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Son Preference in China: Why is it Stronger in Rural Areas?

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Abstract

The imbalanced sex ratio of the population in China has become a serious problem for the society. In recent decades considerably more male babies than female babies have been born in China due to people's preference for having male children. This trend is more prominent in rural areas than in urban areas. In this paper, we try to understand why rural areas have stronger son preference than urban areas. We hypothesize that the relationship between residential location and son preference is mediated by education, son's economic and cultural utilities, gender role beliefs, and patriarchal beliefs. To test these mediation effects we use the data from Chinese General Social Survey (CGSS) in 2006. The results indicate that the stronger son preference in rural areas is explained by lower educational level and the perception of son's economic and cultural utilities. It is not explained by gender role beliefs or patriarchal beliefs. In concluding remarks we offer suggestions for policy makers.

Keywords

Son preference, China, rural/urban difference, son's economic and cultural utilities

1. Introduction

Sex ratio imbalance is one of the biggest challenges for China in the 21st century. There are many more boys than girls born in China each year and this tendency has become more obvious in recent decades. The natural sex ratio at birth for humans is about 104 to 107 boys to 100 girls (Chahnazarian 1991). Sex ratio at birth in China was as high as 108 boys per 100 girls in the 1980s (Zeng et al. 1993) and increased to 111 in 1990, 116.9 in 2000, and 120.5 in 2005 (Bhattacharjya et al. 2008). Census and 1% population survey in China showed that sex ratio at birth in rural areas has been higher than urban areas since 1982 (Li 2007). In 2005, sex ratio at birth was 115.2 in cities, 119.9 in towns, and 122.9 in rural areas (Li 2007).

The major reason for the imbalanced sex ratio is widespread son preference in South and East Asia (Gupta et al. 2003). Gupta, Jiang et al. (2003) claim that, as a result of strong son preference in East and South Asia, sex ratio at birth, sex ratios of aborted fetuses, and sex ratios of child mortality reveal the same pattern of manipulation of family composition by parents. Keen desire for sons encourages parents to adopt different methods to increase the possibility of obtaining a male child. Although the population and family planning law in China prohibits sex selective abortion, in recent decades, couples were increasingly using abortion as a major approach to make sure they had sons for the next birth. Moreover, the increasing availability of ultrasonography in the early 1980s in China aided the implementation of sex selective abortion.

Some scholars argue that the one-child policy implemented in China since 1979 has exacerbated son preference (Liang 2008). Under one-child policy people express greater desire for sons because they don't have a second opportunity to realize their desire for a male child (Liang 2008). We need to notice that one-child policy is not universally implemented across China (Nie 2008). In cities and rural areas in six provinces, one-child policy is strictly implemented. In rural areas other than the six provinces, a relaxed fertility control policy is implemented, which is called 1.5-child policy. Couples in these rural areas could have a second child if the first one is a girl. Moreover, ethnic minorities are not regulated by the fertility control policy in China. Nie (2008) found that women in areas with strict one-child policy were more likely to have sex-selective abortion and to have their firstborn be a boy compared with women in areas with relaxed fertility control policy. These findings support the claim that one-child policy exacerbates people's preference for sons.

A clear trend in China is that son preference is more persistent in rural areas than in urban areas (Arnold and Liu 1986). Qiao (2004) found that women in rural areas are three times more likely to prefer a son than women in urban areas, after controlling for other variables. After 1990, the preference for sons among urban residents significantly dropped and people in some cities even showed preference toward daughters (Qiao 2004). The current study aims to explore why rural areas have stronger son preference than urban areas. In the rural-urban dualistic structure in China, rural areas have lower economic development level, incomplete social welfare system, and more traditional social norms and culture compared to urban areas. Using the quantitative data from the Chinese General Social Survey (CGSS) in 2006, we try to understand how much of the disparity in son preference between rural and urban areas can be explained by factors such as education, traditional beliefs, and perceptions about son's economic and cultural utility.

Son preference is deeply rooted in Chinese society due to a complex interaction of economic, social and cultural reasons. Earlier studies have examined the impact of gender, income, education, marriage status, residential location, ethnicity, marriage form, family system, and traditional attitudes and beliefs on son preference (Jin, Li and Feldman 2007; Lavelly, Li and Li 2001; Liang 2008). However, existing studies have been subjected to several limitations. First, although some studies found that son preference is stronger in rural areas than in cities, none of them has explored the reasons for this disparity. Second, few studies have focused on subjective perceptions, beliefs,

and attitudes that are causally prior to son preference. Third, studies addressing the impacts of traditional beliefs, attitudes, and perceptions on son preference are mostly qualitative or theoretical. Especially, it remains unclear what kind of beliefs or attitudes are able to explain the rural-urban disparity in son preference. Our study addresses these limitations by providing quantitative analysis of how perceptions about son's economic and cultural utilities, gender role and patriarchal beliefs, and other social factors explain the urban-rural difference in son preference.

In the following section, we explain the theoretical background about how each factor explains the relationship between urban-rural locations and son preference. In the next two sections, we present our data and methods, and summarize our results. In the last two sections of this paper, we address the limitations and contributions of this study and propose suggestions for future research.

