



# The Competitive Saving Motive: Evidence from Rising Sex Ratios and Savings Rates in China

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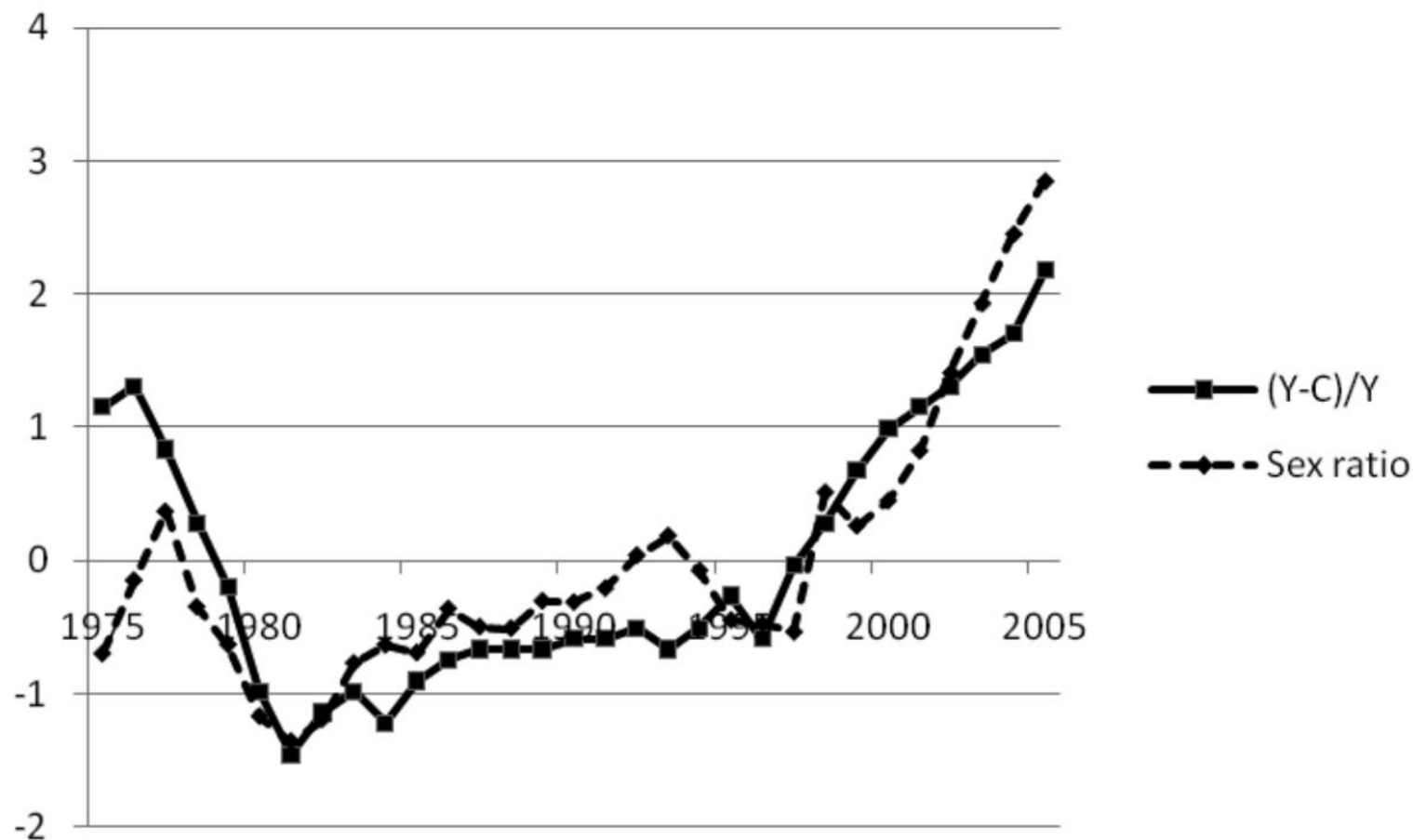
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# 01 | 研究背景

## ● 性别失衡问题

1980年，中国的出生性别比接近正常(每100名女孩中有106名男孩)，但自1980年代中期以来一直稳步上升，2005年每100名女孩中有120名男孩，25岁或25岁以下的男子人数超过妇女约3 000万人。从数学上讲，多余的男人是不可能结婚的。



# 研究背景

## ● 中国人储蓄的原因

● 2002年对农村家庭(CHIP)的一项调查询问了家庭为什么要储蓄。有七个可能的原因：(1)子女结婚，(2)子女教育 (3) 遗赠给子女 (4) 建房子 (5) 养老 (6) 医疗支出 (7) 其他

● 表1列出了将指定类别作为最重要或最重要的储蓄原因的家庭的百分比

● 无论对三人家庭还是四人家庭，为儿子结婚进行储蓄往往被认为是更重要的事情

**Table 1: Why Do People Save? Self-Reported the Most or the Second Most Important Reason for Savings (% of Respondents)**

