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# Do Siblings Make Us Happy?

Shun Wang\* and Weina Zhou†

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## Abstract

In this paper we estimate the causal effect of having brothers as compared to having sisters on individuals' happiness in China. To identify the effect, we explore random gender assignment of siblings, conditional on the number of siblings, among urban residents born before the One Child Policy (1979). We find that having more brothers significantly increases individuals' happiness. Specifically, having one more brother rather than one sister increases one's self-reported happiness by 0.023 on a 1 to 5 scale, which is equivalent to the effect of a 14% increase in the annual household income. The brothers effect is particularly large among low-income individuals and individuals with large income uncertainties. These results are consistent with findings in early literature, suggesting that brothers provide each other with financial support in case of need.

Keywords: happiness, brothers, siblings, China

JEL codes: I31, J12, J16

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# 1 Introduction

In recent decades, the distorted gender ratio situation has become acutely felt in developing countries such as China and India. The gender ratio has a profound impact on many aspects of the economy and the society. At the macro level, studies show that it affects household savings (Wei and Zhang, 2011a), housing prices (Wei and Zhang, 2011b; Wei et al., 2012) and crime rates (Edlund et al., 2013). At the family level, it has an impact on earnings (Butcher and Case, 1994; Peter et al., 2015; Rainer and Siedler, 2009), housing (Wang and Zhou, 2015), education (Butcher and Case, 1994; Chen et al., 2014; Hauser and Kuo, 1998; Kaestner, 1997; Peter et al., 2015), as well as mobility (Rainer and Siedler, 2009). Though many of the effects of gender composition have been examined in recent studies, little attention has been paid to its effect on individuals' happiness. In a culture where male siblings have strong family ties and are able to help each other, would having more brothers rather than sisters affect an individual's happiness? If such an effect does exist, through which channel would it exist?

In the growing literature on happiness, researchers study many factors, both economic and non-economic, that can influence an individual's happiness (Easterlin, 1974; Clark et al., 2008; Helliwell and Wang, 2011; Helliwell et al., 2014, 2015; Stutzer, 2004). Most studies on the impact of family structure on happiness focus on such issues as marriage and divorce (Clark and Georgellis, 2013; Lucas et al., 2003; Yap et al., 2012; Guven et al., 2012) or parenting and children (Herbst and Ifcher 2015; Myrskylä and Margolis 2014; Pedersen and Schmidt 2014; Samoilova and Vance 2015; Stanca 2012; see Hansen, 2012 for a review of earlier work) while studies on the effect of sibling composition are rare. A recent study on college students aged 18 - 21 in the UK shows that having at least one sister is associated with lower distress and higher levels of measures important for happiness, such as perceived support and better family relations (Cassidy et al., 2014). The result, however, may only apply to youths who are economically dependent. Moreover, the study does not directly examine the impact on happiness, nor can it identify the causal impact of sibling

composition.

Our paper fills a gap in the literature by identifying the effect on happiness of having brothers rather than sisters, using the survey data of urban residents<sup>1</sup> born during the baby boom, 1945-1978. The dependent variable is an evaluative measure of subjective well-being—happiness. The key explanatory variable is the number of brothers. To deal with the endogeneity of our key explanatory variable, we follow the identification strategy used in Zhou (2014) and Wang and Zhou (2015). The underlying assumption of the identification strategy is that, conditional on the number of siblings, the gender of siblings is a random assignment by nature. We estimate the relative effect of having a brother instead of a sister. Zhou (2014) and Wang and Zhou (2015) find that this assumption is plausible among the baby boom generation in urban areas in China.

We find that having one more brother compared to a sister, conditional on the number of siblings, increases an individual's happiness by 0.023 on a 1 to 5 scale, controlling for personal, household, and parent information. The coefficient is both statistically and economically significant. Comparing the coefficient of the number of brothers with the coefficient of log household income, we further calculate that the impact of one more brother is equivalent to a 14% increase in the annual household income. We also conduct robustness checks by restricting samples or adopting different regression methods and yield consistent results.

Early literature suggests that brothers provide financial support when an individual experiences financial difficulties. For example, brothers can share their risks against income shocks, can share the burden of supporting elderly parents, or can help each other in housing purchases when the housing market is privatized (Zhou, 2014; Wang and Zhou, 2015). Ge (2015) further finds that a child having more uncles (father's male siblings) is less likely to suffer negative education effects when the father is laid off. In other words, life may become more financially secure in the presence of brothers. Thus, it is likely that individuals with more brothers are happier than those with less or zero brother(s).

