The Role of Social Norms in Old-age Support: Evidence from China

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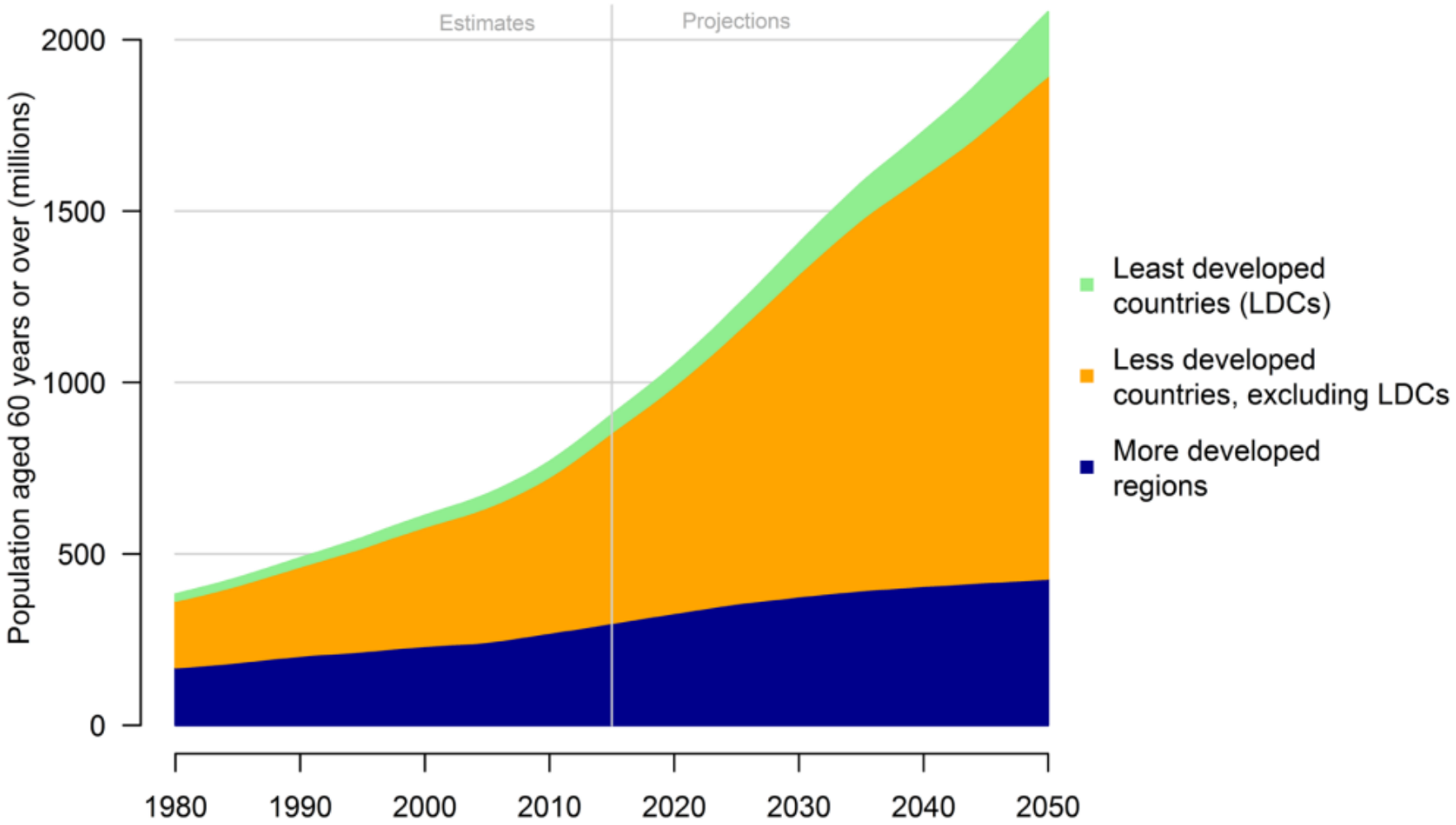
An Ageing World



Data source: United Nations (2017). World Population Prospects: the 2017 Revision.

