“Gold Miss” or “Earthy Mom”?

Evidence from Thailand

Sasiwimon Warunsiri Paweenawat and Lusi Liao,

PIER Discussion Paper No. 110, 2019

1. Introduction

- Population aging is a serious concern for the government and society
  - The continuous decline in fertility and increase in single and childless women have accelerated demographic changes.
- Though the top ten countries with the lowest fertility have been developed countries, primarily in Europe, over the last few decades, after 2010, nearly half of these have been Asian (United Nation 2015).
  - In 2017, Thailand became among the bottom ten countries with average fertility rate (Global Burden Disease 2018).

1. Introduction

According to the Institute of Population and Social Research, the average number of births per Thai woman was six in 1964 and this number dropped to less than two in 2014, which is the fastest decline in all of Southeast Asia.

The remarkable decline of fertility, also associated with higher elderly populations due to longer life spans, makes Thai society an aging one.

1. Introduction

- Research has demonstrated that education has played a significant role in the decline of fertility by increasing the women's age at marriage, enhancing the tie to the labor market, and changing attitudes toward childbearing.
  - Studies have thus found a strong inverse relationship between marriage age and total fertility rate

1. Introduction

- Higher-educated women tend to delay marriage, a common global phenomenon.
  - A majority of these women on this “marriage strike” are highly educated, holding a university degree.
  - In developed Asia, this group of single women with high socioeconomic status and education attainment, called “Gold Miss,” has been characterized differently compared with its Western counterparts, where women not only delay marriage, but remain single.

1. Introduction

Hwang (2016) attributes the “Gold Miss” phenomenon to the rapid growth of economy associated with the intergenerational transmission of gender attitudes

- As gender norms still treat women as the main provider of childcare and household labor, higher-educated women who prioritize their career development or personal life, rather than marriage or family, tend to stay single.
- Inspired by this argument, our study provides evidence on whether this phenomenon applies to a rapidly developing country in Asia with strong cultural background.

1. Introduction

Previous studies have also pointed a negative relationship between the female education and fertility

- With higher education, the opportunity cost for women to bear and rear children will increase
- Education also helps to improve child health and lower mortality rates, encouraging fewer birth

1. Introduction

- In this study, we use the Labor Force Survey (LFS) of Thailand (1985–2017)
- We first estimate the effect of education on the marriage market, focusing on the marriage probability of women with university education
  - Doubly robust Inverse Probability Weighted Regression Adjustment (IPWRA) approach
  - Obtaining a university degree decreases the probability of marriage for women by 14.8%

1. Introduction

- Next, we examine the effect of education on fertility using both the instrumental variable (IV) and pseudo-panel approaches by incorporating the LFS data.
  - The results under both approaches show that education causally reduces fertility, a conclusion that is consistent with previous findings in the literature

2. Background and the reform

There are several possible factors that cause women to reduce the fertility.

- **First**, the cost of childrearing may delay or even cancel the decision of couples to have children.
- **Second**, the younger generations with higher education have different attitudes toward marriage and childbearing. They are likely to prioritize their career development or personal freedom.
- **Third**, lack of support and protection for parents from the government and society, such as the shortage of public childcare, working flexibility, and workplace discrimination, decrease the desire for childbearing.

