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How does one child policy influence Chinese household saving behavior

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How does the One Child Policy Influence Chinese Household Saving Behavior?

by

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ABSTRACT: This paper investigates the influence the decline in the family size on household size through a Chinese family planning policy, the One-Child Policy (OCP). I find the evidence of the negative effect at the micro level using Chinese household survey data. I also study the aggregated effect using Chinese provincial level data. With the concern of endogeneity, I use a two-stage least square regression with financial punishments for having more than one child and share of population that were exempted from the restriction as instruments for the fertility variable. This regression shows a positive impact of the implementation of the OCP on household saving rate. The empirical result indicates that the decline in the share of population under 20 can explain 40 percent of the observed increase of the Chinese household saving rate in the last thirty years.

Keywords: Saving Rate, China, One-Child Policy, Demographics

JEL Classifications: D12, E21

1. Introduction

The Chinese saving rate has been increasing for years and is currently one of the highest in the world. It increased from 13.73% in 1981 to 29.84% in 2012. At the same time, population growth has been slowing down in China. The number of people entering the labor force started decreasing in 2012. The family planning policies, such as the One-Child Policy, directly leads to the demographic change. The one-child restriction controlled the fast increase of population starting from the 1950s. As a result of the OCP, the average number of children in a family dropped from 3 in the early 1970s to 1 since the early 1980s. The demographic change under the influence of the OCP reduced the share of youth in the total population. This paper proposes that the demographic change resulted from the OCP is one of the reasons that led to the current high household saving rate in China.

Understanding the saving behavior is important due to its influence on the Chinese economy. Studying this effect is especially essential to Chinese policymakers. Starting from January 2016, China has officially changed the family planning policy from a One-Child Policy to a Two-Child Policy (TCP). By studying how the change in family size, resulted from the OCP, impacts saving rates, this paper can help better understand the possible influence of the new family planning policy, the TCP. The high saving rate not only supports Chinese domestic investment, but also has a spillover effect on the global trade balance. The relaxation of the family planning policy will influence both Chinese domestic economy growth and the global trade balance through its impact on Chinese household saving rate.

The OCP affects household saving rate in two potential aspects, the expenditure channel and the transfer channel. On the one hand, having only one child requires less expenditure on raising children. Part of the reduced consumption goes to saving. Thus, the expenditure channel

expects that decreasing share of youth leads to a higher saving rate. On the other hand, the children's financial support to old-age parents is the transfer channel. Parents raise children as an investment with expected long-term positive financial returns. As a part of the traditional value of family, children have the responsibility to support their parents financially in the retirement period. The restriction of the number of children does not only decrease the quantity of the expected future income but also increases the risk of the transfer payment. With the consideration of future consumption level, households save more to compensate the reduction of potential transfer from children. Therefore, based on both the life-cycle theory and permanent income theory, it is reasonable to expect a negative relationship between the number of children and the household saving rate. I predict an increase in the saving rate in order to maintain consumption in the retirement period due to the reduction in the expenditure of rearing children and decreased expected financial support from the next generation.

This paper conducts two approaches to examine the influence of the OCP on Chinese household saving behavior. First, with the provincial data from the Chines Statistic Yearbook, I perform a 2SLS regression to estimate the macro level effect on household saving rate with regards to the implementation of the OCP, through its direct impact on share of youth. I estimate the share of population under 20 years old using financial punishment of having more than one child and share of minority as instruments to avoid the issue of potential endogeneity. These instruments also indicate the strictness of the OCP. Thus, the 2SLS regression shows the direct effect of the implementation of the OCP on household saving rate. This estimation predicts that the OCP limits the share of youth and increases the saving rate. Second, I test this relation at the micro level using household survey data from the Chinese Household Income Project (CHIP). I find that at household level, the number of children is negatively related to the saving rate. Both

of the results support my hypothesis that the implementation of the OCP led to an increase in the Chinese household saving rate.

2. Background Information

Since the Chinese economic reforms initiated by Deng Xiaoping in 1978, China's economic development burgeoned and has maintained the high level of growth. It has been argued that investment and net export have been the main factors fueling China's growth. However, with a challenging global economy, particularly in the western world, the Chinese government decided to switch the focus to consumption through the expansion of domestic demand to promote growth. While further economic reforms have been initiated since 2005, domestic consumption remains low by international standards partly due to the high saving rate.[1] The average provincial level household saving rate in 2012 was 29.84%. This is relatively high compared to other countries. For example, the private saving rate was 6.6% in the United States and 3.5% in South Korea in 2012. Chinese high saving rate has been a puzzling economic fact. If we can explain the high saving rate in China, it would be easier for the Chinese government to set policies in order to stimulate domestic consumption. The high saving rate in China may be caused by the government policy itself, the One-Child Policy.