	Three-person households		Four-person households			All households
	Girl	Boy	Only girls	Boy and girl	Only boys	
<i>Total sample</i>						
Directly related to children	86.4	92.2	86.4	94.0	96.1	78.2
Children's wedding	18.3	29.8	22.0	34.0	37.4	33.0
Children's education	75.9	79.2	75.7	82.1	80.4	52.0
Bequest to children	12.5	11.9	10.2	8.9	6.8	13.8
Not directly related to children	69.6	59.2	72.3	56.0	55.9	69.5
To build a house	19.7	20.2	20.3	24.3	26.7	18.3
Retirement	45.5	37.3	45.8	27.9	22.8	47
Medical expenses	14.2	6.1	14.7	7.5	8.5	18.9
Others	8.7	7.1	2.3	8.2	11.7	9.5

Source: Authors' tabulation based on the Chinese Household Income Project (2002), available from <http://www.icpsr.umich.edu/cocoon/ICPSR/STUDY/21741.xml>.

- 利用中国家庭和地区数据，检验一种关于家庭储蓄行为的新假说：竞争性储蓄动机——人们存钱是为了提高他们在婚姻市场上的相对地位
  - 当性别比例（婚前人群中每名女性对应的男性的人数）上升时，有儿子的家庭相互竞争，以提高他们的储蓄率，以应对婚姻市场不断上升的压力
  - 有女儿的家庭可能不会减少储蓄由于两个相反的动机：“搭便车”和增加女儿婚后讨价还价的筹码
  - 此外，如果有儿子的家庭之间的竞争抬高了房价，没有儿子的家庭也可能会被诱导储蓄更多

- 首先利用CHIP（2002）家庭层面数据，作者发现保持其他家庭特征不变的情况下，有儿子的家庭在性别失衡较严重的地区储蓄更多，农村地区有女儿的家庭并没有因为当地性别比例的上升而减少储蓄；城市样本中的有女儿的家庭在性别比例偏高的城市储蓄率也更高
- 进一步使用地区层面数据，作者发现在性别比例较不平衡的地区，地方储蓄率往往较高
- 最后，使用IV估计，发现婚姻市场竞争因素可能占1990-2007年家庭储蓄率实际增长的一半左右



# 02 | 文献综述



## ●关于储蓄行为

●生命周期理论：储蓄率会随着劳动年龄人口在总人口中的比例增加而增加；但在家庭层面没有发现实证证据（Chamon and Prasad 2010）

●预防性储蓄动机：为预防收入的不确定性而储蓄；问题是，虽然中国的养老金制度和公共医疗服务自2003年以来一直在改善，但家庭储蓄在可支配收入中所占的比例在这一时期继续上升

●金融发展水平低下。问题是今天的金融体系很可能比几年前更有效率，但储蓄率仍在上升

●文化传统。问题是文化规范往往是持久的，因此不太可能解释过去20年来储蓄率明显上升的原因

## ●关于家庭经济学

●几篇论文探讨了性别比例失衡对婚姻前景的影响，包括性别和(女性)劳动力市场的参与(e.g., Edlund 2001; Angrist 2002; Chiappori, Fortin, and Lacroix 2002)等，与本文特别相关的一个有趣的发现是，更高的性别比率(男性多于女性)倾向于增加女性在婚姻市场和家庭内的议价能力。

●Siow (1998) 研究了肥胖女性在婚姻市场中相对短缺对性别角色的影响。但是，这些论文没有直接研究对总储蓄的影响

## ● 最相关文献

Du and Wei (2010)和Bhaskar and Hopkins (2011)使用的模型是目前唯一两篇分析性别比上升对总储蓄率影响的一般均衡的研究，使用OLG模型，他们得出：当性别比增加，一个典型的男性会提高储蓄率来提高他在婚姻市场成功的机会。当考虑家庭内部讨价还价（相对议价能力部分地取决于夫妻之间的相对婚前财富水平）时，性别比率上升对典型女性的储蓄率的影响是模糊的。避免在婚姻中讨价还价能力受到侵蚀的愿望可能会促使妇女提高储蓄率，以应对性别比率的上升；这抵消了对未来丈夫更高的储蓄率搭便车的愿望

## ● 论文贡献

在Du and Wei (2010)和Bhaskar and Hopkins (2011)模型的基础上指出其他一些因素可能会使得没有儿子的父母也会提高储蓄率。第一，房价渠道。有儿子的父母（或未婚男性）可能会试图通过购买更大的房子来提高他们的竞争力，并可能在性别比例不平衡的地区抬高房价。因此，即使没有儿子的父母也必须储蓄更多才能买得起住房。其次，“锦标赛效应”。当男性储蓄更多时，如果富裕的男性也更喜欢相对富裕的女性，女性或有女儿的父母的储蓄的奖励会增加，因此，有女儿的父母也更愿意攒钱



# 03 | 数据

## ● 家庭层面数据

● 2002年中国家庭收入项目  
Chinese Household Income Project  
(CHIP), 覆盖122个农村县和70个市

● 基本样本为那些双亲都还活着, 母亲在40岁以下, 不和祖父母、叔叔或姑姑同住的三人核心家庭

## ● 人口普查数据

● 1990年人口普查数据  
(家庭所在地性别比)

