Motherhood penalty and fatherhood premium?

Gender disparities of fertility effects in China*

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Abstract

"Motherhood penalty" and "fatherhood premium" regarding labor market outcomes have been established by an array of empirical studies. However, validity of the fertility effects has been controversial due to the potential selection bias. Moreover, fertility effects on subjective outcomes are also crucial while receiving limited attention. China's exemption policy to the one-child policy that couples whose first child is a girl can have a second child makes gender of the first child a powerful instrumental variable (IV). Based on the IV approach, this paper examines the gender-specific fertility effects on parents' time use, income and subjective well-being outcomes, using the nationally-representative 2010 Chinese Family Panel Study (CFPS). Results show that with more children, fathers spend significantly more time working and less time taking care of family members. Mothers, on the other hand, report better subjective well-being. That is, we find premiums for both fathers and mothers and penalty for neither.

Keywords: motherhood penalty, fatherhood premium, gender, time use, labor market outcome, subjective well-being

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1.Introduction

The relationship between fertility and employment outcomes is a crucial issue at the intersection of family and career lives (Angrist and Evans, 1998; Goldin, 1995; Gough and Noonan, 2013). The negative link between childbearing and labor force participation has been established by an array of empirical studies (e.g., Budig and England, 2001; Glauber, 2007; Goldin, 1995; Gronau, 1988; Korenman and Neumark, 1992). Some studies have further argued that due to the within-household specialization, fathers tend to devote more effort to bread-earning while mothers assume more responsibility at home for nursing and nurturing the children (Becker, 1981, 1985; Glauber, 2007, 2008; Killewald and Gough, 2013). Therefore, as mothers are established to suffer from a "motherhood penalty" within the labor market, number of children is supposed to have no or even positive impact on father's labor force participation (Angrist and Evans, 1998; Glauber, 2008; Hochschild and Machung, 1989; Killewald, 2013; Noonan, 2001), that is, the "fatherhood premium."

However, the causal interpretation of the associations between fertility and labor force participation has been controversial considering the strong theoretical rationales that the fertility and labor supply are jointly determined (Goldin, 1995; Gough and Noonan, 2013; Schultz, 1981). In the first place, parents and non-parents can be different in observed or unobserved characteristics, such as motivation and sense of responsibility, that relate to labor market outcomes (Gough and Noonan, 2013). Moreover, not only fertility may influence the labor supply outcomes of the parents, it is also possible that individuals make decisions about

childbearing based on their labor force participation performance. When one is more active and successful occupationally, they are more likely to be economically prepared and thus more ready to have more children. That is, the established fertility effects could merely be due to selection, rather than actual causality. Instrumental variables strategy (IV) is among the most powerful methods to address this issue considering the prevalence of randomness within fertility behaviors. Since an instrumental variable is supposed to be strongly correlated with the independent variable, its randomness guarantees that it only influences the dependent variable through its association with the independent variable. Thus, the potentially endogenous independent variable is purged of its non-causal correlation with the dependent variable, and the more accurate causal effect is estimated. One successful example in this line of studies is Angrist and Evans's (1998) application of the IV strategy based on the sibling sex composition and twinning at first birth in families with two or more children, using the U.S. 1980 and 1990 Census Public Use Micro Samples.

China is an ideal research setting to test the "motherhood penalty" and the "fatherhood premium," in both theoretical and methodological regards. From the theoretical perspective, China is a country with high-speed economic growth. During this process, women's social and economic status has increased tremendously. Two major demonstrations of women's upgraded social positions are the prevalence of female labor force participation and the decline of division of labor within the households (Lavely et al., 1990; Oppenheimer, 1997; Smock, Manning and Gupta, 1999; Wu and Song, 2010). Hence, the within-household specialization may have already been largely eroded in China and whether "motherhood penalty" may still hold for contemporary China is uncertain and begs empirical examination (Bian, Shu, and Logan, 2000; Whyte and

Parish, 1984; Wolf, 1984; Zuo and Bian, 2001). From the methodological perspective, the differential implementation of the "one-child policy" in China provides a powerful instrumental variable. The "one-child policy" in China was initiated around 1978 to 1980 to officially restrict the married couples to having only one child. However, the actual implementation of the policy varies with gender of the first-born child. Specifically, individuals in the specified areas with their first child being a girl can exempt from the "one-child policy" and are allowed to have a second child.[1] Since gender of birth is generally considered random,[2] after restricting the sample to the population who were influenced by this "exemption" policy, gender of the first child can work as a powerful instrumental variable for whether to have more than one child. By applying the IV approach, we are able to provide a causal estimate of the fertility effects.