The OCP is a strict family planning policy introduced by the Chinese government in 1978 and had been enacted from 1980 to 2015. China faced an increasing rate of population growth in the 1960s. With worries based from the Malthusian growth model, the Chinese government implemented a strict one-child restriction to control the increasing population at 1980. Although there are exceptions for rural citizens and ethnic minorities, citizens who violate the OCP face

[1] Chart 1 in Appendix A shows the trend of average of the household saving rate of 31 provinces in China from 1980 to 2007.

not only a large amount of economic fines, but also the risk of losing their job from the state-owned enterprises (SOEs) and exclusion from any form of government subsidies. This family planning policy affected the fertility decision of a wide range of Chinese households and also influenced their economic behaviors. Although this policy is implemented nationally, each state government has its own power of the specific rules. As a result, the strictness of the OCP is different across provinces based from the level of financial and political punishment.

The demographic change by the influence of the OCP can provide an explanation of the high saving rate through its effect on the share of youth in the total population. The OCP affects household saving rate in two potential aspects, the expenditure channel and the transfer channel. The transfer channel is especially prominent within the Chinese culture. Children act as a main support for aged parents. It is even stipulated by Constitutional law: "children who have come to age have the duty to support and assist their parents" (Article 49). After the introduction of the OCP, the average number of children in a family dropped to 1 from 3 in the early 1970s[2]. The restriction of the number of children in a family caused a decrease in the expected future income for parents. In addition, considering that parent's income during their retirement period, depends on the only child; it increases the risk of potential payment.

3. Related Literature

Many scholars have explored the Chinese saving puzzle. Chamon and Prasad (2010) state that the precautionary purpose of saving based on the income uncertainty and lack of mature national social security system is a possible explanation. The undeveloped financial market also contributes to the high saving rate. Since 2003 the pension system, health care and the financial

[2] Chart 2 in Appendix A shows the trend of average of share of population that is under 20 years old for 31 provinces in China from 1980 to 2007.

system all developed significantly, however, the saving rate did not stop from increasing. The unique Chinese culture is another common explanation. Risk aversion is a culture norm in China. However, culture norm is not subject to significant change. This particular cultural-ethical value cannot explain the recent sudden increase of Chinese household saving rate while historically the saving rate was as low as 5.3% during 1960s.

In this paper, I will explain the high saving rate in China by the One-Child policy with its direct impact on demographic change. The link between the fertility and the household saving rate has caught the attention of many economists. Modigliani and Cao (2004) first propose to explain the Chinese saving puzzle with the life-cycle hypothesis. They state that the saving rate should depend on long-term rate of income growth instead of the per-capita income, as in the standard Keynesian model. Household utility function is derived from the allocation of current and future consumption. Therefore, explaining the increasing saving rate with the rising income level is not sound. While increase in income does drive up saving, it cannot explain the sharp change of share of saving. Modigliani and Cao state that the saving rate is affected by the demographic structure. Particularly, the reciprocal of dependence ratio (ratio of working to non-working population) has a strong negative effect on saving ratio. They show that within 20 years of the implementation of the OCP, the share of people under fifteen years relative to working population decreased almost by half. The rising saving rate matches with the increased share of working population in the total population, which supports their theory.

In addition to the influence from increased working population ratio, Curtis, Lugauer and Mark (2015) provide two more channels, expenditure and intergenerational transfer effect, to explain the saving behavior, similarly to what I propose. They employ an overlapping generations model (OLG) that includes the children's consumption in parent's utility and

intergenerational transfer with the consideration of the entire age distribution. Their OLG model predicts a negative relation between the number of children and the saving rate. The results of Curtis etc. (2015) is consistent with the micro-level data.

Moreover, Zhang (2014) adds the consideration of the increased risk of expected future income with only one child to explain the saving rate. After the implementation of OCP, the old-age support of most Chinese households depends solely on one single child. It is riskier compared to having multiple children, which allows diversification. In Zhang's study, he studies the effect of fertility on the household saving rate at provincial level with control of income growth, young and old age dependency ratio, and the interaction between the young-age dependency ratios with fertility. Contradictory to the predicted negative correlation, Zhang finds a positive effect of fertility on saving. He explains the unexpected positive influence with the increase in the investment in human capital and the expenditure of insurance to hedge the uncertainty.