● 2000年人口普查数据  
(省级层面性别比)

TABLE 4  
SUMMARY STATISTICS ON HOUSEHOLD SAVINGS IN 2002

Household Type	Mean	Median	Max	Min	SD	Observations
Rural:						
One son	.393	.394	2.462	-2.986	.625	580
One daughter	.318	.353	1.812	-3.559	.626	326
All families	.316	.316	2.846	-5.026	.582	9,199
Urban:						
One son	.312	.306	1.849	-1.816	.333	769
One daughter	.302	.308	2.153	-1.299	.356	766
All families	.304	.286	2.308	-2.432	.378	6,835

NOTE.—The savings rate is defined as  $\log(\text{income}/\text{consumption})$ . The data come from the Chinese Household Income Project (2002), available from <http://www.icpsr.umich.edu/cocoon/ICPSR/STUDY/21741.xml>. To maximize comparability, we restrict the sample to nuclear households with both parents still alive and mother younger than 40. “All families” include families with at-home children and families with more than two children.



# 04 | 实证分析

## ●假说

当性别比例（婚前人群中每名女性对应的男性的人数）**上升**时，有儿子的家庭相互竞争，以**提高**他们的储蓄率，以应对婚姻市场不断上升的压力 → 暗示了储蓄率的一种特定的地区差异：保持家庭收入不变和其他特征不变的情况下，有儿子的家庭应该在性别比更不平衡的地区储蓄更多

●被解释变量：家庭储蓄率 =  $\log(\text{税后净收入} / \text{生活支出})$

●核心解释变量：家庭所在地性别比（县级层面），定义为2002年时12至21岁年龄组的性别比例，数据来源于1990年人口普查数据（这群人1990年的年龄是0-9岁）

# 家庭层面分析

## ●农村样本：基本结果

**Table 5: Rural Household Savings by Three-person Households with a Child in 2002**

	Full sample		Sub-sample that removes the following potential outliers					
	Son	Daughter	Income or expenditure <2000 yuans		Bottom and top 5% savers		Bottom and top 5% savers & no explicit marriage status for child	
			Son	Daughter	Son	Daughter	Son	Daughter
Local sex ratio (county level)	1.34** (0.52)	-0.17 (0.55)	1.38** (0.51)	-0.18 (0.54)	1.10** (0.44)	-0.23 (0.43)	1.20** (0.43)	-0.32 (0.44)
Per capita income (log)	2.88** (0.63)	2.49** (0.45)	2.60** (0.91)	2.76** (0.80)	1.82** (0.56)	2.44** (0.72)	1.52** (0.56)	3.10** (0.59)
Per capita income squared (log)	-0.15** (0.04)	-0.12** (0.03)	-0.13** (0.06)	-0.14** (0.05)	-0.09** (0.04)	-0.13** (0.05)	-0.07** (0.04)	-0.17** (0.04)
Child aged 5-9	0.01 (0.10)	-0.03 (0.08)	-0.02 (0.10)	0.09 (0.07)	-0.05 (0.07)	-0.05 (0.07)	0.00 (0.06)	-0.06 (0.07)
Child aged 10-14	-0.07 (0.10)	-0.14 (0.09)	-0.08 (0.09)	-0.02 (0.08)	-0.05 (0.07)	-0.11 (0.07)	-0.02 (0.06)	-0.12 (0.08)
Child aged 15-19	-0.23* (0.12)	-0.20* (0.11)	-0.23** (0.11)	-0.08 (0.11)	-0.20** (0.08)	-0.08 (0.09)	-0.19** (0.07)	-0.08 (0.10)
Household head age	0.00 (0.01)	0.01 (0.01)	0.00 (0.01)	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Household head gender (Female =1)	-0.06 (0.14)	-0.36* (0.20)	-0.05 (0.13)	-0.36* (0.20)	-0.09 (0.12)	-0.10 (0.14)	-0.12 (0.14)	-0.09 (0.14)
Household head year of schooling	0.01 (0.01)	-0.02** (0.01)	0.01 (0.01)	-0.02** (0.01)	-0.01 (0.01)	-0.02* (0.01)	-0.01 (0.01)	-0.02 (0.01)
Household head as a minority	-0.15** (0.06)	-0.22** (0.08)	-0.14** (0.06)	-0.17** (0.07)	-0.04 (0.05)	-0.11* (0.06)	-0.05 (0.05)	-0.10 (0.07)
Poor health	0.03 (0.12)	-0.72* (0.37)	0.06 (0.12)	-0.72** (0.37)	-0.04 (0.11)	-0.17** (0.05)	-0.03 (0.09)	-0.02 (0.16)
Gini at the county level	-1.01** (0.45)	-0.40 (0.44)	-1.16** (0.40)	-0.33 (0.40)	-0.88** (0.34)	-0.53 (0.33)	-0.71** (0.35)	-0.38 (0.35)
Adj. R-squared	0.30	0.54	0.27	0.36	0.20	0.30	0.20	0.29
AIC	906	376.4	836.3	329.8	466.5	171.2	393.5	157.2
N	580	326	564	315	522	292	489	269