Moreover, among the numerous studies on "motherhood penalty" and "fatherhood premium," most of them exclusively focus on the fertility effect on employment and financial outcomes. However, family, as one of the most important terrain in individuals' lives, may impose more comprehensive and penetrating influences. Specifically, fertility behaviors may change the parents' entire life including their time use plans and subjective well-being, aside from the conventional labor market outcomes (Waite and Gallagher, 2000). If this is the case, the "motherhood penalty" and "fatherhood premium" may not necessarily hold. First of all, as a crucial fulfillment of life, having more children may compensate the parents subjectively. Secondly, if anything, mothers, often as the one interacting most with the children, may reap the most of the "subjective premium" (Waite and Gallagher, 2000). Hence, without examining the

[1] For details of the policy, please refer to Appendix Table 1.
[2] For discussion on the validity of this assumption, please go to the "Conclusions and discussion" section.

fertility effects on other outcomes, aside from the labor market outcomes, we cannot have the full understanding on how having more children may change individuals' lives.

Specifically, our research questions are:

(1) Does having more than one child influence the parents' time use, income, and subjective well-being outcomes in China?

(2) If yes, how is the effect different for fathers and mothers?

To sum up, using the nationally-representative 2010 Chinese Family Panel Study (CFPS), this paper examines the gender-specific effects of fertility on a variety of outcomes including parents' time use, income and subjective well-being, based on the IV approach. Our main contribution is to provide an evaluation of the causal link running from fertility to both time use and subjective well-being outcomes, aside from the conventionally focused income outcome.

2. Theoretical issues and research setting

2.1 "Motherhood penalty" and "fatherhood premium"

Under the model of within-household specialization, couples pursue a joint strategy in which they divide labor to maximize the household-level well-being (Becker, 1981, 1985). The division of labor is usually based on the comparative advantage of the spouses. Due to the gender gap in labor market outcomes and the socialized skills by gender, men are often supposed to assume the role of bread-earners, and women are accordingly, take the responsibility as home-makers. Thus, specialization serves as the dominant causal explanation for women's "motherhood penalty" and men's "fatherhood premium" regarding labor market outcomes (Budig and England, 2001; Glauber, 2008; Gough and Noonan, 2013; Killewald and Gough, 2013).

However, the causality from childbearing to labor market outcomes has been controversial that the established fertility effects could just be due to selection (Gough and Noonan, 2013). In the first place, individuals who decide to become parents may differ from those non-parents in ways that are related to the labor market outcomes, such as motivation, work commitment and sense of responsibility (Gough and Noonan, 2013). Secondly, individuals may make decisions on their fertility behaviors based on their labor market and financial situations (Angrist and Evans, 1998; Gough and Noonan, 2013). For example, when women's employment status is unsatisfactory, they may want to retreat to the role of homemakers and mothers. However, men, to the contrary, may decide to have (more) children when they are economically established. That is, the actual causality may run from labor market outcomes to the fertility decisions.

Studies aiming to address this selection bias have mostly done so either by directly controlling for possible differences between the parents and non-parents, or by exploiting a longitudinal structure of the dataset (Becker, 1985; Blank, 1990; Lundberg and Rose, 2000). However, it is hard to sufficiently and accurately identify the relevant differences between the parents and non-parents. It is even harder to control for those unobserved characteristics. Additionally, a longitudinal design in data is highly complicated and costly and is often of low availability. Comparatively, among various methods dealing with the selection bias, instrumental variable strategy is considered one of the most powerful (Angrist and Evans, 1998). However, a suitable and good instrumental variable is often difficult to find. Moreover, this method is mostly applied in economic studies and rarely been applied in sociological work (e.g., Angrist and Evans, 1998; Jacobsen et al., 1999; Miller, 2011).

Furthermore, as discussed above, the fertility effects have mainly been established for employment and financial outcomes (Angrist and Evans, 1998; Budig and England, 2001; Glauber, 2007, 2008; Killewald, 2013; Killewald and Gough, 2013). However, as childbearing and childrearing are such important events in one's life course, it would unavoidably influence the ways in which the individuals allocate their time, as well as the levels of their subjective well-being (Waite and Gallagher, 2000). However, studies on those fertility effects have been rare (Waite and Gallagher, 2000).