However, in Zhang's regression, there is potential endogeneity that can lead a biased estimation. Saving rate can endogenously affect fertility decisions. Taking this issue into consideration, I perform a 2SLS estimation as a comparison with OLS. Banerjee, Meng, and Qian (2010) along with Lugauer, Ni and Yin (2015) use instruments for the number of children in their micro-level study of the impact of the number of children on household saving rate. Banerjee etc. (2010) estimate the effect of the number of children on household saving rate at a micro level. They instrument the number of children with a dummy variable for whether the first child was born during or after 1972, the starting year of the set of family planning policy. In 1972, the Chinese government shifted the demographic policy from pro-fertility to controlling the population growth. If the first child was born after 1972, the number of children that the

household could have is limited exogenously by the family planning policy. Except for the limitation in the number of children, there is no other significant difference before and after 1972. Thus the estimated number of children using the birth period of the first child is not correlated to other variables that relate to saving rate. However, the strictness of the family planning policy changes over years and is also different across regions. While this instrument is still valid, it is worth noting that the result is the estimation of post-reform average effect. Lugauer etc. (2015) use the county level number of birth to instrument the number of children at the household level. They claim that OCP, as a natural experiment, has exogenous shock on the birth rate for each region and affects the fertility choice for each household. But the county level birth rate is not correlated with the household saving rate, thus it is a valid instrument for a micro level study. In order to study the effect of fertility on saving at the aggregate level, Wang (2010) uses share of minority as an instrument for the provincial fertility level. When examining the aggregated gender effect on Chinese saving behavior, Ebenstein (2008) and Wei and Zhang (2011) use financial punishment in addition to share of minority as instruments for sex ratio. I follow their choice of instruments to correct for the endogeneity. However, I use these instruments for the share of youth in the total population to provide a direct implication of OCP on saving rate. I will explain the validity of the financial punishment and share of minority as instruments in the empirical strategy section.

In general, I predict a positive effect of the OCP on saving rate through its direct influence of the share of young population. However, it is worth noting while partial equilibrium of the OLG model predicts a strong negative relationship between the number of children and saving rate, Banerjee, Meng, Porzio and Qian (2013) claim that the general equilibrium effect of interest rate and wage growth can offset this negative relationship. They argue that if wage and

price are endogenous, an increase in aggregate fertility drives up labor-capital ratio and leads to increasing interest rate. With the reduced value of future transfer payment, the aggregate saving increases. Taking general equilibrium force into account, the transfer channel predicts a positive relation between fertility and the saving rate.

4. Theoretical Model

I use a life cycle model to show the relation between fertility decision and household saving decision. This model considers household consumption and saving behavior for two generations in two periods, working period (w) and retirement period (o). All agents in the same period are assumed to have identical consumption and saving behaviors. The utility of the agents first depends on their consumption in working period and in retirement period with a discount factor, β. In addition, the consumption of the dependent children who are younger than 20 years old also enters utility function of their parents with a utility weight θ. The lifetime utility function of an individual is presented as Equation 1.

$$U = \theta N_k \ln(C_k) + \ln(C_w) + \beta \ln(C_o) \quad (1)$$

where the number of children, N_k is exogenous.

In the working period, the agents transfer a percentage of income, τY_w, to their parents as old age support. Besides the consumption for their children, the rest of the disposable income goes to saving, S. In the retirement period, the agent get τY_w amount of transfer payment from each of the children. A household with N_k children will receive $N_k \tau Y_w$ as the transfer from the working age children. In addition, the agent also collect the accumulated saving with interest payment. The agents make consumption and saving decision to maximize utility with subject to the budget constraints, which are presented as Equation 2 and 3.

$$C_w + N_k C_k + S = (1-\tau)Y_w \quad (2)$$

$$C_o = Y_o + N_k \tau Y_w + (1+r)S \quad (3)$$

where the income in the working and retirement period, Y_w *and* Y_o, interest rate, r, and the transfer facto, τ, are all exogenous.

