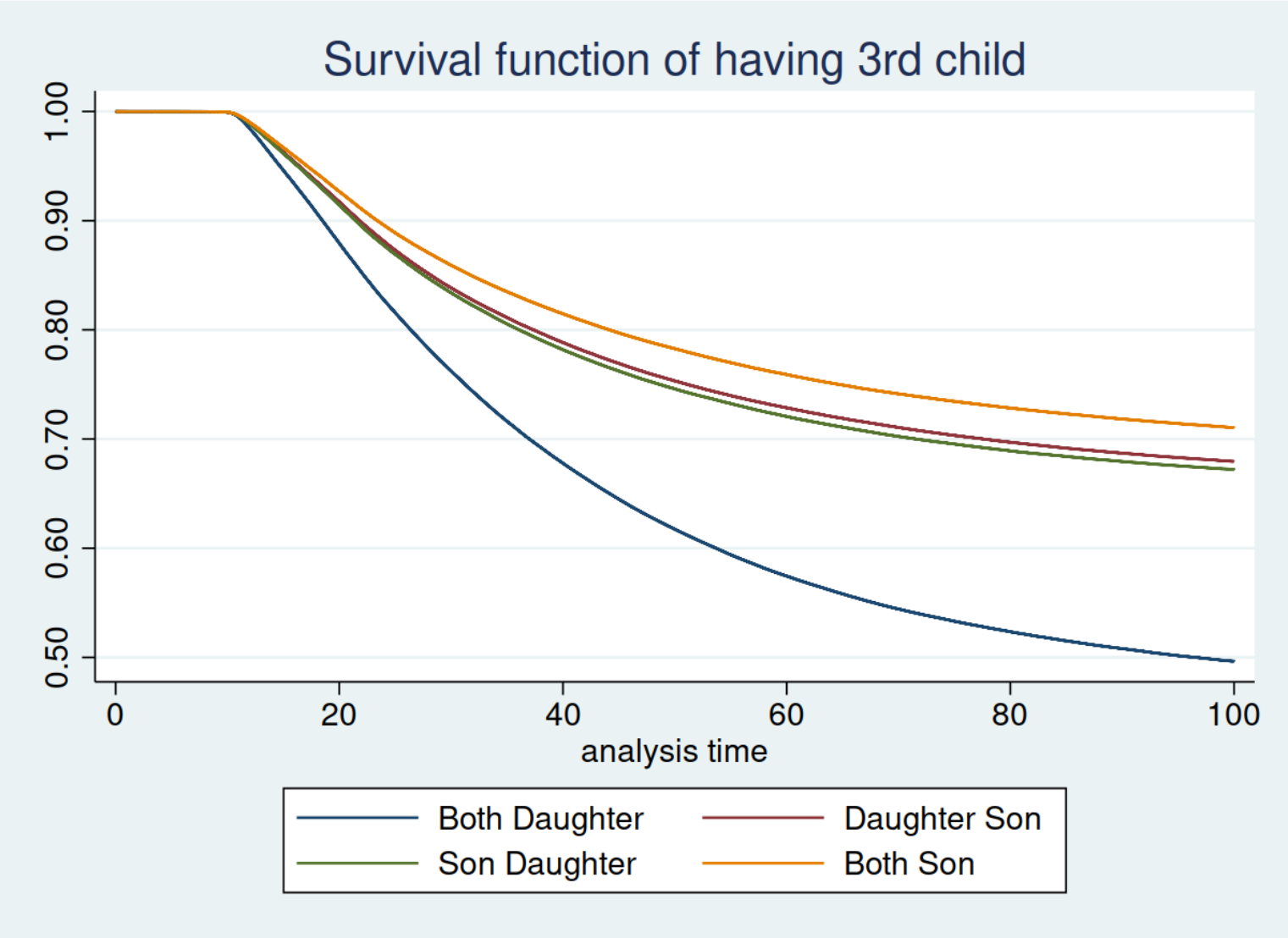

Figure 2: Survival Function Estimate for 3rd Parity Fertility

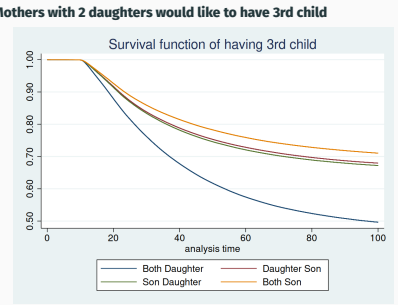

Figure 2: Survival Function Estimate for 3rd Parity Fertility

Another important observation is that mothers with 2 daughters would be more likely to have 3rd child.