## ● 结论

- 在农村，家庭所在地性别比增加0.01个单位，有儿子的家庭储蓄率会增加1.34%。即在性别比率更大的地区，儿子家庭的储蓄往往会更高
- 相反，性别比例不平衡对女儿家庭储蓄的净影响似乎为零

## ● 稳定性检验

- A. 把样本家庭中母亲的年龄换成45岁一下（相比40岁一下），但仍然是3人核心家庭，结果仍然稳健
- B. 把家庭样本扩展至extended家庭（有祖父母、叔叔或姑姑同住），结果仍然稳健
- C. 把OLS回归扩展至中位数回归，结果仍然稳健

● 农村样本：稳定性检验

**Table 6: Robust Checks - Rural Household-Level Savings**

	Full sample		Subsample that removes the following potential outliers							
			Income or expenditure < 2000 yuan		Bottom and top 1% savers		Bottom and top 5% savers		Bottom and top 5% savers & no explicit marriage status for child	
	Son	Daughter	Son	Daughter	Son	Daughter	Son	Daughter	Son	Daughter
Mother age younger than 45 (nuclear family)										
OLS	1.29*** (0.46)	-0.13 (0.60)	1.32*** (0.46)	-0.31 (0.58)	1.03** (0.42)	-0.19 (0.56)	1.32*** (0.39)	-0.32 (0.48)	1.07*** (0.41)	-0.58 (0.48)
Median regression	1.18** (0.52)	0.07 (0.46)	0.97* (0.56)	0.34 (0.52)	0.95** (0.41)	0.07 (0.41)	1.09*** (0.36)	-0.36 (0.31)	1.20** (0.49)	-0.26 (0.63)
Number of observations	705	387	688	372	689	379	633	347	634	321
Household head age younger than 45 (extended family)										
OLS	0.99** (0.39)	0.19 (0.47)	0.96** (0.39)	0.15 (0.47)	0.85** (0.36)	0.21 (0.44)	1.19*** (0.32)	-0.01 (0.39)	1.30*** (0.34)	0.23 (0.38)
Median regression	1.10*** (0.41)	0.19 (0.43)	1.00** (0.41)	0.16 (0.41)	1.00*** (0.39)	0.27 (0.42)	1.14*** (0.34)	0.26 (0.50)	1.15*** (0.35)	0.21 (0.58)
Number of observations	1125	639	1099	617	1101	625	1011	575	933	562

# 家庭层面分析

●农村样本：将儿子家庭和女儿家庭放在一个样本中，并且加上性别比和儿子家庭虚拟变量的交乘项使用OLS和中位数回归

●结果：交叉项均为正，说明要想使家庭拥有高储蓄率，需要有一个儿子和生活在个性别比例高的地区的结合

**Table 7: Pooled Sample - Rural Household-Level Savings in 2002**

	All families with one child		All nuclear families with one child	
	OLS	Median	OLS	Median
Local sex ratio (county level)	-0.45 (0.36)	-0.43 (0.35)	-0.03 (0.56)	-0.12 (0.51)
Sex ratio * dummy for son	1.26** (0.48)	1.15** (0.46)	1.39* (0.77)	1.21* (0.65)
Son	-1.39** (0.53)	-1.25** (0.50)	-1.53* (0.83)	-1.33* (0.70)
Per capita income (log)	2.37** (0.20)	2.36** (0.15)	2.59** (0.38)	2.19** (0.19)
Per capita income squared (log)	-0.12** (0.01)	-0.12** (0.01)	-0.13** (0.02)	-0.11** (0.01)
Child aged 5-9	0.04 (0.04)	-0.01 (0.04)	-0.02 (0.07)	-0.07 (0.05)
Child aged 10-14	-0.06 (0.04)	-0.04 (0.04)	-0.1 (0.07)	-0.10* (0.05)
Child aged 15-19	-0.12** (0.05)	-0.14** (0.04)	-0.22** (0.09)	-0.21** (0.06)
Household size	0.06** (0.01)	0.06** (0.01)		
Household head age	0.00* (0.00)	0.00 (0.00)	-0.01 (0.00)	-0.01** (0.00)
Household head gender (Female =1)	-0.09* (0.05)	-0.10** (0.05)	-0.20 (0.12)	-0.08 (0.08)
Household head year of schooling	-0.01** (0.00)	-0.02** (0.00)	-0.01 (0.01)	-0.01* (0.01)
Household head as a minority	-0.13** (0.03)	-0.09** (0.03)	-0.18** (0.05)	-0.23** (0.04)
Poor health	-0.12** (0.06)	-0.13** (0.05)	-0.15 (0.14)	-0.12 (0.11)
Gini at the county level	-0.69** (0.19)	-0.74** (0.18)	-0.81** (0.32)	-0.92** (0.26)
N	2616	2616	906	906

Notes: For the one-child nuclear family sample, the mother is younger than 40.