2. Background and the reform

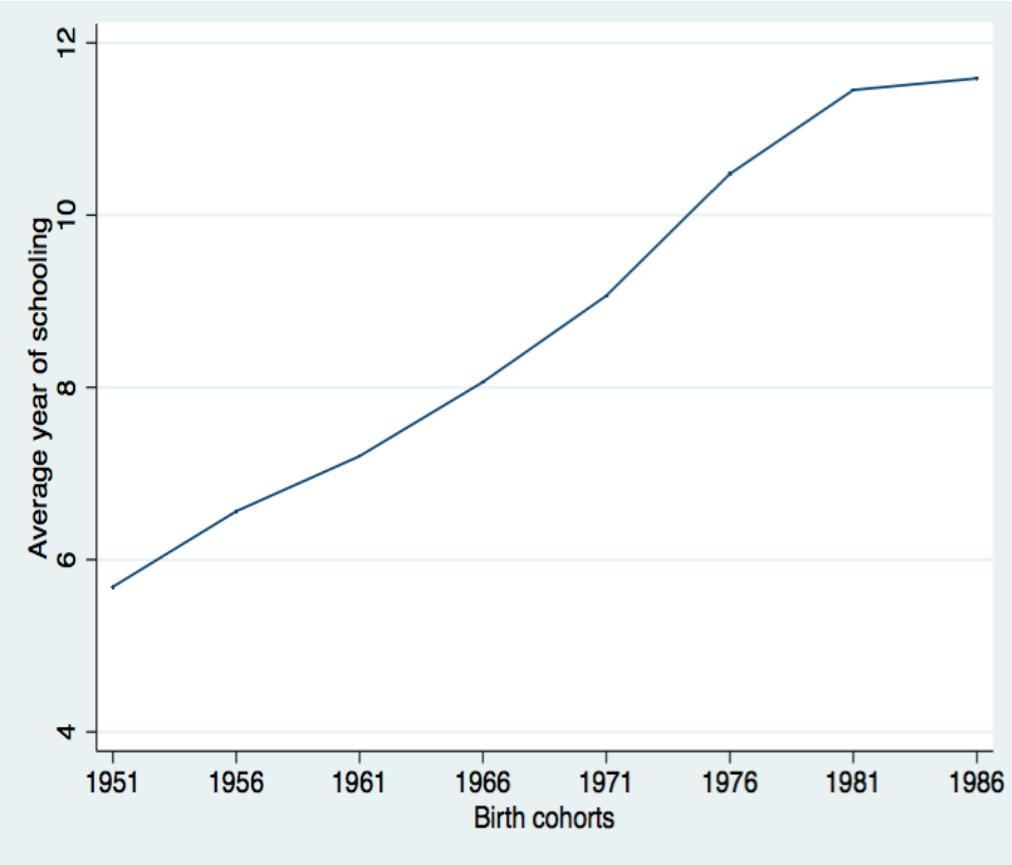
- **Figure 1 (A)** shows the increase of year of schooling and

- **Figure 1 (B)** shows the increase of share of higher educational degree for birth cohorts. The share of primary level drops over 30% for post-1970 cohorts.