In this model, the expenditure channel and transfer channel are both present to show how does the exogenous restriction of fertility affect household saving rate. The $N_k C_k$ *is* the expenditure of the dependent children, which represents the expenditure channel. The $N_k \tau Y_w$ is the transfer payment as old-age support from the dependent children. Using the optimal level of consumption and saving derived from first order condition[3], I first calculate the marginal effect of the number of children for the total consumption for the agent in the working period, which is shown in Equation 4. The positive partial derivative indicates that the total level of consumption decrease as the number of children becomes restricted, thus leads to an increase in the saving account. This condition is consistent with the expenditure channel. Moreover, in order to check for the transfer channel, I then calculate the marginal effect of the transfer factor, τ, on saving. The result of this partial derivate is shown as Equation 5. The negative sign indicates that the amount of saving will increase as the transfer payment decreases, which supports the transfer channel theory. This model shows that, overall, as the number of children decreases, the amount of saving will increase. This is shown by the negative partial derivative of the number of children on saving that is presented as Equation 6. Together, these illustrate the channels I propose in the empirical analysis.

$$\frac{\partial(C_w+N_kC_k)}{\partial N_k} = \frac{(1+\beta+\theta N_k)[\tau Y_w+\theta Y_o+2\theta\tau Y_w N_k+(1+r)(1-\tau)\theta Y_w]+\theta(1+\theta N_k)[Y_o+\tau Y_w N_k+(1+r)(1-\tau)Y_w]}{(1+r)(1+\beta+\theta N_k)^2} > 0 \quad (4)$$

[3] Please see the calculation in Appendix B.

$$\frac{\partial s_o}{\partial \tau} = -\frac{1+\frac{N_k Y_w}{1+r}\frac{\theta N_k{}^2 Y_w}{1+r}}{1+\beta+\theta N_k} < 0 \quad (5)$$

$$\frac{\partial s}{\partial N_k} = \frac{Y_w}{1+\beta+\theta N_k}\left(\frac{-\tau-2\tau\theta N_k-\theta}{1+r} - \frac{\beta(1-\tau)\theta}{(1+\beta+\theta N_k)} + \frac{\theta(1+\tau N_k+\tau\theta N_k{}^2+\theta N_k}{(1+r)(1+\beta+\theta N_k)}\right) < 0 \quad (6)$$

5. Empirical Strategy

I use a provincial panel dataset of the share of youth in total population and the private saving rate to see the effect of OCP on household savings behavior. The proposed regression is as follows:

$$saving_{it} = \beta_0 + \underset{(-)}{\beta_1} share\ of\ under20_{it} + \beta \boldsymbol{X_j} + \epsilon_{it} \quad (7)$$

β_1 measures the effect of share of youth on saving rate. Vector X is the group of additional explanatory variables: per capita income and GDP growth at the provincial level, share of labor force enrolled in social security, fixed year effect and fixed province effect. Even with these control variables, there will be issues with endogeneity in this OLS model. The fertility decision can be endogenously decided by the saving choice. Households with high savings can better afford the financial punishment of violating the one child restriction. Thus, the saving rate can influence the household's choice on the number of children to raise and then influence the share of youth positively. Also, the income level of the household can bring multicollinearity concern because it positively relates to both the share of youth and the saving rate in the society.

In order to avoid the endogeneity, I plan to run a 2SLS regression using the financial punishment and the minority group as instruments for the share of population under 20. Although the OCP was effective since 1980, the implementation of financial punishment started in 1993. If the household is found having more children than their limit, the household must pay a large amount of fine for each additional child. The amount of fine is a certain percentage of the

annual income of the household. Although the OCP is a national policy, each state government enforces it individually. This allows for a variation in the strictness of the implementation, which could result in distinct ratio of the youth in each province. A local government has the right to decide the amount of the fine imposed for the violation of the OCP within its province. The fine amount charged for violating the OCP should influence the share of youth in the region; however, saving behavior is expected to be independent from the strictness of financial punishment. The possibility of precautionary saving behavior to pay for the fine to have additional children is small. The average rate of the fine across province is 1.25 times of the annual income. The maximum rate is 5 times of the annual income, which was enforced in Beijing. Due to the large amount of financial punishment, the likelihood of saving for the fine is small. Moreover, the provinces with heavy amount of fine are those that have strong motive to control for the population growth. These provinces are also likely to have strict political punishment as well. This further reduces household's motivation of the precautionary saving to counter the fine. Therefore, the fine acts as a proxy of the enforcement of the OCP and can be used as an instrument for the share of youth to avoid the endogeneity. Another instrument I am using is the share of minority. China consists of fifty-six ethnic groups. The Han Chinese is the majority ethnic group, which accounts for 92% of China's population. The remaining groups are minorities. The Chinese government set many public policies in favor of the minorities, such as exclusion from the OCP, to promote a harmonious environment between the Han and the minorities. If a married couple is of an ethnic minority, the household can be exempted from the OCP. With the allowance of having two children, increasing minority share in the province has a positive effect on the share of youth. In most provinces, because of the urbanization, the minorities have converted to the general Chinese life-style and are well merged with the Han

community. Moreover, cross ethnic group marriage is common. It is reasonable to expect that there is no endogenous difference across the pure Han households and the minority ones. Thus, the share of minorities in the province is a feasible instrument for the share of youth.