2. The factors influencing son preference

Personal socio-economic characteristics, son's economic and cultural utilities, gender role ideology, and patriarchal beliefs have been proposed to attribute to son preference (Arnold and Liu 1986; Hardee, Xie and Gu 2004; Liang 2008; Qiao 2004). But few studies have tested whether the beliefs in son's economic and social-cultural utilities and conservative attitudes toward gender role and patriarchal values actually result in son preference. Furthermore, these factors have not been used to explain the difference in son preference between rural and urban areas. In this section, we will explain how these factors might affect the desire for sons and how they differ between rural and urban areas.

a. Individual social economic characteristics

Demographic characteristics, such as age, education, and income, are related to different attitudes toward having sons. Age is positively related to son preference. Hardee et al. (2004) found that son preference is more prominent among middle-aged and older women than among young women. Jin, Li and Feldman (2007) reported that women married after 1990 are less likely to prefer sons than those who married earlier (1981-1989), controlling for education, occupation and marriage arrangement. Education changes people's attitudes toward childbearing because it leads them to rethink the value and meaning of having children. The higher individuals' educational attainment, the weaker is their preference for sons (Liang 2008). Qiao (2004) showed that people with middle school education or higher have significantly weaker son preference than people with primary school education or less. Furthermore, son preference is more prominent among couples of lower socioeconomic status (Arnold and Liu 1986). A study in Guangdong province found low income families reported stronger preference for sons when they could only have one child (Liang 2008). The above-mentioned socio-economic characteristics are associated with the urban-rural discrepancy in economic development level in China. People in rural areas tend to be less educated and have lower income compared with urban residents.

b. Son's economic utility

In China, giving birth to sons is economically significant for a family. Sons are more likely than daughters to help a family on farm lands or in family business (Jin, Li and Feldman 2007). In rural areas, traditional customs require a woman to live with her husband's family after marriage which makes it hard for the woman to return to her parents' place (Gupta et al. 2003). A Chinese traditional saying describes a married daughter as "water splashed out of a bowl". Parents cannot count on getting anything back from their married daughters. In cities, the situation is different. It is common for a married couple to build a nuclear family instead of living with the husband's parents. A married woman can continue to visit and take care of their parents.

In addition, due to the absence of a well-established social welfare system, old age support in China is traditionally regarded as the responsibility of families. A study in Anhui, Jiangsu, and Yunan provinces showed that 47-56% of women believed they would live with their sons when they are old, whereas only 9-34%¹ thought they would live with their daughters (Hardee, Xie and Gu 2004). Again, rural and urban areas differ in their need for support from sons in old age. Only urban residents working in the formal sectors receive social welfare benefits, including old age, health, life, hazard, and disability insurances (Hardee, Xie and Gu 2004). Elderly rural residents without adult children can live on the subsidy from the "five guarantees" program provided by villages: food, housing, clothing, health care, and burial expenses (Hardee, Xie and Gu 2004). However, their living standard is relatively low and receiving care from villages is viewed negatively within rural communities. Therefore, lacking social insurance, rural residents have to depend on their own children, especially sons, for support in their old age.

Because of the prevalence of traditional customs of family structure and the lack of social insurance, rural residents may have formed stronger perception that sons are critical for old age support throughout history. This belief is a potential cause for son preference. In a fertility survey in Hubei province, half of the respondents identified the desire for old age support as the main reason to have a son (Davin 1985). In a study in Guangdong province, those who believe that "only having sons could guarantee my life in old age" reported stronger son preference (Liang 2008). Similarly, those who believe that only son can provide labor and income to the family showed stronger son preference (Liang 2008).

In sum, perception about son's economic utility is one primary motivation to prefer sons over daughters. Furthermore, people in rural areas place more value on sons, because they are more likely to believe sons could bring economic benefits to the family compared to urban residents.

c. Son's sociocultural utility

Another important factor why sons are believed to be important for a family is because they meet the cultural and social needs of the family. First, having male children allows the continuation of family lineage, since only sons' offspring are entitled to use their fathers' surnames (Jin, Li and Feldman 2007). The continuation of family line was rated as the second most important reason to have sons in the fertility survey in Hubei province (Davin 1985). According to Confucian culture, failing to have a son is regarded as one of the three grave unfilial acts because it cuts off the family lineage (Wong 2005). Additionally, having sons is culturally important because only sons are allowed to perform last rites or ancestor worship for their parents. In some areas in China, people believe that the souls of deceased parents could be salvaged only if their son ignites the funeral pyre for them (Mutharayappa, Choe, Arnold and Roy 1997). In rural areas where the traditional culture is well preserved, it is a social norm that giving birth to a son is the duty of a woman. In many rural areas, a woman without a son is discriminated and badly treated by her husband's family (Xie 1998).

In terms of fulfilling family's social needs, having a son helps a family to build broader social network, achieve better social evaluation, and gain more social support (Feng and Zhang 2002). Having more sons indicates that a family thrives. The more sons a family has, the greater power and social status it will gain in a village. In contrast, families without a son are often ridiculed by community members (Lavelly, Li and Li 2001). In short, traditional belief about son's cultural utility to continue family lineage and social norms serve as driving forces behind the desire for sons.

d. Gender role ideology

¹ The range shows the difference between the numbers from three different provinces.

Gender role ideology refers to the expectation about women's and men's appropriate roles, rights, and responsibilities in a society. In China, especially in rural areas, traditional gender role ideology emphasizes the value of men over women. Within a family, for example, a man's role is to support the family through breadwinning activities and a woman fulfills her role through housework and child caring. Besides, the continuing, perhaps even ingrained, traditional gender role ideology is reflected in gender inequality in education and in the labor market (Bauer, Wang, Riley and Zhao 1992). In China, females, on average, have both lower educational attainment and lower income than males (Wong 2005).

Existing literature doesn't examine the direct relationship between gender role ideology and son preference, but it is shown that some expressions of traditional gender role beliefs are positively linked to son preference. For example, Liang (2008) found that families which distribute more properties to males and invest more in male children showed stronger son preference.