2.2 The Chinese context

Chinese society is one that has been undergoing dramatic social changes. Two of the most salient among those changes are women's upgraded social status and the evolution of China's one-child policy. Therefore, China provides an ideal research setting to examine the fertility effects, from both theoretical and methodological perspectives.

Theoretically, due to the Communist revolution and government's enthusiastic promotion of the ideology on gender equality, women's social status has upgraded tremendously (Lavely et al., 1990). The People's Republic of China was founded in 1949 after the Communist Revolution. For the first 30 years, the Communist ideology regarding equality had been zealously promulgated, among which women's parity to men had been highlighted (Meisner, 1999; Parish, 1981; Whyte, 2010; Yu and Xie, 2013). The slogan "Women hold up half the sky" (fu nv neng ding ban bian tian) had dominated the mainstream discourse (Mauer-Fazio, Rawski, and Zhang, 1999). In the sphere of political and work life, the Chinese constitution guarantees women equal rights with men in all aspects of life and endorses the policy of "same-work, same-pay" (tong

gong tong chou) (Mauer-Fazio, Rawski, and Zhang, 1999; Zuo and Bian, 2001). In the sphere of family life, in 1950, China instituted the Marriage Law, which formally legalized free-choice marriages and explicitly protected wives' rights and interests, making them equal to those of husbands (China Administration Council, 1950: Item 5; Zuo and Bian, 2001). Throughout this process, women's social standing and economic status have both significantly improved (Hannum, 2005; Lavely et al., 1990; Song, 2009; Zhang, Hannum, and Wang, 2008). In education, women's attainment has gradually caught up with that of men (Wu and Song, 2010: Table 2; Wu and Zhang, 2010). In employment, the gender gap in income and labor force participation has declined and the occupational distribution across gender has changed in favor of women (Meng, 1993; Parish and Busse, 1998). During the same process, gender inequality within the household had been dramatically reduced and within-household specialization had been largely eroded in contemporary China (Bian, Shu, and Logan, 2000; Whyte and Parish, 1984; Wolf, 1984; Zuo and Bian, 2001). Correspondingly, the contrast between the "motherhood penalty" and the "fatherhood premium" may have lost its primary foundation to prevail. Thus, it is necessary to empirically examine the gender-specific fertility effects under this new circumstance of the gender power structure within the household.

Methodologically, as aforementioned, IV strategy is among the most powerful approaches to address the selection bias issue with the suitable instrumental variable in hand. The exemption policy to the one-child policy in China provides us with such a variable. The "one-child policy" in China was initiated in 1978 and it officially restricted married couples to having only one child (Greenhalgh, 2008). However, the actual implementation of the policy varies with the gender of the first-born child. Specifically, individuals in the specified areas with

their first child being a girl can exempt from the "one-child policy" and are allowed to have a second child (Gu et al., 2007). Therefore, parents whose first child is a girl are substantially more likely to go on to have an or more additional child(ren).[3] Since gender of birth is virtually randomly assigned, a dummy variable for whether the first-born child is a girl provides a plausible instrumental variable for further childbearing among parents with at least one girl. By using the IV approach, we are able to evaluate the causal effect of fertility, which seems unlikely to obtain through regular OLS regression analysis.

3. Data and methods

This study utilizes the IV approach to examine the gender-specific fertility effects on the parents' time use, income and subjective well-being outcomes, based on a sample from the nationally representative 2010 Chinese Family Panel Study (CFPS). CFPS covers a wide range of information on individuals' time use, income, subjective well-being and family backgrounds. Specifically, we use the adult sample for the parents' information, and derive the children's, the spouses', and the grandparents' information by linking the adult sample to the family relationship sample.

3.1 Analytical Sample

Based on the adult sample and the linked information from the family relationship sample, we first restrict the dataset to those who have at least on child. Then to secure the basic validity of the analysis, we only keep those who have eligible values for all the independent variables,

[3] This is supported by the results in Table 1.

including the endogenous variables, the instrumental variable, and the control variables. After these restrictions, to guarantee the relevance and comparability of the outcome variables across individuals, we further restrict the sample to those parents aged between 20 and 50 (20 and 50 included), the prime working age, as well as to those who have not yet retired.