The 2SLS estimations can correct for endogeneity. More importantly, since financial punishment and share of minorities are both directly related to the strictness of the family planning policy, they allow the examination of the impact of the OCP on the saving rate through the ratio of youth in total population. Here are two proposed first stage regressions:

$$share\ under\ 20_{it} = \alpha_0 + \underset{(-)}{\alpha_1 fine_{it}} + \alpha \boldsymbol{X_j} + \varepsilon_{it} \tag{8}$$

$$share\ under\ 20_{it} = \beta_0 + \underset{(+)}{\beta_1 sh.minority_{it}} + \beta \boldsymbol{X_j} + \mu_{it} \tag{9}$$

$$share\ under\ 20_{it} = \gamma_0 + \underset{(+)}{\gamma_1 fine_{it}} + \underset{(+)}{\gamma_2 sh.minority_{it}} + \gamma \boldsymbol{X_j} + \epsilon_{it} \tag{10}$$

Equation 8 and 9 are the first stages with only fines or share of minority as the instrument for the share of youth respectfully, while Equation 10 uses both fines and share of minority as instruments. Using the estimated share of population under 20, the second stage is given in Equation 11. The coefficient on the estimated share of youth will provide an unbiased estimation of the effect of the OCP on private saving rate through the change of share of youth.

$$saving_{it} = \delta_0 + \delta_1 \widehat{share\ of\ under 20_{it}} + \delta \boldsymbol{X_j} + v_{it} \tag{11}$$

6. Data Description

The household saving rate is the percentage point of the private saving of a household's disposable income. The amount of private saving is calculated by subtracting living expenditure from disposable income. I collected this data from Chinese Statistical Yearbooks. Provincial GDP growth rate is also available at Chinese Statistical Yearbooks. Scharping (2003) provides

data of the financial punishment for unauthorized birth. The fine is defined as a percentage of household's annual income. In addition, I obtained the data of the share of population less than 20 years old, the share of minorities, the share of population enrolled in social security and log of per capita income level from Wei and Zhang (2011). Table 1 shows the statistical summary of variables. All of the data are at provincial level ranging from the year 1980 to 2007. It contains the time period from the beginning of OCP enforcement. There are in total thirty-one provinces in China. However, Chongqing was under the governance of Sichuan Province before 1996. Thus there is only data for Chongqing after 1996. In addition, data for Tibet became available after 1986. Other provinces have full data from 1980 to 2007 for all the variables.

7. Statistical Result

Table 2 presents the result of the OLS estimation in column 1. It shows that the share of youth has a positive effect on private saving rate with the control of per capita income, GDP growth rate, the share of labor force enrolled in social security, and year and province fixed effect. This coefficient is not statistically significant even at the 10% confidence level. In addition, it is not economically significant either. A one standard deviation increase of share of youth leads to only a 0.2 percentage point increase of the savings rate. This result is possibly biased due to the endogeneity as explained in the previous section. Thus, I perform two 2SLS estimations to correct for potential endogeneity and to better examine the direct influence of the OCP on the saving rate. The second column of table 2 is the IV estimation with only the fine as the instrument. With the same control in the OLS regression, the first IV estimation predicts a negative relation between share of youth and household saving rate. It is statistically significant at a 10% confidence level. One standard deviation increase of the share of youth decreases 11

percentage points of the saving rate. However, the fine alone is not a strong instrument. The critical value of F-statistic in the first stage regression is only 4.1. Similarly, the third column of table 2 is the IV estimation with only the share of minority as the instrument. It makes a stronger estimation compare to using fine as instrument. The first stage F-statistic is 25.5. The second IV estimation also predicts a statistically significant negative correlation between the fertility decision and saving behavior. It indicates that one standard deviation increase of the share of youth decreases 3.6 percentage points of the saving rate. Moreover, the third IV estimation with instruments of both the share of minority and the fine is presented in the forth column of table 2. As expected, it indicates a negative correlation between the share of youth and the private saving rate as expected. It is statistically significant at a 1% confidence level. It predicts that one standard deviation increase of the share of youth decreases 4.7 percentage points of the saving rate. This regression estimates that the income level and the GDP growth positively relate to the household saving rate. It also indicates that increase share of population enrolled in the social security plan decreases the household saving rate.