The status inequality between men and women is greater in rural areas than in cities (Gu and Chen 2005). Thus, gender role beliefs are more traditional among rural residents. In conclusion, gender role ideology is related to son preference and – furthermore – the gender role ideology is generally stronger in rural areas than in urban areas of China.

e. Patriarchal beliefs

The patriarchal, more specifically patrilineal and patrilocal, system is rigid in Chinese society, especially in rural areas (Gupta et al. 2003; Li 2000). Patrilineality means passing the family's productive assets through the male line, while daughters obtain some movable dowry, and tracing a person's family lineage through the father's side. Partilocality indicates the tendency of couples to live at men's family after marriage. Both patrilinearity and patrilocality generate patriarchal beliefs that grant greater power to the male family member, place more value on male offspring, and provide a solid basis for son preference.

Patriarchal attitudes and beliefs are prevalent in China, particularly in the rural areas (Hooper 1984). These beliefs include respecting the preeminent status of men in the household (Croll 1994) and placing greater values on male offspring than female offspring (Clark, Colson, Lee and Scudder 1995). In sum, patriarchal beliefs are more prominent in rural areas and are likely to increase son preference.

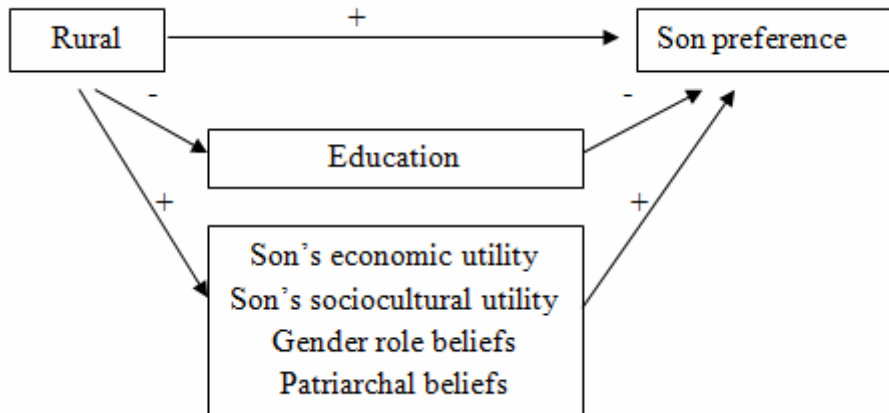
3. Hypotheses

To understand the difference in son preference between rural and urban areas in China we first need to establish that such a difference exists.

Hypothesis 1: The likelihood of son preference in China is higher in rural areas than in urban areas.

However, the main aim of this paper is not to establish the difference between the son preference in urban and rural areas, but to understand why this difference exists. As discussed above, earlier literature suggested several factors influencing the son preference in China. Many of those, such as education, son's economic utility, son's cultural utility, patriarchal beliefs, and gender role ideology, vary by urban-rural residential location. Therefore, we propose a mediation model in which demographic characteristics and social-cultural beliefs explain the urban/rural difference in son preference.

Figure 1. Conceptual Model of Mediation Hypotheses



According to the conceptual model in Figure 1, rural residents have stronger son preference than urban residents. Based on the literature reviewed above, we propose that there are five different mechanisms or mediators that explain why rural residents have higher son preference: 1) education, 2) the perception of son's economic utility, 3) the perception of son's cultural utility, 4) gender role beliefs, and 5) patriarchal beliefs. As stated above, all of these factors have been associated with stronger son preference. Furthermore, rural areas have, on average, a lower level of education. Families in rural areas depend more on son's economic utilities in terms of providing labor and old age support; rural areas have stronger perception of son's economic and cultural utility, stronger gender role and patriarchal beliefs. Thus, we expect all of these factors to explain some of the relationship between the urban/rural location and son preference.

Hypothesis 2.1: The relationship between residential location and son preference is partially mediated by education.

Hypothesis 2.2: The relationship between residential location and son preference is partially mediated by the perception of son's economic utilities.

Hypothesis 2.3: The relationship between residential location and son preference is partially mediated by the perception of son's sociocultural utility.

Hypothesis 2.4: The relationship between residential location and son preference is partially mediated by gender role beliefs.

Hypothesis 2.5: The relationship between residential location and son preference is partially mediated by patriarchal beliefs.

4. Data and methods

a. Data

We use Chinese General Social Survey (CGSS) data collected in September through December of 2006, the newest CGSS data available. The fieldwork is undertaken by All China Strategic Research. CGSS is a national survey of all Chinese people aged 18-69 carried out by interviews at respondents' homes. A total of 3,208 people from 28 provinces responded to the family questionnaire. The total valid response rate was 45%, compared to AAPOR estimates of a 50% response rate in the US for a rigorous survey in 2003 (Keeter et al. 2006). The sample was drawn using a stratified sampling method from four strata: county, town, community, and household.

Counties, towns, and communities were drawn from the frame provided by the 2000 census. Households were randomly drawn from communities, and one person was randomly drawn from each selected household.

b. Measures

Son Preference & Residential Location

The dependent variable **son preference** is measured by one item: “If you could have only one child, do you prefer a son or a daughter?” This measure is legitimate and realistic in the Chinese context because it takes into account the restriction of one-child policy. The answers are “son” coded as 1 and “daughter” and “son and daughter are the same” coded as 0. In the survey, 25.4% respondents prefer to have a son, 65.2% chose “son and daughter the same”, and only 9.4% prefer to have a daughter, which evidently reveals the general tendency of son preference.

Table 1. Prevalence of Son Preference by Residential Location

Son preference	Residential location		Total
	Rural	Urban	
Prefers sons	33.8%	19.5%	25.4%
Prefers daughters	6.1%	11.7%	9.4%
Son and daughter the same	60.0%	68.8%	65.2%
Total	100%	100%	100%
N	1,309	1,899	3,208

Source: CGSS, 2006.