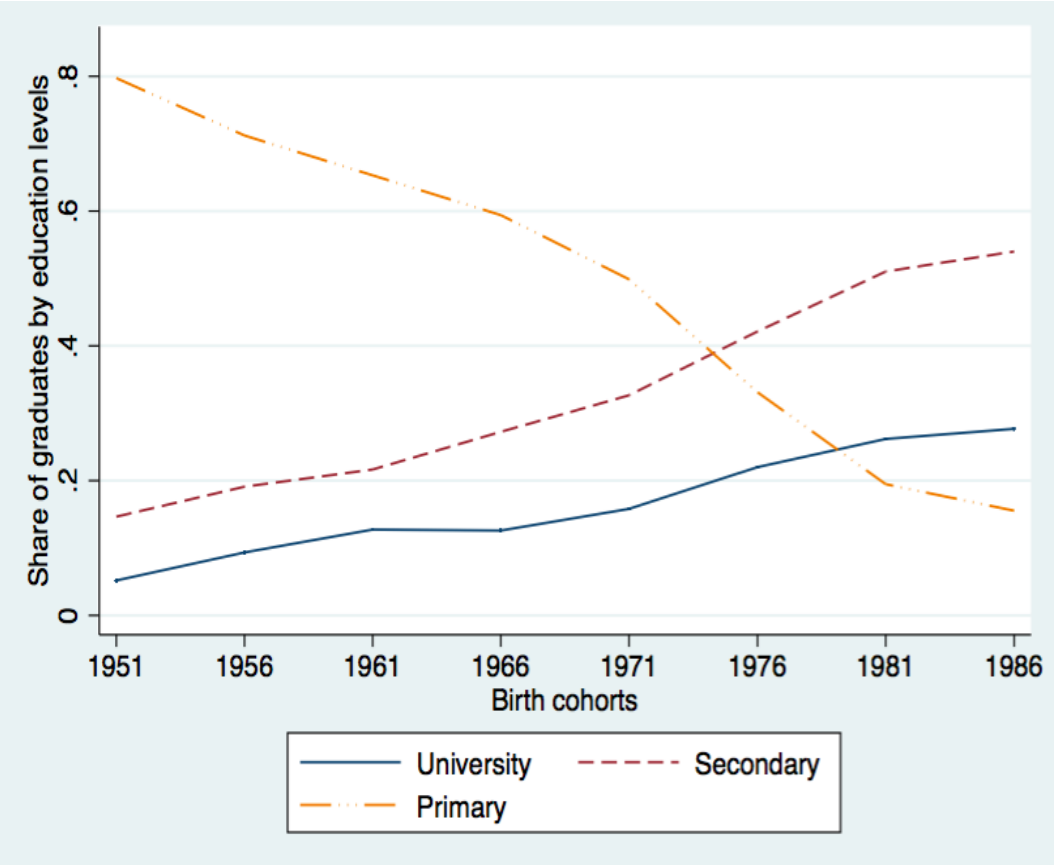
2. Background and the reform

Figure 1. The education attainments of women by year of schooling and degree

A) Average year of schooling



B) The share of graduates by education levels



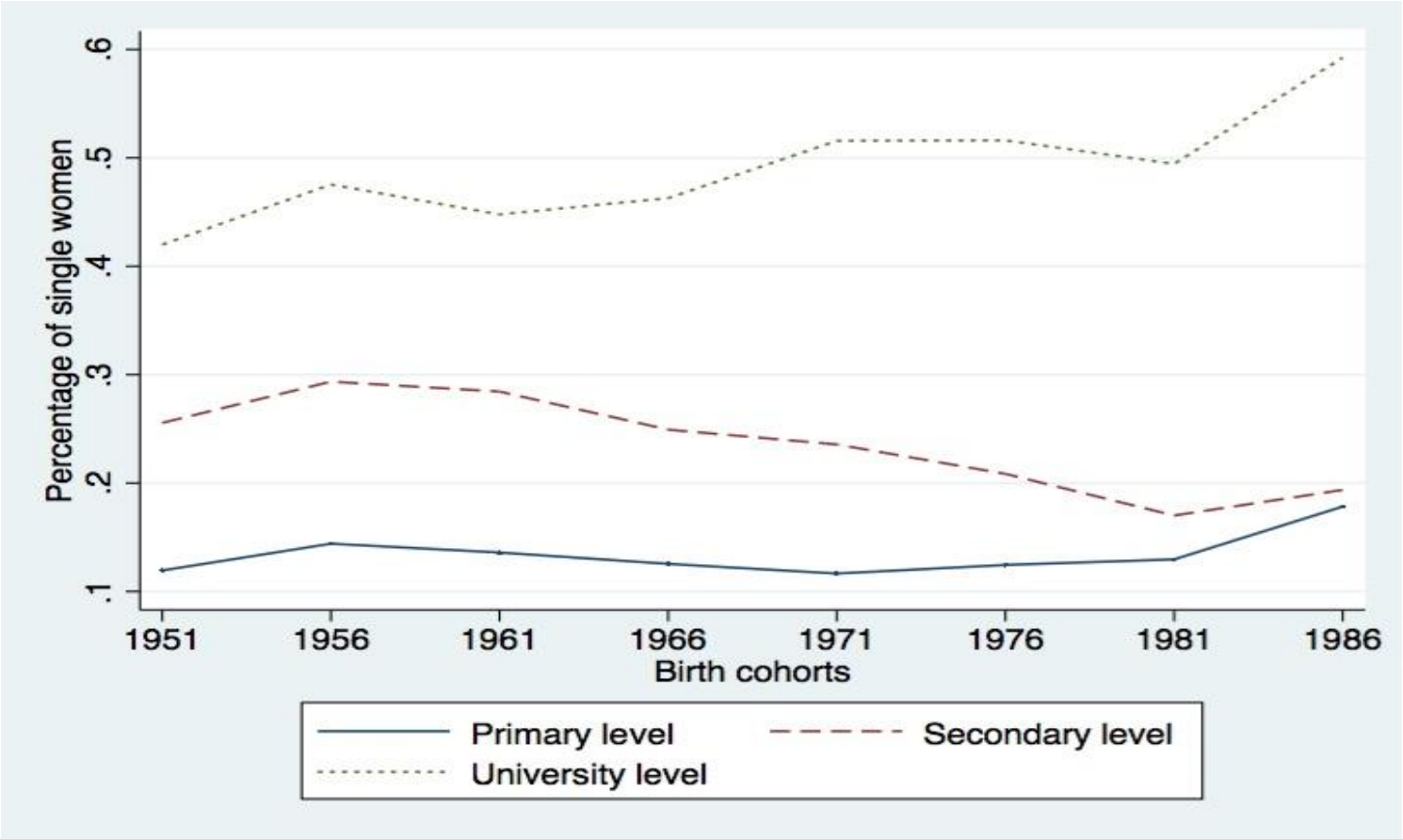
2. Background and the reform

Figure 2 shows the percentage of single women age between 25 to 34 years by three education levels born during 1951 to 1992.

- There are only less than 15% of single women among those with primary education, while it is higher for those with secondary level and much higher for university level.
- The percentage of higher-educated single women has increased nearly 20% across the birth cohorts.

2. Background and the reform

Figure 2. The percentage of single women age between 25 to 34 by education levels



2. Background and the reform

Figure 3 shows the average cohort fertility of women age between 25–34 years, which has decreased in all of the three education groups. The gap of fertility between higher-educated women and lower-educated women has not converged.

Figure 4 shows the percentage of single women with university or higher age over 35, defined as the “Gold Miss” group.

- Generally, with the increase in female education attainments over time, more women choose to stay single and have less or no children.