From 1980 to 2007 in China, the average share of population under 20 across provinces decrease by 4 percent, and the average household saving increased by 13 percent. The third IV estimation, using both fine and share of minority as instruments, predicts that a 4 percentage point decrease of share of population under 20 will lead to increase the household saving rate by 5.5 percent. According to this regression, the implementation of the OCP can account for 40 percent of the observed increase in Chinese household saving rate from 1980 to 2007.

8. Robustness Check: Micro Level Evidence

In order to test whether the influence of the OCP on saving rate is consistent at the micro level, I perform an OLS regression of number of children on household saving rate using a household survey data. I use the cross section data from the Chinese Household Income Project 2008-2009. Considering households with multiple generations living together can have a potential difference in saving behaviors, following Curtis etc. (2015), I limit the data to only nuclear families that contain the household head, his or her spouse and their biological or in-law children. Moreover, the saving behavior can be inherently different for people in different stages of the life cycle. Thus, I restrict the data to the household head that is no older than 65 years old. This data contains 2,495 observations. For each household, I match the data of the children to the household head to generate the number of children that each household has. I calculate the saving rate by taking the ratio of the difference of the household annual income and expenditure to their annual income. The household annual income and expenditure are sum of these of all the working people in the household. The summary statistics of the household head of a nuclear family is in table 3. Furthermore, I create a restricted data for households that have children at home that are younger than 22 years old, which is the age of college graduation and is also the common age for children become financially independent. I suspect that the saving behavior for households with older children staying with parents to be different from the one with younger children. Thus, I will perform an additional regression to examine the impact of the number of children on saving rate with a separate restricted household data. The restricted data contains 2,216 households; the summary statistics are shown in table 4.

I perform an OLS regression of household saving rate on the number of children with the control of the age of the household head, annual income, and dummy variable of the pension

status and educational background. Table 5 shows the result of the OLS regressions of unrestricted and restricted data. The second column is the regression using the restricted data with the control of natural log of income instead of income from one to the third power. It predicts that increase of the number of children by one unit decreases the household saving rate by 11-percentage points. It is statistically significant at a 99-percentage confidence level. All the other regressions also indicate similar results. Banerjee etc. (2013), using the first-born child after 1972 as an instrument for the number of children, also found that one additional child decrease saving rate by 11-percentage points. While these regressions do not imply causation, the result confirms the hypothesis of the negative relation between number of children and saving rate and support the result at the provincial level.

9. Conclusion

In this paper, I find that the high level of Chinese household saving rate can be explained by the change of demographic structure that is influenced by family planning policy, such as the OCP. The OCP, working as a natural experiment, exogenously decreased the share of youth in the population. With the reduced total expenditure on rearing children and diminished potential over-generation transfer payment, the decreased share of youth in China led to the increasing saving rate. The use of financial punishment and share of minority as instrument for the share of population under 20 years old in each province help to control for endogeneity and give an unbiased estimation of the effect of the change in family size. The result from the 2SLS estimations using provincial aggregated data and the OLS estimation with the household survey data are both consistent with the hypothesis that decreasing share of youth leads to increase in the private saving rate.

The practice of family planning policy, the OCP, limited the share of youth in China, and resulted in a high state of the household saving rate. In the same logic, the recent relaxation of the One-Child Policy is expected to have a negative effect on the saving rate in the long run. If the Two-Child Policy stimulated fertility and led to an increase in the share of youth, the saving rate in China is expected to decrease in the future. Consequently, both Chinese domestic investment and consumption and global trade balance will be influenced. However, with the economics development and the openness to western culture, people's belief regarding fertility decision is also changing in China. Like the situation in the U.S. and many European countries, as the Chinese economy becomes more developed, people may prefer not to have more children for support in their elder years.