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<sup>1</sup>Urban residents are defined as individuals who have an urban resident card (Huko).

We hypothesize that brothers increase one's happiness because brothers may provide financial help. If the hypothesis is true, we should observe that the brothers effect would be higher for those with a lower and/or unstable income. This is because individuals with low/unstable incomes have more need of financial security, or they are likely to experience difficulties accessing the formal financial markets, therefore depending more heavily on their brothers. We do find supportive evidence: compared to the brothers effect on individuals with high income, the brothers effect among individuals with low income is particularly large; even among the low-income group, those with unstable incomes have a much stronger brothers effect than those with stable incomes.

The rest of the paper is organized as follows. Section 2 discusses the data and empirical methods. Section 3 reports the main estimation results and some robustness checks. Section 4 presents some evidence of the channels through which gender composition matters by showing the heterogeneous impacts of gender composition in different groups. Section 5 draws conclusions.

## **2 Data and Empirical Strategy**

The China General Social Survey (CGSS) 2006 and 2008 urban data are used in this paper. The CGSS is a national-level survey widely used in investigating social and economic issues in China. The data was collected jointly by the Sociology Department of the People's University of China and the Hong Kong University of Science and Technology Survey Research Center. It covers 4 municipalities under the central government—Beijing, Shanghai, Tianjin, and Chongqing—and 24 other provinces. Only three autonomous regions are not included in the survey: Tibet, Qinghai, and Ningxia. The 2006 stratification design was based on the 2000 population census and that of 2008 was based on the 2005 1% national population survey data as sampling frame. The CGSS had 8 waves between 2003 and 2013, but only the 2006 and 2008 waves questioned respondents as to their number of siblings; thus, we employ these two waves for our study.

We use Equation 1 to estimate the effect of the number of brothers on happiness, following

Zhou (2014) and Wang and Zhou (2015). In 2006, an individual's happiness was measured by a 1 to 5 scale response to the survey question of "Generally speaking, how do you personally feel about your life?" where 5 meant "very happy" and 1 meant "very unhappy." In 2008, the question on happiness consisted of "Generally speaking, do you feel happy or not?" The answer was again measured by a 1 to 5 scale where 5 meant "very happy" and 1 meant "very unhappy."  $Bro_i$  denotes individual  $i$ 's number of brothers.  $X_i$  is a set of individual  $i$ 's basic, detailed, and parent characteristics. Basic characteristics include gender, marital status, age, age squared, years of education, and household income. Detailed characteristics further include a dummy for housing ownership, employment status dummies (full-time and part-time)<sup>2</sup>, and the number of male and female children. Parents' information includes the same set of variables for father and mother: a dummy indicating whether he or she is alive and education group dummies.<sup>3</sup> Table 1 reports the summary statistics of our variables.  $\delta(Sib_i)$  is a function of the number of siblings. We use siblings dummies to approximate this function. Parameter  $\alpha$  identifies the effect of having a brother instead of a sister on an individual's happiness.

$$Happiness_i = \alpha Bro_i + \delta(Sib_i) + X_i\beta + \varepsilon_i \quad (1)$$

The underlying assumption of this identification strategy is that, conditional on the number of siblings, the gender of siblings is a random assignment by nature. Zhou (2014) and Wang and Zhou (2015) find that this assumption is plausible among the baby boom generation in urban areas in China (see Zhou (2014) for detailed explanations and proofs). For this reason, we restrict the sample by the same criteria—respondents in urban China who were born between 1945 and 1978. In this restricted sample, the average sibling size is 2.5; among those individuals who have one or more siblings, the proportion of males in their families is 50.7%, which is very close to the

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<sup>2</sup>Individuals with no jobs are the omitted group.

<sup>3</sup>Since many parents of the baby boom generation did not have any degree level education, we divide parents' education into three education groups: (1) No education, (2) Primary school level education and (3) Middle school level education or higher.

proportion caused by the natural gender assignment estimated in the literature: 51.4%.