Table 1 displays people’s preference of child’s gender by residential location. Based on Chi-square association test, son preference is more prevalent in rural areas than in urban areas (Pearson Chi-Square=97.168, $p < 0.01$). In rural areas about 34% of respondents prefer sons, compared to only 20% among urban residents. At the opposite, the percentage of respondents that prefer to have daughters is higher in urban areas (11.7%) than in rural areas (6.1%).

Our main independent variable is **residential location**. It is measured by residential registration of the individuals which is called “*Hukou*” registration, including three categories, urban, rural, and blue-cover *Hukou*². The blue-cover type is combined with the urban type due to its similarity to the urban *Hukou*. Rural *Hukou* is coded as 1, urban and blue-cover *Hukou* coded as 0. Rural residents account for 38%, urban residents for 62% of the sample.

Mediating Variables

In accordance with our hypotheses, we measure five mediating concepts: 1) education, 2) the perception of son’s economic utility, 3) the perception of son’s cultural utility, 4) gender role belief, and 5) patriarchal belief. **Education** is measured by years of education, ranging from 1 to 23 years. The average education is about 9.3 years (equivalent to completing middle school). As Table 2 indicates, the average level of education differs in rural and urban areas: on average people in rural areas have about 7.5 and people in urban areas have about 10.4 years of education ($p < .001$).

² Blue-cover *Hukou* refers to temporary residential registration for people who have moved to a city from other areas and have bought an apartment or have found a job in that city. People holding blue-cover *Hukou* can enjoy the same benefits as the formal residents of that city and they will probably get formal *Hukou* within 3 to 5 years.

Table 2. Means for Independent Variables by Residential Location

	Overall mean	Residential Location		Significance ^a
		Rural	Urban	
<i>Socioeconomic Status</i>				
Years of education	9.29	7.47	10.40	.000
<i>Son's economic utilities</i>				
Sacrifice for parents	.55	.57	.53	.019
Son support parents	.15	.23	.10	.000
<i>Son's cultural utilities</i>				
Family lineage continuation	.44	.53	.38	.000
<i>Gender role beliefs</i>				
Index of gender role belief	10.49	11.01	10.16	.000
<i>Patriarchal beliefs</i>				
Father's supreme power	.84	.83	.84	.423
Oldest son heritage	.28	.32	.26	.000
Importance of husbands' family	.43	.45	.42	.057
<i>Control variables</i>				
Male	48%	50%	47%	.213
Age	41.49	40.10	42.33	.000
Income (in thousands)	11.55	7.34	14.12	.000
Marital status ^b				
Married or cohabitating	81%	83%	79%	.069
Divorced, separated, widowed	5%	5%	6%	
Children ^c				
Only daughters	24%	17%	28%	.000
Only sons	32%	28%	34%	
Both daughters & sons	26%	38%	18%	
Religious	11%	11%	11%	.576

^a Significance level from t-tests (continuous variables) and chi-square tests (for categorical variables); testing the difference between urban and rural areas.

^b Compared to single.

^c Compared to no children.

Source: CGSS, 2006; N=2,806

The perception of son's economic utilities is reflected in two respects in the literature, namely, providing labor for families and supporting parents in their old age. However, since the CGSS does not contain questions about providing labor to the family we measure son's economic utility by two variables concerning the belief of son's supporting function in parents' old age.

The first indicator of son's economic utility measures the attitudes regarding children's responsibility to sacrifice for parents. The question in the survey is "Do you agree with that children should sacrifice their own pursuits to fulfill their parents' dreams?" This indicator is measured by a seven-point Likert scale with responses ranging from strongly disagree to strongly agree (larger values indicating stronger belief in son's economic utility). For our analyses, we have dichotomized the responses with first 4 categories recoded into 0 and last 3 categories recoded into 1. About 55% of the respondents agree with the statement that children should sacrifice their own

pursuits to fulfill their parents' dreams. As shown in Table 2, this belief is stronger in rural than in urban areas (57% vs. 53%; $p < .05$).

The second indicator is a more specific question about son's responsibility to support parents. The question is "*Who should support parents during their old ages?*" The answers "*daughters*", "*none of the children should*", "*other*", "*both sons and daughters can*", and "*all of the children should*" are collapsed and coded as 0; "*Sons*" and "*oldest son*" is coded as 1. Thus, this measure indicates whether sons should support parents during their old ages. On average, 15% of the sample believes that sons should support parents during their old ages. The belief about son's responsibility to support parents is stronger in rural than in urban areas (23% vs. 10%; $p < .001$).

The data do not include much information about the perception of son's **sociocultural utility**. We use only one variable concerning son's function to continue family lineage: "*In order to continue the family lineage, it is necessary to have at least one son.*" The original seven point Likert scale from strongly disagree to strongly agree is dichotomized with first 4 categories recoded to 0 and last 3 recoded to 1. About 44% of the sample believes that in order to continue the family lineage it is necessary to have at least one son. Again this belief is stronger in rural than in urban areas (53% vs. 38%; $p < .001$).

For **gender role beliefs**, we have three indicators measuring the attitudes regarding the appropriate roles of women and men within families and in the labor market. All use 7-point Likert scales (from strongly disagree to strongly agree):

- 1) "*It is more important for wives to support the career of their husbands than to pursue their own careers.*"
- 2) "*Husbands' responsibility is to earn money and wives' responsibility is to take care of the family.*"
- 3) "*In the economic downturn, women should be dismissed first.*"

The Cronbach's Alpha for the three items is 0.64. We add these items to build an index for gender role belief ranging from 1 to 21. Based on a t-test, the gender role belief is significantly stronger in rural than in urban areas (11.01 vs. 10.16; $p < .001$).