Then, regarding the childbearing behavior, we make the restriction to those parents whose first child was born in or after 1978, so as to ensure their childbearing decision was under the influence of the family planning policy. Moreover, since number of children will mainly influence the parents when the children are relatively young and require care, we restrict the sample to those whose first child is or under age 18. Additionally, we do not have information on the marital parity of the respondent's spouse. Hence, to maximally ensure that the focal couples are the biological parents of the children reported in the survey, we further restrict the sample to those both who themselves and their spouses are married and those who are in their first marriages at the time of the survey.

Finally, regarding the exemption policy, we make the restriction to include only those rural parents living in provinces where they can have a second child if the first child is a girl and if they are of rural residential registration status. Then we further restrict the sample to those parents who are ethnic majority Han, considering ethnic minorities are allowed to have two or more children (China State Ethnic Affairs Commission, 1999). Furthermore, to maximally exploit the already limited sample size after the long list of sample restriction procedures and to get more reliable results, we conduct single imputation for all the outcome variables with predicted values based on regressions on the following listed control variables. These procedures of restrictions and imputation leave us with 1,124 fathers and 868 mothers.

As shown in Appendix Table 1, there are also other conditions under which the exemption policy can be applied. However, due to lack of the relevant information, we can hardly make sample restrictions based on all the exemption policies. We do not think this will invalidate the results. As a robustness check, we have experimented with different versions of sample restrictions based on the maximally retrievable information from the CFPS dataset, and the results remain highly consistent.

3.2 Instrumental Variable (IV) approach

Instrumental variable approach is among the most powerful methods to deal with the selection bias issue in establishing causality. Concretely, the instrumental variable is a variable that affects the endogenous variable, while not affecting the outcome variable other than through its effect on the endogenous variable, and the causal effect is estimated by the two-stage least squares estimator (2SLS). For example, if we name the parent's monthly income as Y, whether having more than one child as X, and whether the first child is a girl as Z, then a reduced form model gives us the direct influence of having a girl first on the parent's monthly income:

$$Y_i = \Pi_0 + \Pi_1 Z_i + v_i, \text{ where } \Pi_1 = \frac{\partial Y}{\partial Z} \quad (1)$$

However, we can notice that this reduced form model does not provide any theoretically substantive interpretations. Instead, we may be more interested in a structural parameter, namely the coefficient indicating the fertility effect on the parent's monthly income. That parameter should appear in the structural equation as:

$$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i, \text{ where } \beta_1 = \frac{\partial Y}{\partial X} \quad (2)$$

Based on the notations in (1) and (2), the coefficient from the reduced form model in (1) may also be written as:

$$\Pi_1 = (\frac{\partial X}{\partial Z}) * (\frac{\partial Y}{\partial X}) = (\frac{\partial X}{\partial Z}) * \beta_1 \quad (3)$$

It is the most ideal if we can directly estimate the structural model in (2), given the assignment to X is random. However, this can hardly be the case. For instance, those parents who have a stronger sense of responsibility may be more likely to have more children, and they also tend to earn more. Thus, the causality in the structural model may be contaminated by this selection bias. Therefore, we may need instead to estimate the fertility effect indirectly using IV.

Specifically, we can obtain the first component in (3) by estimating the first stage model:

$$X_i = \theta_0 + \theta_1 Z_i + u_i \text{, where } \theta_1 = \frac{\partial X}{\partial Z} \quad (4)$$

Then the IV estimate is given by the ratio of the reduced form estimate in (1) (also called the second stage model) to the coefficient from (4):

$$\beta_1 = \frac{\partial Y}{\partial X} = \frac{\Pi_1}{\theta_1} \quad (5)$$

Based on this estimation procedure, assuming that gender of the first child is well randomly assigned, we can then purge X of the selection bias, and get a causal estimate of the fertility effect on the parent's monthly income.

3.3 Variables

Instrumental variable: *Gender of the first child*. This is a binary variable with 0=male, and 1=female. Since gender of the first-born child is relatively randomly assigned, and also because

it is highly correlated with the tendency to have more children based on the exemption policy, we consider this as a good choice for an instrumental variable.

Endogenous independent variables: *Fertility level*. In order to fully capture the fertility effects, we utilize two different measures of fertility level, one binary and the other continuous. Specifically:

Whether having more than one child: This is a binary variable with 0=only having one child and 1=having more than one child.

Number of children: This is a continuous variable indicating the count of number of children for the parent.