To estimate the effect of the number of brothers on happiness, we run simple OLS regressions for Equation 1 though the happiness scores are only integers ranging from 1 to 5; as Ferrer-i Carbonell and Frijters (2004) argue, whether happiness scores are treated as ordinal or cardinal does not matter. One benefit of OLS regression is that the coefficients are easily interpreted. Later, we conduct ordered logit and ordered probit regressions to test the consistency of our results.

### **3 Estimation Results**

Table 2 reports the main estimation results. Column 1 only controls for basic characteristics. Column 2 and column 3 further controls for detailed and parent characteristics.. In all columns, we control for province dummies and survey-year dummy. We can see that the coefficients of the number of brothers in the three columns are about 0.023 and all significant at 5% level. We thus use column 3 as our base regression. The brothers effect is 0.023 on a 1 to 5 point scale, which means that, holding other things constant, the presence of one more brother instead of sister leads to a 0.023 increase in an individual's happiness score. This is an economically significant effect. Comparing it with the coefficient of log household income, 0.164, we can convert the brothers effect into monetary value; specifically, one more brother is equivalent to a 14% increase in the annual household income in terms of impact on happiness.

The coefficients of the set of controls are generally consistent with previous studies (Appleton and Song, 2008; Helliwell and Wang, 2011, 2014): females are happier than males, more education is associated with higher levels of happiness, married people report higher level of happiness, a U-shape is perceived with age, and full-time work is associated with higher levels of happiness whereas part-time work is not. However, our results on the number of children differ from those of previous studies where often negative effects are found (see the review article, Hansen, 2012): the number of both male and female children are positively associated with the levels of happiness.



Column 4 adds the birth order variable to test the robustness of the results. Some studies find that birth order matters, for example, where education is concerned Black et al. (2005). In our estimation, no such effect exists. Column 5 explores the potential difference between males' brothers compared to females' brothers by introducing the variable 'Brother $\times$ Female.'<sup>4</sup> The interaction term estimates the brothers effect on females relative to males. The coefficient of Brothers remains the same as in previous columns and the interactions are negative but not statistically different from zero. It is likely that the brothers effect on females is either smaller than or equal to the brothers effect on males.

The fact that the estimator remains almost unchanged regardless of the controls included suggests that the variation of the number of brothers is fairly random, conditional on the number of siblings. It is unlikely that the number of brothers an individual has, conditional on siblings, is correlated with any individual or family characteristics; otherwise, we would observe the estimator of brothers changing considerably through columns 1 to 4.

We further conduct several robustness checks in order to address the following concerns. In 1972, before the One Child Policy, the Chinese government began to introduce trial population contraction policies; albeit, they were not mandatory. In order to rule out any potential bias induced by this policy, we drop in column 1 all individuals born after 1972. The point estimator is 0.027, which is very close to the coefficient in the base model (column 3 in Table 2). Next, we rule out the samples born during the Great Famine (1959-1962) since a nutrition shock in early life may have differential impacts on the mortality rate of different genders (for example, Doblhammer et al. 2013; Mu and Zhang 2008; Yeung et al. 2014). The coefficient of brothers stays the same as in Table 2. Given the nature of the ordered multiple responses to the happiness question in the CGSS, we re-estimate the brothers effect using an ordered logit model and ordered probit model in the last two columns to relax the assumption on the function form of the empirical model. We yield consistent results.

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<sup>4</sup>This variable is generated by interacting the number of brothers with a female dummy which indicates respondent's gender.

## 4 Channels

In this section, we explore the potential reasons for the positive brothers effect on happiness. Relatives and members from extended families are the most important borrowing resources for individuals in China. By using Chinese Household Income Project 2002 data, Zhou (2014) finds that when individuals encounter difficulties and need 10,000 RMB<sup>5</sup> immediately, almost 70% of them ask help from their family members or relatives; only less than 3% of individuals try to borrow from financial institutions. Wang and Zhou (2015) use China Household Finance Survey (CHFS) 2011 and find that siblings are the second largest borrowing resources for housing, after banks.