We measure **patriarchal beliefs** with three variables indicating the belief in: 1) father's supreme power, 2) oldest son's heritage, and 3) importance of husbands' families. The original questions show agreement with the following statements (7-point Likert scales from strongly disagree to strongly agree):

- 1) "*In any case, father's authority should be respected.*"
- 2) "*Eldest son should inherit more family property.*"
- 3) "*When wife's families and husband's families both need help, the couple should first help husband's families.*"

The Cronbach's Alpha for the three items is relatively low (.54), so we keep the three items as separate variables. Again, we dichotomize each item with the first 4 categories coded as 0 and last three coded as 1. As shown in Table 2, there is no difference in the belief in father's supreme power in rural and urban areas ($p > .4$). The belief concerning oldest son's right to inherit more family property is significantly stronger in rural areas than in urban areas: 32% of the rural sample believes that oldest son has the right to inherit more family property while only 26% of the urban sample believe this ($p < .001$). The belief that husband's family is more important does not vary considerably between rural and urban areas ($p = .057$).

Control Variables

We use a series of control variables that might have an effect on both the beliefs and on son preference. First, we control for gender (male coded as 1) and age. In both rural and urban areas just below half of respondents are male. Respondents' ages range from 18 to 70 years with the average age of 41 years. The average age in rural areas is somewhat lower than in urban areas ($p < .001$). We also control for income (measured as respondent's total income in 2005 in thousands of yuan)³. The average income is 11.5 thousand yuan per year, though it varies based on location. In rural areas the average income is 7 thousand, while in urban areas the average income is 14 thousand yuan ($p < .001$). Marital status is measured by two dummy variables: currently married (81%) and previously married (divorced; separated; widowed; 5%). These two categories are contrasted against single respondents (14%). In addition, we control for having children and the gender of children. On average, 24% of the sample has only daughter(s), 32% of the sample has only son(s), and 26% of the sample has both daughter(s) and son(s). The comparison category is no children (18%)⁴. And finally, we control for being religious. The original question differentiates between different religious traditions (Buddhism, Taoism, folk beliefs, Islam, Catholic, Christianity, and other). However, all of these groups are fairly small. Therefore, we dichotomized the measure for just being religious (11%) or not (89%). There is no difference in the proportion of religious respondents between rural and urban locations.

c. Analytic procedures

As proposed by our hypotheses, we expect the relationship between residential location and son preference to be mediated by education, the perception of son's economic utilities, the perception of son's sociocultural utilities, gender role beliefs, and patriarchal beliefs. Four conditions need to be met in order to verify the existence of a mediating effect: 1) the independent variable (urban-rural location) should have a significant impact on the dependent variable (son preference); 2) the independent variable must have a significant influence on the mediating variables; 3) the mediating variables must significantly affect the dependent variable; 4) adding the mediating variables in the model significantly reduces the effect of the independent variable on the dependent variable (Baron and Kenny 1986). It is called a complete mediation if introducing mediating variables into the model makes the relationship between the independent and dependent variable non-significant and it is a partial mediation when the relationship between the independent and dependent variable becomes weaker but still significant (Baron and Kenny 1986).

To meet the conditions above, we first use binary logistic models to test the effect of urban-rural location on categorical mediating variables⁵. Linear regression is used to test the impact of residential location on education and the index of gender role belief. Next, we estimate nested binary logistic regression models predicting son preference. The first model includes the control

³ For 136 missing cases in income we imputed the income value based on family income (the correlation between the two is .75). The results of the multivariate analysis are not affected by the imputation.

⁴ We estimated the same multivariate analysis with more detailed information separating out having just one daughter or two or more and having one son or two or more. The number of daughters or sons did not seem to matter (the coefficients for one daughter and more daughters were similar; coefficients for one son and more sons were similar).

⁵ We also used the original Likert-type coding requiring ordered logistic regressions. However, the proportional odds assumption was not met in these models (except the model predicting father's supreme power). We proceeded to estimate generalized ordered logistic models (`gologit2` command in Stata) and the binary logistic regressions predicting the dichotomized mediating variables. The substantive results regarding the mediating effects from all these models were similar. Therefore, we chose the simpler method (binary logistic regression) to be presented in the paper.

variables and the main independent variable residential location. The next nested models are adding mediating variables (education, son's economic utilities, son's cultural utilities, gender role beliefs, and patriarchal beliefs). Finally, we also use a new method developed in Stata to separate out the proportion of direct and indirect effect of residential location on son preference (Buis 2010). In all regression analyses, we use listwise deletion. The final sample size in the multivariate analyses is 2,806 respondents (down from the total sample size of 3,208 – a reduction of 12%).⁶

5. Results

As the first step in establishing the mediating effects, Table 3 presents the results of binary logistic and linear regression models showing the impact of residential location on the hypothesized mediating variables when controlling for gender, age, education, income, marital status, having children, and religiousness. We use linear regression for years of education and for the index of gender role beliefs (models 1 and 5). The rest of the models are binary logistic regression models as the dependent variables are dichotomized. Model 1 shows that rural area residence has a negative impact on education: people in rural areas are expected to attain 2 and half years less education than people in urban areas ($p < .001$). Compared to urban residents, people in rural areas are more likely to believe in son's responsibility to support parents (model 3; $p < .001$). Models 4, 5, and 7 reveal that attitudes toward son's cultural utility and gender role beliefs are more traditional among rural than urban residents. People in the rural areas are more likely to believe that sons are necessary in family lineage continuation (odds ratio of 1.47; $p < .001$); have higher levels of gender role belief (unstandardized coefficient from linear regression of .33; $p < .05$); and are more likely to believe that older son should inherit more family properties ($p < .05$). According to models 2, 6, and 8, there is no difference in the belief that children need to sacrifice for their parents and two measures of patriarchal beliefs (father's supreme power & husband's family importance) between urban and rural locations. Thus, education, one measure of son's economic utilities, son's cultural utility, gender role beliefs, and one measure of patriarchal beliefs pass the first test of the mediation. One measure of son's economic utilities and two measures of patriarchal beliefs do not pass this first test of mediation.