Outcome variables: We have three domains of outcome variables. Aside from the conventionally focused income outcome and labor force participation outcome, we also include time allocated to take care of the family members, as well as the subjective well-being outcome. Specifically:

Time use variables: we have used two time use variables, hours worked per month in 2009 and average hours taking care of the family members per week. To make the measure of labor force participation more reliable, we generated the first variable by multiplying hours worked per day in 2009 and days worked per month in 2009. Since this variable largely varies across individuals, when conducting analysis, we use its logged form. To obtain a more general understanding on the time use allocation within the household, we generated the second variable by adding up the average hours taking care of the family members either during weekdays or over the weekend.

Income variable: personal income last month. Since income has large variation across individuals in the sample, we use its logged form in the analysis.

Subjective well-being variable: this is a composite scale based on the average of six subjective ratings ranging from 1 to 5, the higher the number, the more positive the rating is. The six ratings are respectively are – self-rated happiness, life satisfaction, self-confidence in career, self-confidence in the future, self-rated quality of social relationship and self-rated social ability.

Control variables: to control for the observed heterogeneity that may influence both the independent variable and the dependent variables, we include a rich set of control variables, which specifically are, whether working in an agricultural industry (0=no, 1=yes), whether a migrant (0=no, 1=yes), age, age at first birth, education, age gap between the oldest child and the youngest child, whether living together with the youngest child (0=no, 1=yes), whether living together with the spouse (0=no, 1=yes), whether living together with the child(ren)'s grandfather (0=no, 1=yes) and whether living together with the child(ren)'s grandmother (0=no, 1=yes).

4. Results

4.1 Validity of the instrumental variable

[Table 1 about here]

Table 1 shows differences in means by gender of the first child for both the two endogenous fertility variables and the outcome variables, separetely for fathers and mothers. As the difference in means for the outcome variables is the Π_1 in Equation (5), which indicates the reduced form parameter, the difference in means for the fertility variables is the θ_1 in Equation

(5), which indicates the strength of correlation between the instrumental variable and the endogenous fertility variables. As can be seen, for both fathers and mothers, and for both the endogenous fertility variables, θ_1 remains significantly positive. This implies that gender of the first child is a highly valid and powerful instrument for both the variable of whether having more than one child and number of children. As for Π_1, for fathers, it shows that having more children may introduce a positive reduced form fertility effect on working hours, and for mothers, having more children may bring them better subjective well-being.

[Table 2 about here]

Table 2 shows comparable results to those in Table 1, except that they are estimated with the control variables. Thus, they are the actual Π_1 and θ_1 used in the main 2SLS analysis whose results are presented in Table 3. As can be seen, θ_1 still remains significantly positive for all the scenarios, again showing the validity of the instrument. However, in this more complicated version of the models, fathers with more children do not only work more hours per month, they also spend significantly less time taking care of the family. There also seem to be a marginally significant bonus in subjective well-being for the fathers. Mothers, on the other hand, remain subjectively better off with more children, while not being influenced by fertility in both time use and income outcomes.

To guarantee the reliability of the 2SLS results, in Appendix Table 2, we present a check of balance of the control variables across values of the instrumental variable. As can be seen, most differences in means by gender of the first child for all the control variables are insignificant. This implies that, between those whose first child is a boy and those whose first child is a girl, for both fathers and mothers, the control variables are relatively comparable.

4.2 Fatherhood premium?

[Table 3 about here]

Table 3-a shows the fertility effects for fathers. As can be predicted by the results in Table 2-a, with more children, fathers tend to work for more hours per month while spending fewer hours per week taking care of the family members. For number of children, fathers report marginally significant gain in subjective well-being. However, there seem to be no significant result for the logged personal income last month.

Among all the significant 2SLS results, their OLS counterparts are of the same direction, though with lower significance. For the logged personal income last month, though neither the OLS nor the 2SLS results are insignificant, we can notice that the 2SLS results and the OLS results are of opposite directions for both endogenous independent variables. All these differences indicate the necessity to apply the IV approach in estimating the fertility effects, compared to the regular OLS analysis.

4.3 Motherhood penalty?

Table 3-b presents the fertility effects for mothers. Consistent with the estimated Π_1 and θ_1 shown in Table 2-b, with more children, mothers tend to fare significantly better in subjective well-being. However, there seem to be no significant fertility effects in both the pair of time use outcomes and the logged personal income last month.

For the significant 2SLS results on subjective well-being, their OLS counterparts are either of the opposite direction or of the insignificant same direction. Note that for the fertility

effect on the logged hours worked per month in 2009, though both insignificant, the 2SLS results and the OLS results are of opposite directions. Moreover, also for this outcome, while the 2SLS results are negative for mothers, they are positive for fathers, which indicate a remaining trace of within-household specialization. These discrepancies between the OLS results and 2SLS results for mothers again indicate the necessity to apply the IV approach in estimating the fertility effects.