We use the following two ways to test this reason for brothers positive effect on happiness. First, low-income individuals are more vulnerable to income shocks and are less likely to be able to access the formal financial markets. Therefore, if brothers affect happiness through the channel of providing financial security, low-income individuals are more likely to have a larger brothers effect. Second, individuals with unstable incomes have greater needs for security, and therefore the brothers effect among those individuals would also be larger. We divide individuals into four groups and run regressions for each one of them: low income with unstable or stable incomes, high income with unstable or stable incomes. An individual belongs to the low-income group if that individual's income is below the median income in the sample. An individual belongs to the unstable-income group if that individual has reported his/her monthly wages as being very unstable in the CGSS 2006 survey. We do not have information on the stability of monthly incomes in the CGSS 2008; thus, we only test it using the 2006 data.

Table 4 reports the results. First we find that the coefficient of brothers is positive and statistically significant among low-income individuals (columns 1 and 2); however, the coefficient becomes negative but is indifferent to zero among high-income individuals (columns 3 and 4). Furthermore, even among low-income individuals, those with an unstable income have a much stronger brothers effect compared to those with a stable income: 0.168 VS 0.048. The estimation results suggest

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<sup>5</sup>In 2002, 10,000RMB is equivalent to about 1209 USD.

that it is the low-income individuals, in particular the low- and unstable- income individuals who benefit from the brothers the most. The evidence strongly suggests that brothers are likely to affect happiness levels by providing each other with financial security or support.

## **5 Conclusions and Discussions**

This paper suggests that having brothers rather than sisters increases individuals' happiness among the baby boom generation in urban China. Specifically, the effect of having one more brother (compared to a sister) is equivalent to a 14% increase in the annual household income, which is rather sizable. In supporting the argument that brothers increase happiness because brothers provide financial security, we find that the brothers effect is particularly large among individuals with low or unstable incomes.

The fact that sisters are less likely to be as helpful as their brothers may be due to many reasons. For example, females on average earn less than males do; compared to the husband, females may have less bargaining power in controlling family income. In a Confucian culture, a weak family tie between female siblings and male siblings or parents could also be a potential reason why sisters do not have the same effect on happiness as brothers do. If sisters were to behave like brothers and play a role in increasing individuals' level of happiness, the estimated relative effect of having a brother instead of a sister would be a lower bound of the absolute effect (having an additional brother as opposed to not); if sisters do not affect individuals' happiness, the estimated relative effect equals to the absolute effect (Zhou, 2014). As we are unable to tell whether or not sisters have effects on individuals' happiness, we can say that our estimation is at least the lower bound of the absolute effect.

The infamous One Child Policy in China significantly reduced the number of brothers individuals have among recent generations. Based on the conclusion that the estimated brothers effect is at least a lower bound of the absolute effect, the findings in this paper may also suggest that the One

Child Policy is likely to have had an unintended consequence—that of reducing happiness levels in China as a result of there being fewer siblings, in particular male siblings. As researchers investigate the reasons why happiness levels in China did not show an increasing trend while incomes have increased rapidly in recent decades (Easterlin et al., 2012; Knight and Gunatilaka, 2011; Graham et al., 2015; Knight and Gunatilaka, 2012), the change in demographic structure might be an additional explanation.

The finding that brothers affect individuals' happiness may not be limited to China alone. In many developing countries where siblings, in particular male siblings, help each other to provide financial security, such effects may also exist. More research can be done along these lines.

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Table1. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Happiness	5,231	3.565	0.843	1	5
Number of brothers	5,231	1.439	1.177	0	7
Number of siblings	5,231	2.840	1.748	0	8
Female	5,231	0.522	0.500	0	1
Years of education	5,231	10.293	3.197	0	22
Married	5,231	0.909	0.287	0	1
Age	5,231	44.582	9.333	28	63
Age squared/100	5,231	20.747	8.478	7.84	39.69
Annual household income (RMB)	5,231	31,552	38,182	0	740,000
ln household income	5,231	9.978	1.002	0	13.514
Housing dummy	5,231	0.793	0.405	0	1
Full-time job	5,231	0.483	0.500	0	1
Part-time job	5,231	0.070	0.255	0	1
Number of male children	5,231	0.637	0.626	0	5
Number of female children	5,231	0.547	0.642	0	5
Father alive	5,231	0.515	0.500	0	1
Mother alive	5,231	0.650	0.477	0	1
Father's education					
No degree	5,231	0.255	0.436	0	1
Primary school	5,231	0.372	0.483	0	1
Middle school or more	5,231	0.373	0.484	0	1
Mother's education					
No degree	5,174	0.440	0.496	0	1
Primary school	5,174	0.308	0.462	0	1
Middle school or more	5,174	0.252	0.434	0	1
Birth order	5,231	2.507	1.511	1	9