As the next step, we estimate a set of nested binary logistic regression models, first establishing the relationship between residential location and son preference without mediating effects and then adding the mediating effects in the model one by one (see Table 4). Model 1 includes only the control variables and the residential location. People in rural areas have 77% higher odds of preferring sons than people in urban areas ($p < .001$). This supports our first general hypothesis (H1).

Next, we include the first mediating effect, years of education (model 2). Adding education improves the model fit significantly (LR Chi-square = 16.23, $df = 1$, $p < .001$). Consistent with our expectation, people with higher education are less likely to report son preference: each year of education decreases the odds of son preference by 7% (odds ratio of .93; $p < .001$). Residential location still exerts a significant positive influence on son preference. However, the coefficient for residential location is reduced by 32% in absolute size (log odds of .39 instead of .57). Therefore, education meets all four requirements of mediation and it partially mediates the relationship between residential location and son preference (Hypothesis 2.1).

⁶ We present unweighted multivariate analysis. Weights are necessary to avoid bias in population parameter estimates (therefore, one should not use this paper to estimate how much son preference there is in general in China). However, in multivariate analysis that aims to uncover relationships between variables (unless the sampling weights are based on the dependent variable) unweighted estimates are preferred because they are unbiased, consistent and have smaller standard errors than weighted estimates (Winship and Radbill 1994). Preliminary results from weighted regressions closely mirror the unweighted results.

Table 3. Odds Ratios from Binary Logistic and Unstandardized Coefficients from Linear Regression Models: The Effect of Rural Location on Mediators for Son Preference in China

Independent variables	Socio-economic characteristics	Son's economic utilities		Son's cultural utility	Gender role belief	Patriarchal beliefs		
	Years of education ^a	Sacrifice for parents	Son support parents	Family lineage continuation	Gender role belief ^a	Father's supreme power	Oldest son inherit more	Importance of husbands' family
	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)	(Model 6)	(Model 7)	(Model 8)
Rural	-2.79***	1.15	2.01***	1.47***	.33*	.84	1.26*	.91
<i>Control variables</i>								
Age	-.07***	1.01*	1.01	1.00	-.01*	1.00	1.00	1.00
Male	.51***	.94	1.82***	1.18*	.56***	1.11	1.15	1.29**
Years of education	--	.99	.93***	.96**	-.13***	.98	.99	.94***
Income (in thousands)	.02***	.99**	1.00	1.00	-.00	1.00	1.00	.99
Marital status ^b								
Married/cohabitating	-.35	1.19	.41*	1.05	.22	1.60	1.38	1.28
Previously married	-.92**	1.23	.54	.88	.13	1.32	1.49	1.14
Children ^c								
Only daughters	-.65*	.99	1.71	.92	.38	.80	.70	.95
Only sons	-.84**	.95	2.46*	1.74**	.64*	.73	.68	.97
Both	1.53***	.96	2.64**	2.19***	.90**	.83	.89	1.05
Religious	-.35*	1.06	1.63**	1.16	-.15	1.37	1.14	1.41**
Constant	13.89***	.81	.13***	.59*	11.04***	5.75***	.29***	1.13
Nagelkerke R² or R²	.35	.02	.10	.09	.06	.01	.02	.03
Likelihood Ratio Chi-square or F-statistic	152.57***	41.14***	158.86***	187.15***	15.32***	11.41	32.42**	55.27***
Degrees of freedom	10	11	11	11	11	11	11	11

^a Linear regression is used for education and gender role belief index. The rest of the models are binary logistic regression models.

^b Compared to single.

^c Compared to no children.

Source: CGSS, 2006; N=2,806 *** p < .001 ** p < .01 * p < .05 (two-tailed tests)

Table 4. Odds Ratios from Binary Logistic Regression Predicting Son Preference in China

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Rural	1.77***	1.47***	1.32**	1.25*	1.25	1.25*
<i>Control variables</i>						
Male	1.47***	1.54***	1.41***	1.37**	1.35**	1.36**
Age	.99**	.98***	.98***	.98***	.98***	.98***
Income (in thousands)	1.00	1.00	1.00	1.00	1.00	1.00
<i>Marital status^a</i>						
Married/cohabitating	1.58	1.55	1.75*	1.80*	1.79*	1.83*
Previously married	1.90*	1.80	1.92*	2.07*	2.07*	2.12*
<i>Children^b</i>						
Only daughters	.75	.72	.68	.67	.66	.64
Only sons	2.06**	1.97**	1.84**	1.62*	1.60*	1.54
Both	1.89**	1.72*	1.58	1.29	1.27	1.23
Religious	1.53**	1.51**	1.39*	1.38*	1.39*	1.41*
Years of education		.93***	.94***	.95**	.95**	.95**
<i>Son's economic utilities</i>						
Sacrifice for parents			.96	.75**	.73**	.76**
Son support parents			3.14***	2.87***	2.84***	2.91***
<i>Son's cultural utilities</i>						
Family lineage continuation				2.89***	2.78***	2.90***
<i>Gender role belief</i>						
Gender role belief index					1.03	1.04*
<i>Patriarchal beliefs</i>						
Father's supreme power						1.03
Oldest son heritage						.78*
Importance of husbands' family						.91
Constant	.14***	.36***	.32***	.23***	.17***	.16***
<hr/>						
Nagelkerke R²	.09	.10	.15	.20	.20	.20
LR Chi-square for whole model (d.f.)	174.43*** (10)	190.91*** (11)	285.78*** (13)	397.97*** (14)	400.60*** (15)	407.16*** (18)
LR Chi-square for model change (d.f.)	34.47*** (1)	16.23*** (1)	97.19*** (2)	108.27*** (1)	2.62 (1)	6.47 (3)

^a Compared to single.