2. Background and the reform

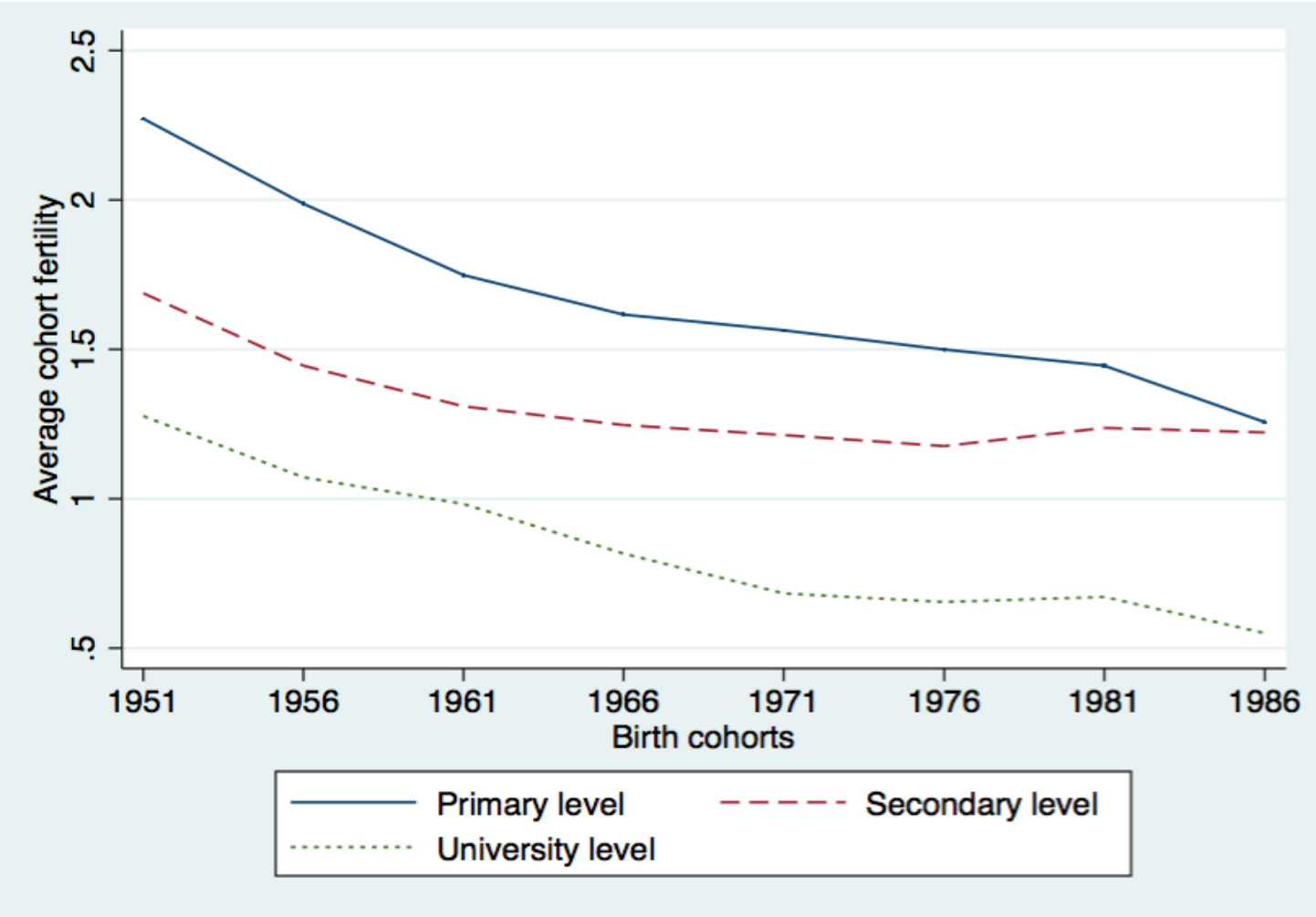


Figure 3. The average cohort fertility of women age between 25 to 34 by education levels