This figure plots survival function of mothers having their 3rd child after they got their 2nd. The x-axis indicates months after her 2nd child born. Y-axis indicates the proportion of mothers not yet having 3rd child.

We can see that for ”both daughter” group that is mothers with 2 daughters and no son, they would be running for another child 10 months after they got their 2nd children.

This special behavior is most likely due to the fact that mothers with no son are displaying strong son preference and desperately trying to obtain a son. Therefore, their propensity to have 3rd child would be an behavioral indicator for their son preference. If she won’t get it, she might have less son preference. If she desperately tries to get it, she is showing strong preference.

Regression Specification

First Stage

$$\text{Treatment}_{itcd} = \alpha + \beta \% \text{ Reserved Seats}_{tcd} + \mathbf{X}_i \Gamma + \mathbf{X}_{tcd} \rho + \delta_t + \delta_c + \varepsilon_{itcd}$$

Reduced Form

$$\text{Child3}_{itcd} = \alpha + \beta \% \text{ Reserved Seats}_{tcd} \times \text{Sex Composition}_i + \mathbf{X}_i \Gamma + \mathbf{X}_{tcd} \rho + \delta_t + \delta_c + \varepsilon_{itcd}$$

First Stage

Table 1: 3rd Child Fertility Estimates: First Stage

	1	2
	% Female Elected	% Female Candidates
% Reserved Seats	.898***	.716***
	(0.074)	(0.060)
Mean Dep. Var.	0.202	0.191
Obs.	11681525	11419516
Adj. R-square	0.402	0.423

Clustered (election-township level) standard errors in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

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This table shows the first stage regression result.

1 percent increase in reserved seats is associated with 0.9% increase in female councilors.

And 1 percent increase in reserved seats is associated with 0.7% increase in female candidates.

Both two treatments are binding with the policy variation.

Table 2: 3rd Child Fertility Estimates: Reduced Form

	1	2	3	4	5
	Full Sample	High School	Non-HS	Urban	Non-Urban
(β_0) % Reserved Seats	-.0325***	-.0336***	-.0357***	-.0574***	-.0262***
	(0.0054)	(0.0062)	(0.0061)	(0.011)	(0.0061)
(β_1) Daughter Son × % Reserved Seats	.0353***	.0331***	.0424***	.0586***	.0305***
	(0.0050)	(0.0059)	(0.0058)	(0.011)	(0.0056)
(β_2) Son Daughter × % Reserved Seats	.0357***	.0376***	.0401***	.0658***	.0302***
	(0.0050)	(0.0059)	(0.0057)	(0.011)	(0.0054)
(β_3) Both Son × % Reserved Seats	.0400***	.0431***	.0430***	.0746***	.0337***
	(0.0058)	(0.0067)	(0.0065)	(0.013)	(0.0064)
Mean	0.0215	0.023	0.0202	0.0148	0.0237
Obs.	11681525	5610905	6070620	2864758	8816767
Adj. R-square	0.0257	0.0249	0.0269	0.0172	0.0271
p-value $H_0 : \beta_0 + \beta_1 = 0$	0.378	0.881	0.051	0.828	0.241
p-value $H_0 : \beta_0 + \beta_2 = 0$	0.294	0.262	0.197	0.132	0.262
p-value $H_0 : \beta_0 + \beta_3 = 0$	0.018	0.008	0.035	0.003	0.043

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Now we can have a look at our main regression result of propensity to have 3rd child.

Our benchmark group of interaction is two daughter mothers. From 0 to 100% increase in reservation would induce 3.25 percent less propensity for two daughter mother to have another child. For 25% increase in reservation, there's 0.8% decrease in propensity, roughly accounts for 37% of the mean. For other sex compositions, their coefficients cancel out. Marginal effects are zero (we cannot reject the hypothesis that it equals zero).