Table 2. The Brothers Effect on Individuals' Happiness

	<u>Dependent Variable: Happiness</u>				
	(1)	(2)	(3)	(4)	(5)
Number of brothers	0.022** (0.010)	0.023** (0.010)	0.023** (0.010)	0.023** (0.010)	0.023* (0.014)
Number of brothers×Female					-0.001 (0.016)
Female	0.049 (0.029)	0.071** (0.031)	0.071** (0.031)	0.070** (0.030)	0.071* (0.035)
Years of education	0.021*** (0.006)	0.020*** (0.006)	0.018*** (0.006)	0.019*** (0.006)	0.019*** (0.006)
Married	0.405*** (0.048)	0.381*** (0.047)	0.382*** (0.047)	0.382*** (0.047)	0.382*** (0.047)
Age	-0.068*** (0.013)	-0.076*** (0.013)	-0.075*** (0.013)	-0.075*** (0.013)	-0.075*** (0.013)
Age squared/100	0.078*** (0.014)	0.087*** (0.014)	0.087*** (0.015)	0.086*** (0.015)	0.086*** (0.015)
Ln household income	0.184*** (0.023)	0.164*** (0.021)	0.164*** (0.022)	0.164*** (0.022)	0.164*** (0.022)
Housing dummy		0.178*** (0.032)	0.176*** (0.032)	0.177*** (0.032)	0.177*** (0.032)
Full-time job		0.138*** (0.031)	0.136*** (0.032)	0.136*** (0.032)	0.136*** (0.032)
Part-time job		-0.030 (0.054)	-0.035 (0.054)	-0.035 (0.055)	-0.035 (0.055)
Number of male children		0.033 (0.026)	0.032 (0.026)	0.032 (0.026)	0.032 (0.026)
Number of female children		0.077*** (0.026)	0.075*** (0.027)	0.075** (0.027)	0.075** (0.027)
Father alive			-0.016 (0.022)	-0.018 (0.022)	-0.018 (0.022)
Mother alive			0.008 (0.024)	0.006 (0.026)	0.006 (0.026)
Father's education - primary school			0.001 (0.032)	0.001 (0.032)	0.001 (0.032)
Father's education - middle school or more			-0.001 (0.044)	-0.002 (0.044)	-0.002 (0.044)
Mother's education - primary school			0.017 (0.023)	0.017 (0.023)	0.017 (0.023)
Mother's education - middle school or more			0.070* (0.035)	0.069* (0.035)	0.069* (0.035)
Birth order				-0.007 (0.012)	-0.007 (0.012)
Sibling dummies	Y	Y	Y	Y	Y
Province dummies	Y	Y	Y	Y	Y
Year dummy	Y	Y	Y	Y	Y
Observations	5,231	5,231	5,174	5,174	5,174
Adjusted R-squared	0.143	0.158	0.159	0.159	0.159

Note: Robust standard errors in parentheses are clustered at the province level. \*\*\* p<0.01, \*\* p<0.05,

\* p<0.1

Table 3. Additional Robustness Check

	<u>Dependent Variable: Happiness</u>			
	Born before 1972 (1)	Exclude Famine (2)	Ordered logit (3)	Ordered probit (4)
Number of brothers	0.027** (0.013)	0.023** (0.011)	0.055** (0.028)	0.033** (0.015)
Observations	4,150	4,636	5,174	5,174
Adjusted R-squared	0.159	0.157		
Pseudo R-squared			0.160	0.162

Note: All regressions have same controls as in column 3 in Table 2. Robust standard errors in parentheses are clustered at the province level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4. Channel of the Brothers Effect

	<u>Dependent Variable: Happiness</u>			
	Low income		High income	
	Unstable income (1)	Stable income (2)	Unstable income (3)	Stable income (4)
Number of brothers	0.168** 0.064	0.048** (0.022)	-0.054 (0.092)	-0.006 (0.034)
Observations	285	1,124	184	1,107
Adjusted R-squared	0.290	0.167	0.265	0.173

Note: All regressions have same controls as in column 3 in Table 2. Only CGSS 2006 data is used. Robust standard errors in parentheses are clustered at the province level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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