2. Background and the reform

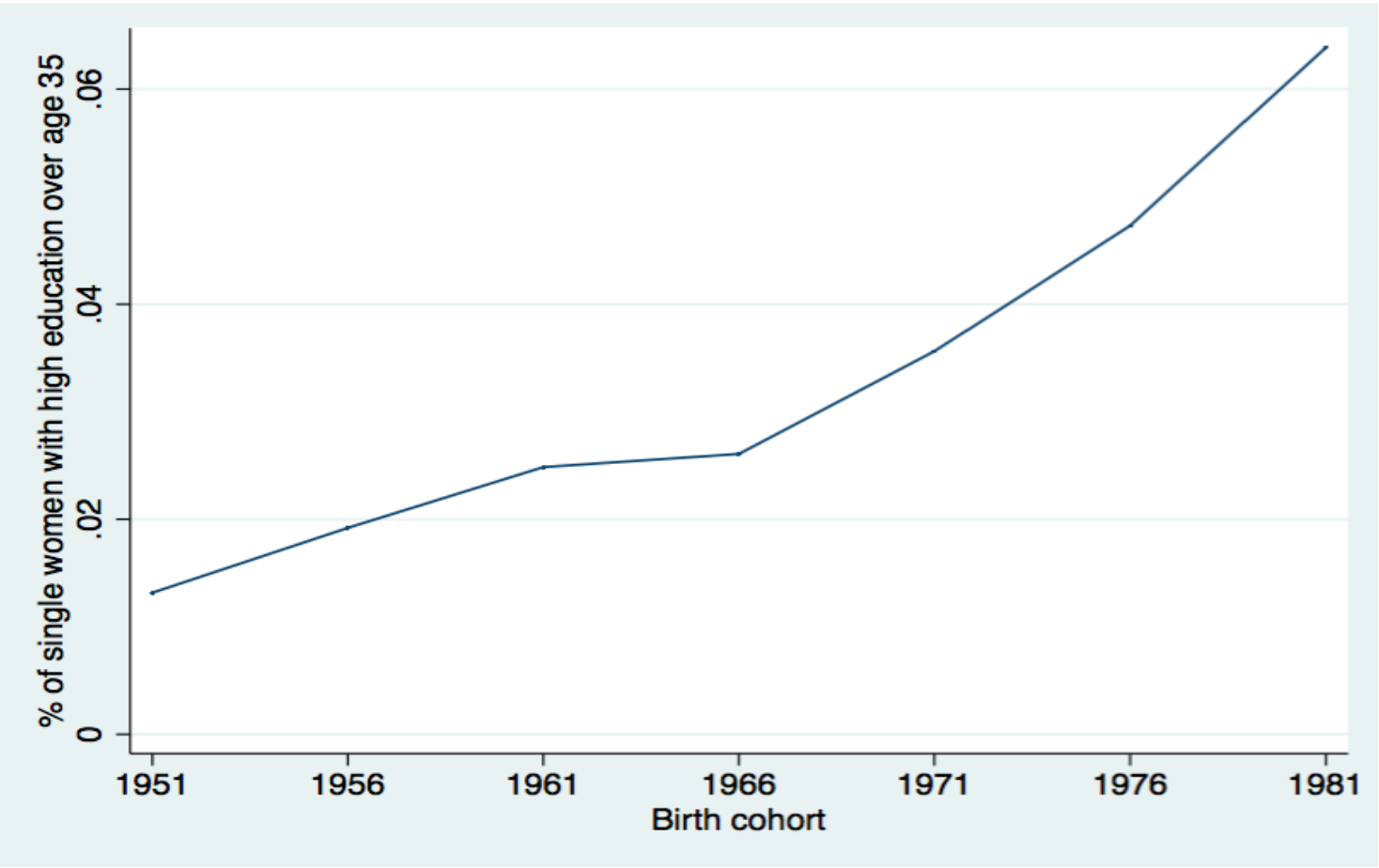


Figure 4. The percentage of single women with university or higher age over 35 ("Gold Miss" phenomenon)

2. Background and the reform

The compulsory reform

The Thai government extended compulsory education from four to six years in 1978, requiring children at the age of 8 to enroll in primary education, in compliance with the Education Development Plan

- The average number of years of schooling thus increased significantly after the reform. Thailand reached almost universal primary education in the late 1980s

3. Literature review

The effect of education on marriage has been addressed as an important channel for fertility with respect to the education effect

- Previous research has suggested the difficulties of analyzing the effect of female education on both the marriage outcome and the fertility, causing by substantial bias from unobserved heterogeneity. For marriage outcomes, this unobserved heterogeneity might arise from the joint determination of marriage and education or selection into marriage.

3. Literature review

Studies that have focused on the effect of education on marriage market have yielded different results across countries.

- Currie and Moretti (2003) find that higher education increases the probability of women's marriage in the US
- Leo (2004) suggests that the effect of education on marriage is insignificant in the US
- The insignificant result is also obtained by Lefgren and McIntyre (2006) for the US and Braakmann (2011) and Anderberg and Zhu (2014) for the UK

3. Literature review

- Theoretically, the effect of education on fertility depends on the joint action of income effects and substitution effects.
  - First, education can affect fertility through the marriage market.
    - With higher education, under positive assortative mating, women tend to find an appropriate partner, increasing income through the spouse-related multiplier effect.
    - With higher earning through the spouse, the income effect may dominate the substitution effect, which increases the fertility.
    - In addition, more education makes women more open-minded, knowledgeable, and flexible, which increases their chances of marriage in the mating market.

3. Literature review

- Second, education increases the opportunity costs of childbearing and childrearing, indicating that the substitution effect should decrease fertility. Education also increases permanent income, suggesting this income effect would increase fertility as families can afford more children (Becker et al. 1960).
  - The income effect may be weakened if parents invest more in the quality of rearing their children (Becker and Lewis 1973).
  - Moreover, education increases the bargaining power of women in the marriage (Mason 1986) and improves the knowledge of contraception (Rosenzweig and Schultz 1989), which may lower the probability of childbearing.

3. Literature review

The possible reverse causality between education and fertility and the unobserved characteristics (e.g., family preferences, individual ability, or community resources, which is associated with both schooling and fertility choice) bias the results.

- We use the compulsory schooling reform in Thailand as the instrument for education
- In addition, we complement the traditional IV approach with a pseudo-panel approach considering the lack of longitudinal data, especially in developing countries.

4. Data and variables

We first use the annual LFS of Thailand 2017, conducted by the National Statistical Office (NSO)

- To examine the effect of obtaining university level education on the marriage outcomes (single vs. married).
  - Table 1 presents the summary statistics for LFS 2017. The marriage rate decreases from 91.8% to 63% accompanying with the increase of level of education for women.