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Appendix A

Chart 1: Chinese Average Provincial Household Saving Rate (1980-2007)

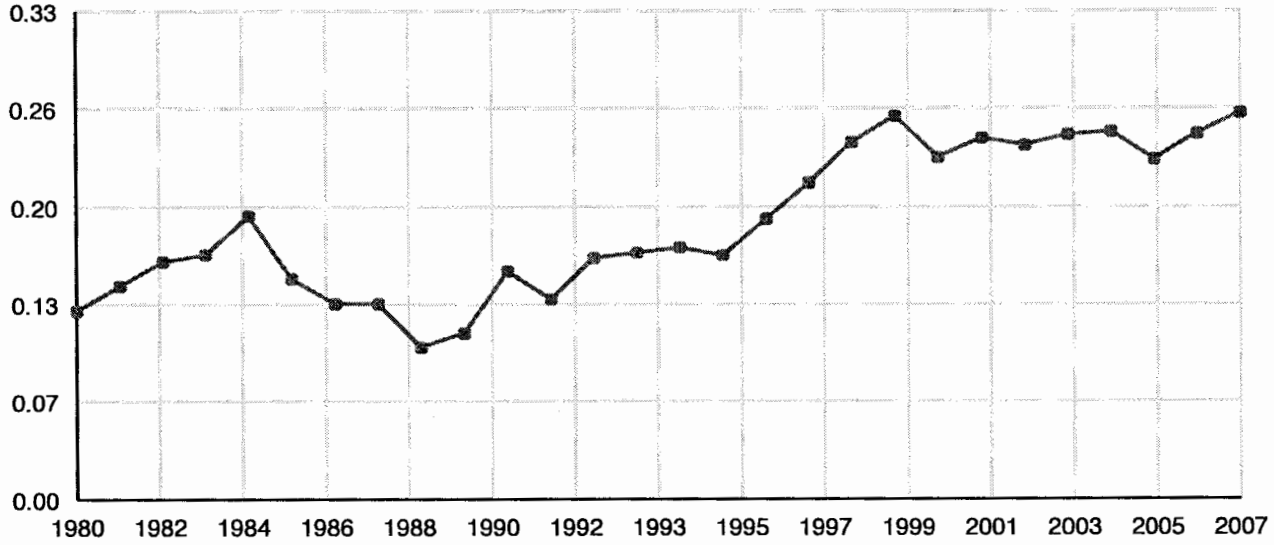

Chart 2: Chinese Average Provincial Share of Population under 20 (1980-2007)

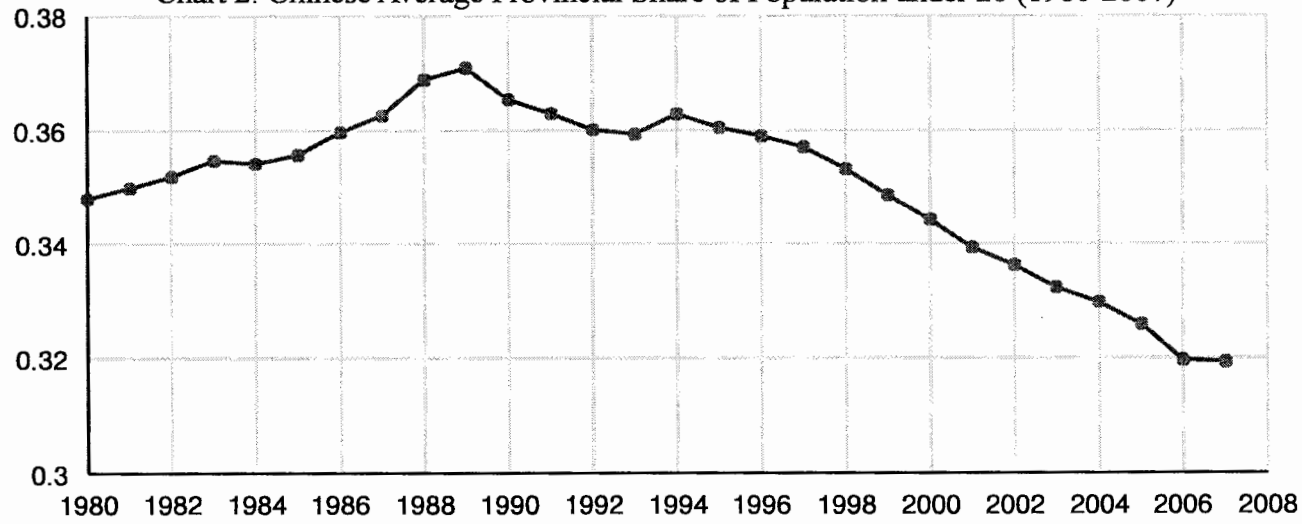

Table 1: Summary Statistics for Provincial Data[4]

Variable	Obs	Mean	Std. Dev.	Min	Max
Saving Rate	843	0.185	0.073	-0.092	0.394
Share of under20	843	0.350	0.034	0.212	0.425
Share of minority	843	0.153	0.211	0.002	0.984
Fine	843	0.684	0.818	0.000	5.000
Ln(income)	843	7.295	1.086	5.181	9.906
GDPgrowth	843	0.163	0.076	-0.047	0.534
Share of enrolled in social security	843	0.080	0.160	0.000	0.970
Non-zero fine	461	1.250	0.717	0.200	5.000

[4] I create a variable "non-zero fine" which eliminates all the observations without implementation of fine to better show the magnitude of the financial punishment for violating the OCP.