## ● 家庭收入分位数回归

● 储蓄对当地性别比例的反应是否随家庭收入的不同而变化，将家庭收入分为4个分位数

● 结果表明对于低收入家庭来说，儿子家庭的储蓄对性别比的反应相对高收入家庭较弱(可能是因为这些家庭中的一些人放弃了为儿子结婚的希望。因此，停止通过储蓄进行竞争)。

● 但不同收入四分位数的女儿家庭的储蓄反应没有显著性差异

TABLE 8  
RURAL HOUSEHOLD-LEVEL SAVINGS IN 2002 (with the Interactive Terms of Income Quartiles and Local Sex Ratio)

	BEFORE REMOVING OUTLIERS		AFTER EXCLUDING TOP/BOTTOM 5% OBSERVATIONS	
	Son (1)	Daughter (2)	Son (3)	Daughter (4)
Quartile 1 × sex ratio	.90 (.56)	-.32 (.56)	.82* (.49)	-.18 (.45)
Quartile 2 × sex ratio	1.02* (.55)	-.27 (.56)	.94* (.49)	-.22 (.45)
Quartile 3 × sex ratio	1.13** (.55)	-.21 (.55)	1.02** (.49)	-.13 (.46)
Quartile 4 × sex ratio	1.19** (.54)	-.15 (.55)	1.10** (.47)	-.09 (.45)
Per capita income (log)	2.35*** (.54)	2.56*** (.46)	.84 (.80)	2.92*** (.55)
Per capita income (log) squared	-.12*** (.03)	-.13*** (.03)	-.04 (.05)	-.17*** (.04)
Household head age	.01 (.09)	-.02 (.08)	.00 (.07)	-.07 (.06)
Child aged 5-9	-.06 (.09)	-.13 (.09)	.00 (.07)	-.12 (.07)
Child aged 10-14	-.23** (.11)	-.15 (.12)	-.14* (.08)	-.05 (.11)

## ● 城市样本和农村样本的不同

● 城市居民有理由对性别比例的特定上升做出更强烈的反应。特别是，由于住房市场在城市和农村地区之间的组织方式不同，性别比例的上升可能会在城市地区推高住房价格。由于一个儿子的父母经常被期待帮助支付新婚夫妇购买公寓的费用，这将转化为提高他们的储蓄率的更大压力

### ● 基本结果（表9）

在城市，家庭所在地性别比增加0.01个单位，有儿子的家庭储蓄率会增加1.54%，有女儿的家庭储蓄率会增加1.85%。

### ● 解释

第一：女儿的父母希望在结婚后保持女儿的议价能力。这抵消了利用他们女婿较高储蓄率的愿望

第二：新郎家庭的更高储蓄可能主要用于新娘和新郎，可能不会对新娘的父母产生直接的好处

第三，通过房价形成一个可能的溢出渠道。如果性别比例越高，由于有儿子的家庭竞争加剧，住房成本就越高，所以所有其他家庭也必须提高他们的储蓄，以支付当地的住房

# 家庭层面分析

## ● 城市样本：基本结果



**Table 9: Urban Household-level Savings by Three-person Households in 2002**

	Subsamples that remove the following outliers							
	Full sample		Income or expenditure < 3000 yuan		Bottom and top 5%		Bottom and top 5% & no explicit marriage status	
	Son	Daughter	Son	Daughter	Son	Daughter	Son	Daughter
Local sex ratio (county level)	1.54** (0.29)	1.85** (0.33)	1.16** (0.30)	1.07** (0.37)	1.31** (0.28)	0.65** (0.26)	0.98** (0.31)	0.47 (0.32)
Per capita income (log)	0.10 (0.73)	0.69 (0.53)	1.60 (1.02)	0.80 (0.85)	-0.06 (0.63)	0.46 (0.43)	1.38** (0.45)	0.37 (0.50)
Per capita income squared (log)	0.00 (0.04)	-0.03 (0.03)	-0.07 (0.06)	-0.03 (0.05)	0.01 (0.04)	-0.02 (0.02)	-0.07** (0.03)	-0.01 (0.03)
Child aged 5-9	-0.01 (0.04)	-0.05 (0.03)	0.01 (0.04)	-0.04 (0.03)	0.00 (0.03)	-0.05* (0.03)	-0.01 (0.04)	0.00 (0.04)
Child aged 10-14	-0.01 (0.04)	-0.03 (0.04)	-0.01 (0.05)	-0.01 (0.04)	0.00 (0.04)	0.01 (0.03)	-0.02 (0.05)	0.04 (0.05)
Child aged 15-19	-0.19** (0.06)	-0.17** (0.07)	-0.17** (0.07)	-0.14* (0.08)	-0.16** (0.06)	-0.05 (0.05)	-0.11 (0.08)	-0.01 (0.07)
Household head age	0.00 (0.01)	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.00 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Household head gender (Female = 1)	-0.05** (0.03)	-0.08** (0.03)	-0.01 (0.03)	-0.05* (0.03)	-0.05** (0.02)	-0.02 (0.02)	-0.02 (0.03)	0.00 (0.03)
Household head year of schooling	-0.01** (0.00)	-0.01* (0.00)	-0.01 (0.00)	-0.01* (0.00)	-0.01** (0.00)	0.00 (0.00)	-0.01** (0.00)	0.00 (0.00)
Household head as a minority	0.00 (0.04)	0.06 (0.06)	0.01 (0.03)	0.05 (0.06)	-0.01 (0.04)	0.04 (0.04)	-0.03 (0.03)	-0.07 (0.06)
Poor health	-0.06 (0.05)	-0.03 (0.05)	-0.01 (0.04)	-0.04 (0.05)	-0.04 (0.04)	0.01 (0.03)	-0.02 (0.05)	0.00 (0.04)
Own a house	0.09** (0.03)	0.03 (0.03)	0.09** (0.03)	0.03 (0.03)	0.07** (0.02)	0.05* (0.03)	0.09** (0.02)	0.08** (0.04)
Gini at the county level	0.35 (0.30)	-0.05 (0.34)	0.69** (0.29)	-0.21 (0.37)	0.14 (0.27)	-0.18 (0.25)	0.41 (0.28)	-0.33 (0.30)
Adj. R-squared	0.11	0.14	0.16	0.14	0.1	0.06	0.08	0.07
AIC	418	489.7	235.9	310.9	222.8	-2.7	-78.7	-21.8
N	769	766	604	605	753	688	384	399