If we split our sample into few subgroups including mothers with high school degree or not, living in urban area or not, we see similar estimate. There's no significant difference between mothers with or without high school degree. But the effect are concentrated in the group of mothers living in urban area. (Taipei, New Taipei, Taoyuan, Taichung, Tainan, Kaoshiung)

Table 3: 3rd Child Sex Ratio Estimates: Reduced Form

	1	2	3	4	5
	Full Sample	High School	Non-HS	Urban	Non-Urban
(β_0) % Reserved Seats	.0926***	0.0605	.0836*	.243**	.0865***
	(0.030)	(0.038)	(0.044)	(0.11)	(0.031)
(β_1) Daughter Son × % Reserved Seats	-.127***	-.122**	-0.0772	-0.0893	-.128***
	(0.040)	(0.056)	(0.059)	(0.13)	(0.042)
(β_2) Son Daughter × % Reserved Seats	-.0742*	0.0149	-.105*	-0.148	-0.0633
	(0.041)	(0.057)	(0.059)	(0.14)	(0.043)
(β_3) Both Son × % Reserved Seats	-.0853**	-.131**	0.0184	-0.127	-.0798*
	(0.043)	(0.057)	(0.059)	(0.14)	(0.045)
Mean	0.539	0.547	0.53	0.545	0.537
Obs.	251671	129151	122520	42386	209285
Adj. R-square	0.00484	0.00772	0.00204	0.00597	0.00461
p-value $H_0 : \beta_0 + \beta_1 = 0$	0.253	0.184	0.881	0.179	0.187
p-value $H_0 : \beta_0 + \beta_2 = 0$	0.564	0.116	0.644	0.459	0.484
p-value $H_0 : \beta_0 + \beta_3 = 0$	0.82	0.133	0.021	0.403	0.844

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Now we shows the estimate of regressing realized neonatal sex of 3rd child on our IV.

Outcome equals 1 if the sex of 3rd child is a son, 0 if a daughter.

Now we see that increasing reservation leads to higher probability of having a son.

This is most likely due to self-selection issue. Given the fact mothers with weaker son preference would prefer not to have additional child, those who insist to have it might be the ones with strong son preference. They might utilize sex-selective abortion to pick sons, resulting in higher sex ratio.

Mechanism Discussion

Benefit-Cost Hypothesis

- Satisfied with daughters due to improved career prospect
  - Female councilors delivering beliefs of promising future
- Daughters being more “valuable”
- **Test**: Gender gap in health investment

Intrahousehold Bargaining Hypothesis

- Men like to have sons, but women simply prefer less children
- When women are gaining awareness in participating household decisions, her preference are more likely to be realized.
- **Test**: Gender division in household decision making

Test for Benefit-Cost Hypothesis

NHRI Mortality Record

- Outcome: Neonatal mortality
- Period: 2000 - 2008
- Boys and girls aged under 3
- Outcome = 1 if he/she dies under 3 years old, 0 otherwise.

Neonatal Mortality Estimates

Table 4: Linear Probability Estimates of Neonatal Mortality (Age ≤ 3)

	1	2
	Boys	Girls
% Reserved Seats	0.000872*	0.00104**
	(0.000487)	(0.000489)
# Birth Order=2 × % Reserved Seats	-0.00273***	-0.00254***
	(0.000728)	(0.000795)
# Birth Order=3 × % Reserved Seats	-0.00357**	-0.00303**
	(0.00146)	(0.00147)
# Birth Order=2	0.000821***	0.000710***
	(0.000142)	(0.000152)
# Birth Order=3	0.00120***	0.00124***
	(0.000281)	(0.000279)
Mean Dep. Var.	0.00155	0.00134
Observations	2884286	2633899
Adj. R-square	0.00140	0.00124

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Joint Hypothesis Test p-value = 0.906

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This table shows the regression result of neonatal mortality.

Although increasing reservation do reduce the mortality for high order children, there's no reduction in gender gap.

We cannot reject the joint hypothesis that the coefficients are equal.

Test for Intrahousehold Bargaining Hypothesis

Survey on Social Development Trends, SSDT

- Outcome: Household decision making
  - Allocation of daily expenditure
  - Parenting
  - Saving & investment
  - Allocation of housework
- Period: 1998, 2002
- Sample limited to married individuals aged between 16 to 45

Taiwan Social Change Survey, TSCS

- Outcome:
  - *In order to continue the patrilineal family, it's important to have at least one son*
  - Ideal number of children
- Period: 2001, 2006

Household Decision Making Estimates

Table 5: Linear Probability Estimates of Bargaining Power, SSDT

	1	2	3	4	5
	Alloc. Daily Expen.	Parenting	Saving & Investment	Alloc. Houseworks	PCA
Reserved Seats %	-0.0849	-0.0416	-0.123	-0.135**	-0.574*
	(0.112)	(0.0827)	(0.0863)	(0.0585)	(0.345)
Woman × Reserved Seats %	0.184***	0.0296	0.234***	0.0783*	0.669***
	(0.0686)	(0.0569)	(0.0651)	(0.0473)	(0.258)
Woman	0.0161	0.0232**	0.0125	0.00684	0.0790*
	(0.0118)	(0.00944)	(0.0106)	(0.00907)	(0.0427)
Age, Edu Control	Yes	Yes	Yes	Yes	Yes
Log-Population Control	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes
Mean	0.833	0.882	0.895	0.938	0.158
Observations	17358	16384	17013	17358	16039