Table 2: Share of population under 20m on private saving rate

	Household Saving Rate			
	OLS	IV (I)	IV (II)	IV (III)
Share of under 20	0.053 (0.062)	-3.245* (1.826)	-1.05*** (0.401)	-1.382*** (0.402)
Ln(income)	0.1935*** (0.014)	-0.011 (0.117)	0.126*** (0.029)	0.105*** (0.030)
GDP Growth	0.041 (0.028)	0.063 (0.058)	0.048* (0.032)	0.051 (0.035)
Share Enrolled in Social Security	-0.019 (0.018)	-0.0449* (0.240)	-0.167*** (0.056)	-0.206*** (0.056)
R^2	0.787			
First Stage				
Fine	-	-0.003** (0.002)	-	-0.004** (0.002)
Share of Minority	-	-	0.131*** (0.026)	0.133*** (0.0259)
F-statistic	-	3.896	25.518	15.279
Year dummy	Yes	Yes	Yes	Yes
Province dummy	Yes	Yes	Yes	Yes
Observations	843	843	843	843

(Standard Error in parenthesis)

Table 3. Summary Statistics for Household Survey Data

Variable	Obs	Mean	Std. Dev.	Min	Max
Saving Rate	2495	0.344	0.329	-0.986	0.955
N_child	2495	0.913	0.467	0	4
Age	2495	43.32	8.350	23	65
Annual income	2495	58435	50619	4800	1140000
Pension	2495	0.808	0.394	0	1
Edu	2495	5.777	1.560	1	9

Table 4. Summary Statistics for Restricted Household Survey Data

Variable	Obs	Mean	Std. Dev.	Min	Max
Saving Rate	2216	0.343	0.323	-0.986	0.961
N_child	2216	0.878	0.478	0	4
Age	2216	41.42	7.640	23	64
Annual income	2216	59123	56660	4800	122400
Pension	2216	0.819	0.385	0	1
Edu	2216	5.936	1.563	1	9

Table 5. Impact of Number of Children on Saving: Micro Data Result

Variables	Restricted I	Restricted II	Unrestricted I	Unrestricted II
# Children	-0.11***	-0.122***	-0.081***	-0.095***
	(0.013)	*(0.013)*	*(0.012)*	*(0.012)*
Age	0.04***	0.038***	0.022***	0.0239***
	(0.007)	*(0.007)*	*(0.006)*	*(0.006)*
Age^2	-0.0005***	0.0004***	-0.0003***	-0.0003***
	(0.00009)	*(0.00008)*	*(0.00007)*	*(0.00007)*
Pension	-0.015	-0.016	-0.0009	-0.002
	(0.015)	*(0.014)*	*(0.014)*	*(0.013)*
ln(income)	-	0.291***	-	0.307***
		(0.009)		*(0.009)*
Additional Controls:				
Income	Yes	No	Yes	No
$Income^2$	Yes	No	Yes	No
$Income^3$	Yes	No	Yes	No
Edu Dummy	Yes	Yes	Yes	Yes
Observations	2216	2216	3018	3018
Adjusted R^2	0.3333	0.3922	0.3233	0.3824

(Standard Error in parenthesis)

Appendix B

Solution for C_w, C_k, C_o and S:

$$C_w = \frac{Y_o + \tau N_k Y_w + (1+r)(1-\tau)Y_w}{(1+r)(1+\beta+\theta N_k)}$$

$$C_k = \frac{\theta[Y_o + \tau N_k Y_w + (1+r)(1-\tau)Y_w]}{(1+r)(1+\beta+\theta N_k)}$$

$$C_o = \frac{\beta[Y_o + \tau N_k Y_w + (1+r)[(1-\tau)Y_w]}{(1+\beta+\theta N_k)}$$

$$S = \frac{\frac{\beta[Y_o + \tau N_k Y_w + (1+r)[(1-\tau)Y_w]}{(1+\beta+\theta N_k)} - Y_o - \tau N_k Y_w}{1+r}$$