# 家庭层面分析

## ● 城市样本：稳定性检验



**Table 10: Robust Checks - Urban Household Savings**

	Full sample		Sub-sample that drops the following observations							
	Son	Daughter	Income or expenditure <3000 yuans		Bottom and top 1% savers		Bottom and top 5% savers		Bottom and top 5% savers & no explicit marriage status for child	
			Son	Daughter	Son	Daughter	Son	Daughter	Son	Daughter
Mother age younger than 45 (nuclear family)										
OLS	1.32*** (0.26)	1.53*** (0.25)	1.32*** (0.26)	0.98*** (0.27)	1.31*** (0.24)	1.18*** (0.23)	0.65*** (0.20)	0.59*** (0.20)	0.84*** (0.24)	0.35 (0.22)
Median regression	0.89*** (0.30)	1.31*** (0.27)	0.75** (0.34)	0.56** (0.25)	1.00*** (0.28)	1.26*** (0.24)	0.70** (0.32)	0.78*** (0.24)	0.90** (0.37)	0.37 (0.36)
Number of observations	1188	1145	971	931	1164	1121	1068	1029	675	657
Mother age younger than 45 (extended family)										
OLS	1.28*** (0.25)	1.51*** (0.25)	0.96*** (0.25)	1.51*** (0.25)	1.16*** (0.23)	1.21*** (0.22)	0.61*** (0.19)	0.57*** (0.19)	0.76*** (0.23)	0.50** (0.22)
Median regression	0.88*** (0.29)	1.20*** (0.19)	0.67*** (0.25)	0.57** (0.25)	0.89*** (0.24)	1.10*** (0.22)	0.56** (0.25)	0.67*** (0.22)	0.72* (0.42)	0.44 (0.37)
Number of observations	1347	1294	1090	1041	1319	1268	1211	1164	761	744

# 家庭层面分析

## ● 性别比和房价

**Table 11: Sex Ratios and Housing Values**

LHS Variable = Per capita living space or average housing value (in log) at the county or city level in 2000

	County				City			
	Space	Space	Value	Value	Space	Space	Value	Value
Sex ratio for age cohort 10-19 in 2000	0.22** (0.09)	-0.02 (0.08)	0.54** (0.16)	0.37** (0.13)	0.70** (0.16)	0.37** (0.14)	1.46** (0.32)	0.74** (0.23)
Per capita GDP in 1999 (log)	-0.06 (0.15)	-0.04 (0.13)	-1.32** (0.22)	-0.65** (0.21)	-0.35 (0.24)	-0.30 (0.22)	-3.24** (0.46)	-1.78** (0.37)
Per capita GDP in 1999 (log) squared	0.01 (0.01)	0.01 (0.01)	0.11** (0.01)	0.06** (0.01)	0.03* -0.014	0.02 -0.013	0.21** -0.026	0.11** -0.021
Household size (log)	-0.43** (0.07)	-0.44** (0.07)	0.70** (0.16)	1.00** (0.21)	1.50** (0.12)	1.55** (0.11)	0.77** (0.19)	0.28* (0.16)
Share of population aged 0-19	-4.35** (0.32)	-2.57** (0.29)	-4.01** (0.68)	-4.11** (0.70)	-3.66** (0.33)	-2.42** -0.314	-1.85** (0.65)	-0.30 -0.567
Share of population aged 20-59	-2.93** (0.30)	-1.32** (0.28)	-3.30** (0.54)	-2.52** (0.57)	-2.89** (0.37)	-1.05** (0.33)	-2.28** (0.68)	-0.28 (0.56)
Province fixed effect		yes		yes		yes		yes
Adjusted R-squared	0.41	0.64	0.33	0.57	0.39	0.69	0.43	0.70
AIC	31.73	-958.00	2584.46	1704.71	-325.82	-718.74	404.35	48.26
N	2088	2088	2088	2088	671	671	671	671

Note: Per capita living space and housing value are from *China Population Census 2000*. The resident bank deposit and per capita GDP are from various issues of *China County Social and Economics Statistical Yearbooks*. The sex ratio for age cohort 0-9 is inferred from the 1990 census (who became age cohort 10-19 in 2000). The share of population aged 0-19 and 25-59 are calculated from the 2000 census. The symbols \* and \*\* stand for significant level at 10% and 5%, respectively.