5. Conclusions and discussion

This paper contributes to the established field of "motherhood penalty" and "fatherhood premium" both theoretically and methodologically. From the theoretical perspective, China is a country with fast and tremendous social change, and one of the major changes within the family sphere is the weakened norms of division of labor within the households. Hence, with the up-to-date and nationally representative 2010 dataset from CFPS, this paper demonstrates how the influence of fertility on various individual behaviors may be framed by the unique social context in contemporary China. From the methodological perspective, the differential implementation of the "one-child policy" serves as an ideal instrumental variable to produce causal estimates of the fertility effects on a variety of outcomes.

Concretely, we examine the gender-specific effects of fertility on the parents' time use, income and subjective well-being based on the IV approach, using the 2010 CFPS. While we find no effect on income, there are significant fertility effects on both time use and subjective well-being outcomes. Specifically, with more children, fathers tend to work for more hours per month while spending less time taking care of the family members. They also report marginally

significant gain in subjective well-being. For mothers, it seems having more children does not benefit them objectively in terms of both time use and income. However, based on both endogenous fertility variables, having more children brings mothers significantly better subjective well-being. To sum up, based on our IV estimation of the causal effects of fertility, we find premiums for both fathers and mothers and penalty for neither of them.

Yet, we are aware of the limitations of this paper and they can work as future directions of studies on the topic. First, it is possible that for those areas with a combination of various exemptions, the actual instrument may be more than gender of the first child. Moreover, the exemption policy may not be strictly implemented in all areas. Also, variables that can be used to operationalize all the exemption policies are not available in the current dataset. However, considering the robust predicting power of the instrument, and the consistent results shown using different sample restrictions, we do not see this as a severe problem. Second, although we do not think this will invalidate our study, whether the gender of the first child is random is worth discussing given the increasing prevalence of the sex-selective abortion. Sex-selective abortion has mainly been enabled by the prenatal sex detection technology, which was not available in remote rural areas until the late-1980s (Chu, 2001). That is to say, the randomness may only be an issue for parents who were under age 20 in 2010 and thus were not covered in our analysis. Third, since the analyses are conducted on a sample with a predominant proportion of rural population, the outcome variables may not be well applicable. This might be the reason why the income variable is insignificant for both fathers and mothers. Fourth, due to the long list of restrictions based on the exemption policy, we are only left with a small sample size. In the future, given more sufficient data or datasets with multiple waves, more reliable results should be

in order. Finally, we may note the vagueness in the implication of the time use outcomes, that is, it is controversial whether spending more time working and less time taking care of the family members should be regarded as a premium. In this paper, we make this assumption for the consistency and convenience of discussion.

This study has contributed greatly to the literature of marriage and family, gender inequality, causal inference and contemporary Chinese studies. It has examined the fertility effects on a rich set of outcomes including time use, income, and subjective well-being in a research setting of tremendous social change in gender inequality. Not only that, it has also facilitated a causal estimation by evaluating the fertility effects through the IV approach, based on China's unique exemption policy in family planning. The abovementioned limitations will serve as good starting points for the future development of this study.

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TABLES

Table 1-a. Difference in Means for Fertility and Outcome Variables, **Father Sample**

	Gender of the First Child				Difference in		
	Male (*N*=566)		Female (*N*=558)		(Female Minus Male)		
Variables	Mean	s.d.	Mean	s.d.	Mean		s.e.
Fertility Variables							
More than one child (ref.=one child)	0.49	0.50	0.70	0.46	0.21	***	0.03
Number of children	1.55	0.61	1.91	0.79	0.36	***	0.04
Outcome Variables							
Time Use Outcomes							
Logged hours worked per month in 2009	5.18	0.82	5.29	0.54	0.11	**	0.04
Average hours taking care of family members per week	5.22	7.43	4.74	6.46	-0.48		0.42
Income Outcomes							
Logged personal income last month	4.09	5.43	4.44	5.22	0.35		0.32
Subjective Outcomes							
Overall subjective scale	3.79	0.66	3.83	0.66	0.05		0.04