4. Data and variables

Second, we use the LFS from 1985 to 2017, as the primary data source to examine the relationship between women's education and fertility

- Our sample is restricted to women at ages 35 to 45
- Table 2 shows the summary statistics for LFS 1985 to 2017 separated into whether the women are affected by the reform or not
- We also use the Socio-Economic Survey (SES) panel data from 2005 to 2012 in the robustness check

4. Data and variables

Table 1. Summary statistics for LFS 2017

Variable	Mean		
	Women	Men	Overall
Education level:			
Primary level	0.521	0.507	0.514
Married	91.8%	87.9%	89.8%
Secondary level	0.312	0.372	0.342
Married	77.6%	67.5%	72.1%
University level	0.142	0.099	0.120
Married	63.0%	69.3%	65.6%
No. of children	0.929	0.883	0.906
Currently married	82.5%	78.2%	80.4%
Observations	73,515	73,377	146,829

4. Data and variables

Table 2. Summary statistics for LFS		
	Affected by the reform	Not affected by the reform
Year of schooling	9.210	6.688
Primary level	0.481	0.709
Secondary level	0.337	0.192
University level	0.153	0.094
No. of children	1.675	1.923
Observations	145,076	339,429

5. Methodology

5.1 Effect of education attainment on marriage outcomes

- To address the selection issue relating to education, we employ the doubly robust IPWRA approach.
- The advantage of using IPWRA is that it estimates both treatment model and outcome model
- IPWRA is characterized with double robust property, which means that the estimates are consistent even if one of the models is misspecified
- The outcome variable is the probability of marriage and the treatment variable is university level of education.

5. Methodology

Outcome model:

$$Married_i = f(x_i, \sigma) + \upsilon_i \qquad (1)$$

Treatment model:

$$\Pr(T_i = 0,1) = h(x_i, \lambda) + \omega_i \qquad (2)$$

where $Married_i$ is a dummy variable, which equals to 1 if individual i is married, and 0 otherwise. T_i is the treatment assignment. x_i is a vector of the covariates of estimation including age, age square, urban indicator and regional dummies.

5. Methodology

5.2 The effect of education on fertility

5.2.1 Instrumental variable approach

- We consider the following models for identifying the causal effect of education on fertility:

$$y_i = \beta_0 + \beta_1 S_i + \beta_2 X_i + \varepsilon_i \ (2)$$

$$S_i = \alpha_1 R_i + \alpha_2 X_i + \varphi_i \ (3)$$

- where y_i is the dependent variable representing woman *i*'s fertility. S_i is the year of schooling, and X_i is a vector of controlling variables, including marital status and five regional dummies. ε_i is the random error term.

5. Methodology

5.2.2 Pseudo-panel approach

- The approach under the RCS data is limited in correcting the unobserved heterogeneity across individuals, but the lack of longitudinal data, especially in developing countries, motivates us to use an alternative approach to solve the problem.
- According to Deaton (1985), by dividing the sample into cohorts basing on a time-invariant characteristics for individuals, like year of birth, we can estimate a fixed effect model from RCS.
- Our pseudo-panel is based on birth year and age, interacting with the time periods. We pool the data from eight- of five-year birth cohorts and 31 survey years for 248 cohort-year observations.

5. Methodology

- The observations in the pseudo panel are the average of each cohort members

$$\overline{y_{ct}} = \beta_0 + \beta_1 \overline{S_{ct}} + \beta_2 \overline{X_{ct}} + \overline{\alpha_{ct}} + \overline{\varepsilon_{ct}} \quad (4)$$

- where y_{ct} is the mean of woman's fertility in cohort *c* at time *t*. α_{ct} is the average fixed effect for the women in cohort *c* at time *t*. It is possible that α_{ct} may correlate with S_{ct} in small samples that yield biased results.

$$\overline{\alpha_{ct}} \approx \alpha_c$$

6. Results

Table 3 shows the IPWRA results of probability of marriage with university education as the treatment variable. Women with university education are estimated to be 14.8% less likely to get married than those without.