# 省份层面分析

- 实证方法：固定效应回归

$$\text{Savings\_rate}_{j,t} = \beta \text{Sex\_ratio}_{j,t} + X_{j,t} \Gamma_{j,t} \\ + \text{province fixed effects} + \text{year dummies} + e_{j,t}.$$

T=1980,1981,...2007

储蓄率 = (地方收入 - 地方消费) / 地方收入

性别比：只有2000年人口普查提供省级个别年龄组的公共数据。把重点放在所有年份7-21岁年龄组的性别比上，这是从2000年人口普查中推断出来的

- 基本结果（表14）：在性别比例较不平衡的地区，地方储蓄率往往较高  
列（7）-列（8）：看看父母是否在子女相对较小或已经非常接近结婚年龄时才开始为子女的婚姻存钱。结果表明父母在孩子相对年轻的时候开始为孩子存钱

- 内生性问题：来源于性别比的测量误差（从2000年人口普查中推断）

- 三个IV

违反政策的罚款，以该省年收入的百分比表示；

对于未经批准的新生儿存在额外罚款的虚拟变量(Eberstein, 2008)；

不受计划生育限制的人口在当地人口中的比例；

## ● 描述性统计

**Table 12: Summary Statistics for Key Variables in Provincial Panel Regressions**

Variables		China	Province		
			Mean	Median	Std
	1980				
Savings rate		0.159	0.137	0.141	0.049
Sex ratio for age cohort 7-21		1.059	1.059	1.059	0.038
Sex ratio at birth in 1982		1.083	1.048	1.070	0.124
Per capita income (log)		5.331	5.444	5.362	0.223
Share of SOEs in total employment		0.189	0.190	0.142	0.103
	1990				
Savings rate		0.162	0.147	0.150	0.048
Sex ratio for age cohort 7-21		1.045	1.045	1.047	0.057
Sex ratio at birth		1.147	1.114	1.117	0.029
Per capita income (log)		6.600	6.715	6.684	0.252
Share of SOEs in total employment		0.162	0.185	0.150	0.100
	2000				
Savings rate		0.262	0.274	0.258	0.076
Sex ratio for age cohort 7-21		1.079	1.080	1.082	0.048
Sex ratio at birth		1.199	1.180	1.160	0.080
Per capita income (log)		7.868	8.087	8.046	0.343
Share of SOEs in total employment		0.114	0.131	0.116	0.063
Share of labor force enrolled in social security		0.191	0.174	0.144	0.107
	2007				
Savings rate		0.302	0.310	0.304	0.056
Sex ratio for age cohort 7-21		1.136	1.136	1.130	0.041
Sex ratio at birth in 2005		1.200	1.200	1.200	0.077
Per capita income (log)		8.743	9.028	8.898	0.337
Share of SOEs in total employment		0.082	0.086	0.070	0.035
Share of labor force enrolled in social security		0.256	0.295	0.257	0.174

Note: Saving rate is defined as  $\log(\text{income}/\text{consumption})$ . The sex ratios for age cohort 7-21 are inferred from the 2000 population census. For example, the cohort 7-21 in 2007 was the cohort 0-14 in the 2000 census, since the two groups should theoretically be the same. The sex ratios at birth in 1982, 1990 and 2000 at the national level are published figures from China Population Censuses. Since the disaggregate sex ratios at birth in 1980 and 1990 are not public available, we use sex ratios for cohort 20 and 10 years old, respectively from the 2000 census to approximate them. The sex ratios at birth in 2005 are from Zhu, Lu and Hesketh (2009) which are calculated based on *China 1% Population Survey 2005*. Zhu, Lu, and Hesketh report sex ratios at birth for urban, town and rural areas. To keep consistency with early years in the table, we combine town and rural areas as rural based on the weights provided in Table 1 of the paper.