Note: 2010 CFPS. The sample is restricted to rural registration, Han ethnicity, eligible provinces with rural registration exemption and eligible cases for all the varibles. Overall subjective scale is the average of six subjective scales ranging from 1 to 5 on overall happiness, life satisfacation, self-confidence in career, self-confidence in the future, quality of social relationship, and social ability. Larger numbers indicate more positive ratings. †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table 1-b. Difference in Means for Outcome Variables, **Mother Sample**

	Gender of the First Child				Difference in		
	Male (*N*=437)		Female (*N*=431)		(Male Minus Female)		
Variables	Mean	s.d.	Mean	s.d.	Mean		s.e.
Fertility Variables							
More than one child (ref.=one child)	0.51	0.50	0.73	0.45	0.22	***	0.03
Number of children	1.56	0.59	1.94	0.80	0.39	***	0.05
Outcome Variables							
Time Use Outcomes							
Logged hours worked per month in 2009	5.04	0.86	5.00	0.94	-0.04		0.06
Average hours taking care of family members per week	9.86	12.32	11.02	14.80	1.16		0.92
Income Outcomes							
Logged personal income last month	1.37	5.79	0.94	5.74	-0.43		0.39
Subjective Outcomes							
Overall subjective scale	3.77	0.62	3.86	0.65	0.09	*	0.04

Note: 2010 CFPS. The sample is restricted to rural registration, Han ethnicity, eligible provinces with rural registration exemption and eligible cases for all the varibles. Overall subjective scale is the average of six subjective scales ranging from 1 to 5 on overall happiness, life satisfacation, self-confidence in career, self-confidence in the future, quality of social relationship, and social ability. Larger numbers indicate more positive ratings. †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table 2. OLS Estimates of Fertility (Stage 1) and Outcome (Stage 2) Equations

	Gender of the First Child (ref.=male)			
Dependent Variables	Father (*N*=1,124)		Mother (*N*=868)	
Stage 1: Fertility Variables				
More than one child (ref.=one child)	0.12	***	0.11	***
	(0.02)		(0.02)	
Number of children	0.23	***	0.24	***
	(0.03)		(0.03)	
Stage 2: Outcome Variables				
Time Use Outcomes				
Logged hours worked per month in 2009	0.11	**	-0.01	
	(0.04)		(0.06)	
Average hours taking care of family members per week	-1.10	**	-0.85	
	(0.40)		(0.80)	
Income Outcomes				
Logged personal income last month	0.37		-0.22	
	(0.28)		(0.30)	
Subjective Outcomes				
Overall subjective scale	0.07	†	0.12	**
	(0.04)		(0.04)	

Note: 2010 CFPS. Standard errors are reported in the parentheses. The sample is restricted to rural registration, Han ethnicity, eligible provinces with rural registration exemption and eligible cases for all the varibles. Overall subjective scale is the average of six subjective scales ranging from 1 to 5 on overall happiness, life satisfacation, self-confidence in career, self-confidence in the future, quality of social relationship, and social ability. Larger numbers indicate more positive ratings. All models are estimated with control variables described in Appendix Table 2. †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table 3-a. OLS and 2SLS Estimates of Outcome Models, **Father Sample**

Estimation method	Father (*N*=1,124)			
	More than one child		Number of children	
	OLS	2SLS	OLS	2SLS
Dependent variables:				
Time Use Outcomes				
Logged hours worked per month in 2009	0.002	0.94 *	0.02	0.48 *
	(0.06)	(0.38)	(0.04)	(0.19)
Average hours taking care of family members per week	-0.55	-9.22 *	-0.66 †	-4.69 **
	(0.62)	(3.66)	(0.40)	(1.79)
Income Outcomes				
Logged personal income last month	-0.37	3.09	-0.19	1.57
	(0.44)	(2.46)	(0.28)	(1.24)
Subjective Outcomes				
Overall subjective scale	-0.01	0.57	0.03	0.29 †
	(0.06)	(0.34)	(0.04)	(0.17)

Note: 2010 CFPS. Standard errors are reported in the parentheses. The sample is restricted to rural registration, Han ethnicity, eligible provinces with rural registration exemption and eligible cases for all the varibles. Overall subjective scale is the average of six subjective scales ranging from 1 to 5 on overall happiness, life satisfacation, self-confidence in career, self-confidence in the future, quality of social relationship, and social ability. Larger numbers indicate more positive ratings. All models are estimated with control variables described in Appendix Table 2. †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table 3-b. OLS and 2SLS Estimates of Outcome Models, **Mother Sample**