Comparing women and men, the high education does not affect men as much as it affects women, where the difference is only 4.3%.

6. Results

It should be noticed that the negative result supports the idea that, with the increase of education attainment of women, the **“Gold Miss”** phenomenon in Thailand is on the rise.

- With the development and further increase in education, the rise of the “Gold Miss” may deepen the fertility problem.

6. Results

Table 3. IPWRA analysis of university education on marriage outcome using LFS 2017			
	Women	**Men**	**Overall**
ATE			
University (1 vs 0)	-0.148***	-0.043***	-0.088***
	(0.000)	(0.000)	(0.000)
POmean	0.855***	0.788***	0.818***
	(0.000)	(0.000)	(0.000)
Observations	73,515	73,377	146,892
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

6. Results

- **In Table 4,** both the OLS and IV estimates indicate a negative association between year of schooling and fertility under different samples.
- The negative results are robust under different selection of birth cohorts, corresponding with the symmetric window of the reform

6. Results

Table 5. The effect of the year of schooling on the fertility

	Sample1 (age 35 to 45)			Sample2 (age 40)		
	5-year window	10-year window	Full sample	5-year window	10-year window	Full sample
OLS	-0.0145***	-0.0151***	-0.0300***	-0.0104***	-0.0135***	-0.0301***
	(0.001)	(0.000)	(0.000)	(0.002)	(0.001)	(0.001)
IV	-0.0214***	-0.0373***	-0.0811***	-0.0484***	-0.0604***	-0.103***
	(0.002)	(0.002)	(0.001)	(0.008)	(0.007)	(0.004)
Poisson	-0.00824***	-0.00852***	-0.0162***	-0.00596***	-0.00755***	-0.0160***
	(0.001)	(0.000)	(0.000)	(0.002)	(0.001)	(0.001)
Observations	89,323	152,631	317,200	10,485	17,667	36,032

Standard errors in parentheses

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

6. Results

Table 5 presents the pseudo-panel results of the effect of year of schooling on the fertility.

- Comparing with Table 5, the WLS and WLS-IV results are also larger than the OLS regressions with individual data. This implies that the individual or cohort-specific unobserved characteristics incur a downward bias of the effect of education on fertility.
- The magnitude of the bias is substantial with the effect being underestimated by 70% to 78% compared with using OLS with individual data to WLS/WLS-IV with pseudo-panel data.
- The pseudo-panel and IV approaches produce similar results, suggesting the success of correcting the bias caused by the unobservable heterogeneity in the individual data

6. Results

Table 5. Pseudo panel results: Effect of education on fertility		
WLS		-0.0932***
		(0.008)
WLS-IV		-0.137***
		(0.020)
Cohort-year observations		248
Individual observations per cohort:		
-Max		83,761
-Min		326

6. Results

The pseudo-panel approach captures the changes of fertility behavior across generations and time periods. Younger generations with higher education tend to have fewer children on average.

- Besides the channels, such as contraceptive use and labor force, attitudes toward childbearing have changed among generations in Thailand

8. Conclusion

- In this study, we examined the impact of women's education on fertility.
- We first discussed the effect of obtaining university education on women's marriage behavior using the LFS 2017.
  - The IPWRA analysis shows that obtaining university degree or higher have a negative effect on marriage, which reduces the probability of marriage by 14.8%. .
- Next, we studied the causal effect of year of schooling on fertility using the LFS from 1985 to 2017.
  - We exploited the 1978 Compulsory Reform in Thailand as the exogenous variation in education. We ran the estimations under individual and pseudo-panel data.
  - Our results show a negative relationship between year of schooling and fertility.

8. Conclusion

- Our study shows that Thailand, having made remarkable progress in social and economic development recently, has seen a dramatic decline in fertility as well as a rise in the “Gold Miss” phenomenon.
- The effect of education on fertility varies by country and institutional settings, which may affect women’s opportunity cost of childbearing.
  - Our negative results may reflect a high opportunity cost of childbearing for women under the labor market condition or traditional cultures, such as flexible working arrangements not commonly offered in Thailand (Global Workforce Roundtable 2007), shortage in public childcare, and the traditional role of women as managers of household work.