TABLE 14  
 SEX RATIOS AND SAVINGS RATES ACROSS PROVINCES: PANEL REGRESSION, 1980–2007  
 LEFT-HAND-SIDE VARIABLE =  $(Y - C)/Y$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sex ratio for age cohort 7–21	.28** (.05)	.58** (.18)	.73** (.15)	.28** (.05)	.32** (.06)	.24** (.07)			
Sex ratio for age cohort 7–14							.19** (.04)		.17** (.04)
Sex ratio for age cohort 15–21								.17** (.04)	.14** (.04)
Per capita income (log)	.20** (.02)	.29** (.04)	.31** (.04)	.20** (.02)	.20** (.02)	.19** (.02)	.19** (.02)	.20** (.02)	.20** (.02)
Share of population aged 0–19	.01 (.06)	.09 (.21)	.08 (.21)	0 (.06)	.04 (.08)	-.03 (.09)	.01 (.07)	-.01 (.07)	.04 (.08)
Share of population aged 20–59	-.24** (.11)	.22 (.43)	.27 (.29)	-.25** (.11)	-.23* (.13)	-.26* (.15)	-.24* (.13)	-.30** (.12)	-.2 (.13)
Gini coefficient		-.08 (.25)							
Average birth rate for age cohort 7–21			.04 (.23)						
Life expectancy (log)				1.29 (.97)					
Share of SOE employment in total labor force					-.10** (.04)	-.03 (.04)	-.06* (.04)	-.03 (.04)	-.10** (.04)
Share of labor force enrolled in social security					-.03* (.02)	-.03* (.02)	-.04* (.02)	-.02 (.02)	-.03 (.02)
Growth rate from $t - 5$ to $t$						-.03* (.02)			
Province fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted $R^2$	.78	.82	.72	.79	.78	.8	.78	.78	.78
AIC	-3,324	-596	-457	-3,270	-3,326	-2,840	-3,311	-3,296	-3,322
Observations	844	141	112	829	844	710	844	844	844

NOTE.—Robust standard errors are in parentheses. Sex ratios are inferred from the 2000 population census. SOE = state-owned enterprise.

\* Significant at the 10 percent level.

\*\* Significant at the 5 percent level.

TABLE 15  
FIRST-STAGE REGRESSIONS FOR SAVINGS RATE AT THE PROVINCIAL LEVEL  
LEFT-HAND-SIDE VARIABLE = SEX RATIO

	R1 (1)	R2 (2)	R3 (3)	R4 (4)	R5 (5)
Penalty for violating family planning policy (% of local yearly income)	.010** (.002)			.010** (.00)	.010** (.00)
Dummy for extra penalty for higher order births		.008** (.002)		.009** (.002)	.003 (.002)
Share of local population exempted from birth quotas			-.283** (.04)		-.278** (.04)
Per capita income (log)	-.034** (.01)	-.034** (.01)	-.050** (.01)	-.035** (.01)	-.050** (.01)
Share of population aged 0-19	-.286** (.07)	-.274** (.07)	-.158** (.08)	-.273** (.07)	-.156** (.08)
Share of population aged 20-59	-.430** (.12)	-.396** (.13)	-.240* (.13)	-.421** (.12)	-.266** (.12)
Share of SOE employment in total labor force	.422** (.05)	.384** (.05)	.343** (.05)	.416** (.05)	.375** (.05)
Share of labor force enrolled in social security	.007 (.02)	.001 (.02)	.009 (.02)	.009 (.02)	.017 (.02)
Province fixed effects?	Yes	Yes	Yes	Yes	Yes
Year fixed effects?	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup>	.72	.71	.73	.72	.74
AIC	-3,795	-3,777	-3,839	-3,799	-3,862
Observations	844	844	844	844	844

NOTE.—Robust standard errors are in parentheses. Sex ratios are inferred from the 2000 population census.

\* Significant at the 10 percent level.

\*\* Significant at the 5 percent level.



## ● IV: 第2阶段回归

地方性别比系数均为正，且大于固定效应回归，表明内生性导致固定效应回归低估了性别比对储蓄率的正向作用

TABLE 16  
2SLS REGRESSIONS FOR SAVINGS AT THE PROVINCIAL LEVEL  
LEFT-HAND-SIDE VARIABLE =  $(Y - C)/Y$

	IV SET		
	All Three IVs (1)	Two Financial Penalty Variables (2)	One Financial Penalty (3)
Local sex ratio	.61** (.18)	1.08** (.36)	1.17** (.47)
Per capita income (log)	.21** (.02)	.22** (.03)	.23** (.03)
Share of population aged 0–19	.12 (.09)	.25* (.15)	.28 (.18)
Share of population aged 20–59	-.11 (.18)	.08 (.28)	.12 (.32)
Share of SOE employment in total labor force	-.21** (.08)	-.40** (.15)	-.43** (.20)
Share of labor force enrolled in social security	-.03 (.02)	-.03 (.03)	-.03 (.03)
Province fixed effects?	Yes	Yes	Yes
Year fixed effects?	Yes	Yes	Yes
Adjusted $R^2$	.77	.71	.69
AIC	-3,224	-3,020	-2,965
Durbin-Wu-Hausman test	.03	.00	.00
Hansen's $J$ -statistic for overidentification	.11	.59	
Observations	844	844	844

NOTE.—Robust standard errors are in parentheses. Sex ratios are inferred from the 2000 population census. The instruments used in the three regressions correspond to those presented in table 15.



# 05 | 结论

# 结论

- 保持其他家庭特征不变的情况下，有儿子的家庭在性别失衡较严重的地区储蓄更多，
- 农村地区有女儿的家庭并没有因为当地性别比例的上升而减少储蓄；城市样本中的有女儿的家庭在性别比例偏高的城市储蓄率也更高
- 在性别比例较不平衡的地区，地方储蓄率往往较高
- 婚姻市场竞争因素可能占1990-2007年家庭储蓄率实际增长的一半左右



THANK YOU !

2019.5.24