^b Compared to no children.

Source: CGSS, 2006; N=2,806. *** p < .001 ** p < .01 * p < .05 (two-tailed tests)

Adding variables concerning son's economic utilities into model 3 increases the model fit even more (Chi-square = 97.19, $df = 2$, $p < .001$). The effects of residential location and education still remain significant. The coefficient of residential location is reduced again, 28% in its absolute size (log odds changing from .39 to .28; the significance level has also been reduced from $p < .001$ to $p < .01$). Those who believe that it is son's responsibility to support parents in their old age are more likely to prefer sons than those who believe that parents should be supported by all kids or daughters or other institutions (odds ratio of 3.14; $p < .001$). Therefore, this variable also meets all four requirements of mediation. However, the belief in children's responsibility to sacrifice their own needs for their parents does not increase the likelihood of son preference, therefore, this indicator of son's economic utility does not act as a mediator between residential location and son preference.

When we include the belief that sons are crucial for family lineage continuation (indicator of son's cultural utility) into model 4, the model fit is again improved significantly (LR Chi-square = 108.27, $df = 1$, $p < .001$). Those who believe that sons are necessary to continue family lineage are more likely to show a preference for sons (odds ratio of 2.89; $p < .001$). The effect of residential location is reduced again, both in absolute size and in significance level (21% drop in log odds from .28 to .22, significance level now at $p < .05$). Thus, the belief that sons are needed for family lineage continuation also meets all four conditions of mediation. Interestingly, the coefficient for the sacrifice for parents is now significant. It shows an unexpected negative relation between the belief that sons should sacrifice for their parents and son preference. Thus, controlling for son's cultural utility, those who think that children should sacrifice their own pursuits to realize the dreams of their parents' are less likely to prefer sons.

In model 5, including the index for gender role belief does not improve the model fit. The influence of residential location is not reduced in its absolute size; however, it is now not significant. Therefore, gender role belief does not mediate the effect between residential location and son preference.

The last model (model 6) includes the three indicators for patriarchal beliefs. Again, the fit of the model is not increased. Neither is the effect of residential location reduced. The only significant addition is the belief in oldest son heritage, however, it is in an unexpected direction. Those who believe that the oldest son has the right to inherit more family properties are less likely to prefer sons (odds ratio of .78; $p < .05$). In conclusion, these three variables do not mediate the effect between residential location and son preference.

As an additional analysis, we decompose the direct and indirect effects of residential location on son preference using a Stata command *ldecomp*. This innovative method allows us to estimate what percentage of the direct effect goes through the mediator when the dependent variable is dichotomous (Buis 2010). We test this with the three mediating effects that fulfill the four requirements of mediation: 1) years of education, 2) son's responsibility to support parents, and 3) family lineage continuation. We calculate separate models for each mediator, controlling for gender, age, income, marital status, having children, and religiousness. The model with education as the mediator shows that 33% of the total effect of rural residence on son preference goes indirectly through education. The model with the belief about son's responsibility to support parents indicates that the indirect effect through this mediator accounts for 30% of the total effect of residential location on son preference. Finally, the indirect effect through the belief that sons are necessary for the continuation of family lineage accounts for the 28% of the total effect between residential location and son preference.

6. Limitations

Before we draw the conclusions from these results, we want to acknowledge the limitations this study has. The first of these limitations is that in the CGSS data son preference is measured as a status of mind, which is not synonymous with sex preferential behavior (Nie 2008). Therefore, this study can only explain the preference towards having sons; it is not able to link the attitude with the actual sex-selective family planning behaviors.

Also, since the data we use is cross-sectional data, we can only hope that the relationships explored here are causal relationships. Statistically, it is impossible to establish causal relationships with these data.

Moreover, using second-hand data limits our freedom to design questions to measure the concepts we need. The CGSS does not contain enough questions about sons' social and cultural utilities. Therefore, we are unable to use the belief regarding son's utility in improving family's social status, building family network, and in performing at parents' funerals. Furthermore, one of the current measures of son's economic utilities (the belief about children needing to sacrifice their own pursuits for their parents' dreams) is measuring the belief about children in general, not specifically whether daughters or sons should sacrifice for parents. Therefore, this is not the best measure for son's economic utility (and it did not turn out to be a mediator). The dependent variable, son preference, is measured by a single question—"If you could have only one child, do you prefer a son or a daughter?" This measure is powerful because it reflects the son preference under the strict regulation of one-child policy. However, the one-child policy in China has been relaxed for several population groups, especially in rural areas, to allow more than one child. In addition, our measure is not able to capture son preference in higher parities of birth. In addition, it could be that the level of son preference is underestimated because respondents might be reluctant to admit this preference during in-person interviews. Therefore, we caution against generalizing the level of son preference in China based on these results; however, the relationships between the variables should still be generalizable. Better measures of both the mediators and the dependent variable may allow deeper insight into the relationship between residential location and son preference.

Finally, due to the limitation of available data, this study is unable to compare son preference across time. The CGSS only has 4 waves of data during a limited time period from 2003 to 2006. If future studies could compare data over longer periods of time, such as 10 years, it would be valuable to investigate how son preference has changed over time.