Estimation method	Mother (*N*=868)			
	More than one child		Number of children	
	OLS	2SLS	OLS	2SLS
Dependent variables:				
Time Use Outcomes				
Logged hours worked per month in 2009	0.09	-0.11	0.06	-0.05
	(0.09)	(0.50)	(0.06)	(0.23)
Average hours taking care of family members per week	0.17	-7.49	-0.88	-3.51
	(1.29)	(7.41)	(0.79)	(3.43)
Income Outcomes				
Logged personal income last month	-0.41	-1.96	0.05	-0.92
	(0.48)	(2.71)	(0.30)	(1.27)
Subjective Outcomes				
Overall subjective scale	-0.03	1.02 *	0.02	0.48 *
	(0.07)	(0.42)	(0.04)	(0.18)

Note: 2010 CFPS. Standard errors are reported in the parentheses. The sample is restricted to rural registration, Han ethnicity, eligible provinces with rural registration exemption and eligible cases for all the varibles. Overall subjective scale is the average of six subjective scales ranging from 1 to 5 on overall happiness, life satisfacation, self-confidence in career, self-confidence in the future, quality of social relationship, and social ability. Larger numbers indicate more positive ratings. All models are estimated with control variables described in Appendix Table 2. †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

APPENDIX

Appendix Table 1. Exemptions Policy to Have a Second Child with One Girl

Condition	**Province**
The parents live in mountain area, rural residents, one girl only	Beijing; Tianjin; Shanxi; Inner Mongol; Jilin; Heilongjiang; Zhejiang; Anhui; Fujian; Jiangxi; Henan; Hubei; Hunan; Guangdong; Chongqing; Guizhou; Shannxi; Gansu.
The parents work in mining industry and directly work in mines, one girl only	Hebei; Jiangsu; Zhengjiang; Anhui; Shandong; Henan.
Mother rural, one girl only	Guangxi.
Mother rural, one girl only and with rural registration	Liaoning; Shandong.
Mother rural, one girl only, father living with his parents-in-law, mother without brothers	Jiangsu.
Mother rural, one girl only, father without brothers and with only one sister	Jiangsu.
Mother rural, one girl only, spouse living in coastal farming areas	Jiangsu.
Mother rural, one girl only, one of the spouse in marine fishing	Jiangsu.
Both parents rural, one of the spouse having non-heritable physical disability, one girl only	Jiangsu.
One of the parents works as contract worker in farming industry, one girl only	Jilin.
One of the parents works in marine fishing industry, one girl only	Shandong.
One of the parents has non-heritable physical disability, one girl only	Shandong.

Source: Population and Family Planning Commission of Shanxi website. http://www.sxrk.gov.cn/Article.jsp?ArticleID=4623

Appendix Table 2. Differences in Means for Control Variables

Variables	Difference in means by gender of the first child (ref.=male) Father (*N*=1,124)		Mother (*N*=868)	
Agriculture	-0.015		0.020	
	(0.029)		(0.033)	
Migrant	0.017		0.001	
	(0.018)		(0.021)	
Age	0.438		-0.225	
	(0.353)		(0.385)	
Age at first birth	0.508	**	0.043	
	(0.195)		(0.205)	
Illiterate or semi illiterate	0.041	*	0.029	
	(0.020)		(0.030)	
Primary	-0.058	*	-0.002	
	(0.027)		(0.032)	
Junior middle	0.023		-0.028	
	(0.030)		(0.031)	
Senior middle	-0.007		0.003	
	(0.018)		(0.017)	
Associate college or above	0.002		-0.002	
	(0.010)		(0.011)	
Age gap between the oldest child and the youngest child	1.250	***	1.390	***
	(0.209)		(0.240)	
Youngest child coresidence	0.007		0.002	
	(0.008)		(0.011)	
Spouse coresidence	0.004		0.002	
	(0.004)		(0.009)	
Grandfather coresidence	-0.024		-0.020	
	(0.028)		(0.013)	
Grandmother coresidence	-0.001		-0.013	
	(0.029)		(0.014)	

Note: 2010 CFPS. Standard errors are reported in the parentheses. The sample is restricted to rural registration, Han ethnicity, eligible provinces with rural registration exemption and eligible cases for all the varibles. Province of the respondent's residential registration is also controlled for as a set of dummy variables to single out the regional fixed effect. P-value of Pearson's Chi-square test for association between gender of the first child and province of residential registration is 0.513 for fathers, and 0.764 for mothers. †p<0.10; *p<0.05; **p<0.01; ***p<0.001.