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Log-Population Control	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes
Mean	0.833	0.882	0.895	0.938	0.158
Observations	17358	16384	17013	17358	16039

Clustered (election-township level) standard errors in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

This table shows the regression result of household decision making. Outcome variable equals one if woman are participating in household decision, no matter it's sole decision by wife or mutual decision by couple. Increasing reservation leads to high probability that female respondents are considering themselves participating the decision making. While husbands do not aware that their wives are doing more decision making.

This shows an increase of awareness by female respondents that they're considering themselves having power in decision making. Supporting our hypothesis that women's preference would be more likely to get realized in joint family decisions such as birth decision.

Table 6: Logistic Estimates of Bargaining Power, SSDT

	1	2	3	4
	Alloc. Daily Expen.	Parenting	Saving & Investment	Alloc. Houseworks
Woman decides over man decides				
Reserved Seats %	0.46	0.123**	0.457	0.0806**
	(0.432)	(0.127)	(0.512)	(0.0802)
Woman × Reserved Seats %	4.500***	8.060***	4.681*	3.879
	(2.568)	(6.153)	(3.798)	(3.245)
Woman	1.193*	1.055	1.448**	1.146
	(0.117)	(0.111)	(0.224)	(0.183)
Mutually decides over man decides				
Reserved Seats %	0.372	0.220*	0.729	0.0922**
	(0.310)	(0.189)	(0.653)	(0.0978)
Woman × Reserved Seats %	3.816***	3.809**	2.75	3.908*
	(1.712)	(2.375)	(1.870)	(3.082)
Woman	1.051	1.126	1.335**	1.061
	(0.0767)	(0.0875)	(0.162)	(0.161)
Observations	17358	16384	17013	17358

Exponentiated coefficients;

Clustered (on election-township level) standard errors in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

Woman Reserved Seats and Female Status in Taiwan

2022-11-09

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Exponentiated coefficients;
Clustered (on election-township level) standard errors in parentheses
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By using multilevel logit model to seperate ”mutual decision” from ”wife decision”, our result remains consistent.

Self-reported Son Preference Estimates

Table 7: Birth Preference Estimates, TSCS

	Important to have at least one son			Number of children willing to have		
	1	2	3	4	5	6
	All age	Age 16-45	Age > 45	All age	Age 16-45	Age > 45
Reserved Seats %	-0.0813	0.23	-0.526	-0.0141	-0.405	0.349
	(.264)	(.313)	(.318)	(.357)	(.42)	(.473)
Woman × Reserved Seats %	-.494**	-0.384	-.626*	-0.249	-0.0278	-0.383
	(.2)	(.288)	(.331)	(.424)	(.392)	(.633)
Woman	-.0671**	-.0993**	-0.00758	0.0547	0.029	0.0504
	(.0305)	(.0463)	(.0505)	(.0834)	(.0757)	(.122)
Age, Edu Control	Yes	Yes	Yes	Yes	Yes	Yes
Log-Population Control	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep. Var.	0.46	0.356	0.594	2.38	2.21	2.55
Observations	3697	2077	1620	4049	2077	1972
Adj. R-square	0.131	0.0567	0.123	0.0854	0.0246	0.059

Clustered (election-township level) standard errors in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

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Now we look at the change of self-reported son preference.

Increasing reservation leads to lower probability that a female would endorse the statement of ”important to have at least one son”. And this effect concentrates in older woman aged more than 45, suggesting a potential intergenerational factors playing in couple’s birth decision.

For instance, mothers-in-law are relaxing their norms on son preference and giving less pressure on couples. Therefore they prefer to have less children instead of desperately chasing for a son.

In the same time, increasing reservation do not lowers the preferred number of children. Thus the change in propensity to get 3rd child is more likely to be a preference change in gender not in quantity.

Conclusions

- Increasing female political representativeness has an impact on family birth decision
- 3rd parity fertility decreased for mothers without son.
- Female gaining more awareness in decision making which affects joint decision (including birth) outcome