7. Discussion and conclusion

In conclusion, we find that the likelihood of son preference is indeed significantly higher in the rural areas of China than in the urban areas. This is consistent with existing literature. To get a better overview of the mediating effects see Table 5: a summary for the fulfillment of all four requirements of mediation identified by Baron and Kenny (1986). Three of the expected mediators indeed operate as mediators for the relationship between residential location and son preference: 1) education, 2) the belief in son's responsibility to support parents (son's economic utility), and 3) the belief in son's cultural utility to continue family lineage (son's cultural utility).

For these three mediating variables all four conditions are met: 1) residential location has a significant impact on the likelihood of son preference when the model does not include the mediating variables (Model 1 in Table 4); 2) residential location has a significant influence on the mediators (Table 3); 3) the three mediators have a significant effect on son preference (Table 4); and 4) adding the mediating variables in the model reduces the effect of residential location on son preference (Table 4).

However, opposite to our hypotheses, gender role beliefs, patriarchal beliefs, and one measure of son's economic utilities (sacrifice for parents) do not act as mediators between residential location and son preference. It is interesting to understand why these hypothesized mediation effects do not exist in our data.

First, belief in children's responsibility to sacrifice for parents does not differ between rural and urban areas. Another surprising finding is that the more people think that children should sacrifice for parents the less son preference they have (when controlling for family lineage continuation). One explanation could be that the belief that children have the obligation to sacrifice their own pursuit for parents makes the individuals feel secure as long as they have a child no matter whether it is a boy or a girl. Thus, this makes it less important for them to have a son.

Second, as demonstrated in Table 5, residential location has a significant impact on gender role belief. This relationship is consistent with our expectation. People in rural areas hold more traditional and unequal gender role ideology. However, although previous literature often regard gender inequality in education and employment as a reason for son preference, our results show that conservative gender role beliefs do not lead to stronger son preference. Gender role beliefs measure the proper role of men and women within the family and reflect women's status in the labor market. Gender role attitudes fail to predict people's preference of their child's gender because 1) these attitudes are rather abstract, 2) they address different aspects of our life, and 3) people tend to give socially desirable answers of gender role ideology. The empirical evidence in China confirms this: as the education and employment rate of women increased in the past several decades, the sex ratio at birth did not drop, but soared. Thus, women's subordinate status in a society is a far less important reason for son preference in China compared with other reasons such as son's economic and socio-cultural utilities which are determined by the traditional Confucian culture and the patrilineal family system.

Third, the three items of patriarchal beliefs do not act as mediators because these beliefs are similar in rural and urban areas. The first item, father's supreme power, is ingrained in Chinese culture and people's minds. Majority of the sample (84%) believe in father's supreme power: this item shows much higher agreement than other items. Confucian culture proposes a strong hierarchy within families in which older males have higher status and should be respected by younger generations. Thus, father's authority at home is supported in both rural and urban China. Similar logic would probably apply for the belief that husband's family is more important. The bivariate difference in the means for this belief between rural and urban areas (only marginally significant) can be mostly explained by the rural-urban disparity in education.

The results of our research provide valuable knowledge about why son preference is different in rural and urban China. According to our results, the cruxes of changing people's gender preference of children are improving education and providing social welfare programs. First, a direct approach that can change the persistent son preference in rural areas is through education. Government should improve the level of educational attainment for rural residents by administrative and economic means. Second, the ingrained traditional beliefs about son's economic and cultural utilities need to be altered. As the social welfare system and social insurance become more prevalent in Chinese rural areas, people's dependence on son's economic function to support them in old ages might be reduced. The belief that only sons can continue the family lineage in the Confucian culture is hard to change quickly, but it might be weakened as new generations get access to diversified cultures.

Table 5. Summary of the Four Requirements of Mediation

Mediators	Requirements of Mediation			
	First	Second	Third	Fourth
	Rural → Son Preference	Rural → Mediator	Mediator → Son Preference	Reduction in Rural → Son Preference Relationship
<i>Socioeconomic factors</i>				
Years of education	√	√	√	√
<i>Son's economic utilities</i>				
Sacrifice for parents	√	NS	NS / √ -	√
Son support parents	√	√	√	√
<i>Son's cultural utilities</i>				
Family lineage continuation	√	√	√	√
<i>Gender role belief</i>				
Gender role belief index	√	√	NS / √	No
<i>Patriarchal beliefs</i>				
Father's supreme power	√	NS	NS	No
Oldest son heritage	√	√	√ -	No
Importance of husbands' family	√	NS	NS	No

Note: √ stands for a significant effect; NS stands for not significant.
 Rows for factors that satisfy all four requirements are highlighted.

We believe that this paper gives valuable insight to the reasons why son preference is stronger in rural areas than in urban areas of China. However, further studies are needed that would be able to better measure the various beliefs that are hypothesized to explain this difference. It would also be interesting to see whether son preference is stronger in some geographic areas of China than others. And finally, the most interesting extension of this study would be to see how the explanations for the difference in son preference change over time. It is possible that some of the mediators that were hypothesized here to explain the difference between rural and urban areas did indeed explain it in the past; however, they might be losing their importance as China is moving forward with cultural modernization.

Our study focuses mostly on beliefs and attitudes as potential mediators between location and son preference (education is the only one that differs, however, education is highly correlated with beliefs). Our models were almost fully able to explain the relationship between location and son preference (with the effect of location in the final model either insignificant or close to insignificant). However, this does not mean that these are the only factors explaining the difference in son preference in urban and rural locations. Further research is needed to establish whether other types of factors, such as community development, social welfare, women's social and economic status, etc., could also help to explain this difference.

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