Family old-age support in China

- Norm of old-age support
  - 74%: children should be responsible (CHFS)
  - Gender specific: sons provide more than daughters
- Improves the welfare of the elderly
  - Incomplete public pension
    - Family support: 50% in rural, 20% in urban in 2010
      China NBS Stat.
  - An ageing population in China: 17% in 2017, 30% in 2040
- Transmitting the norm to future generations might benefit the government

Research question

- How is the norm transmitted inter-generationally?

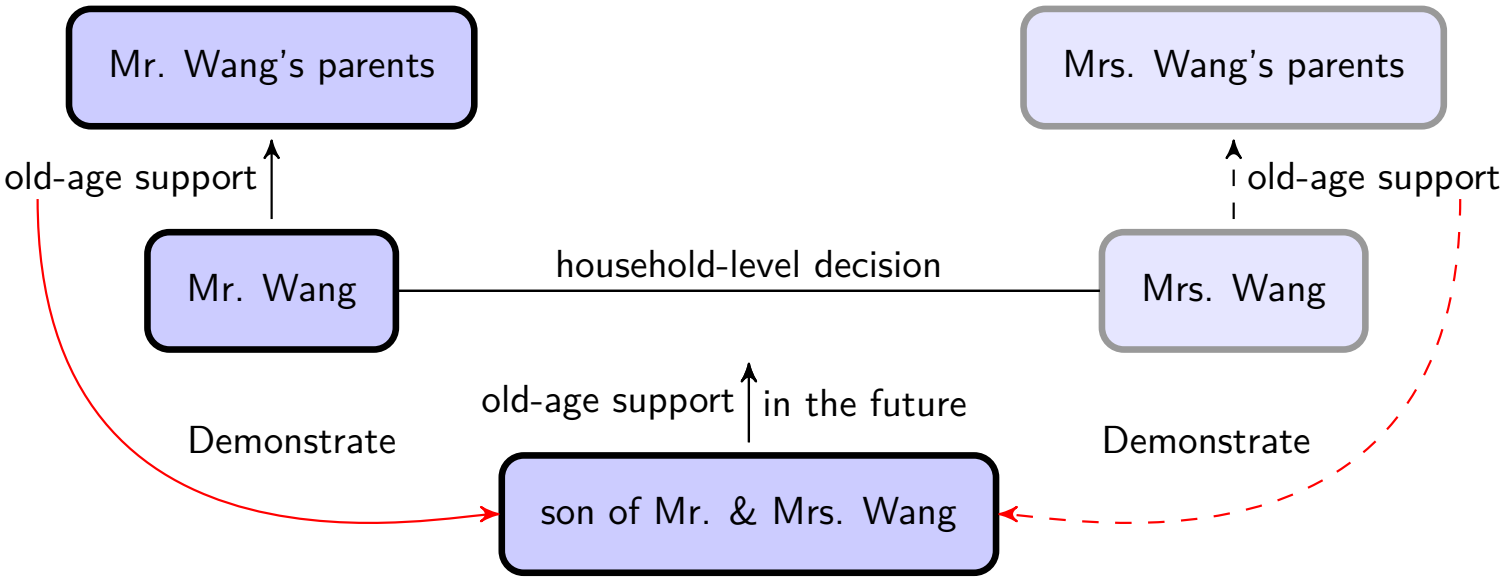
This paper

- Focuses on:
  - Both financial and non-financial old-age support
  - Same-gender transmission channel

Mechanism Hypothesis: three generations

Basic Model

- Indirect reciprocity: Mauss (1958)
- Same gender transmission: Lytton and Romney (1991); Dhar et al. (2018); Kleven et al. (2018)



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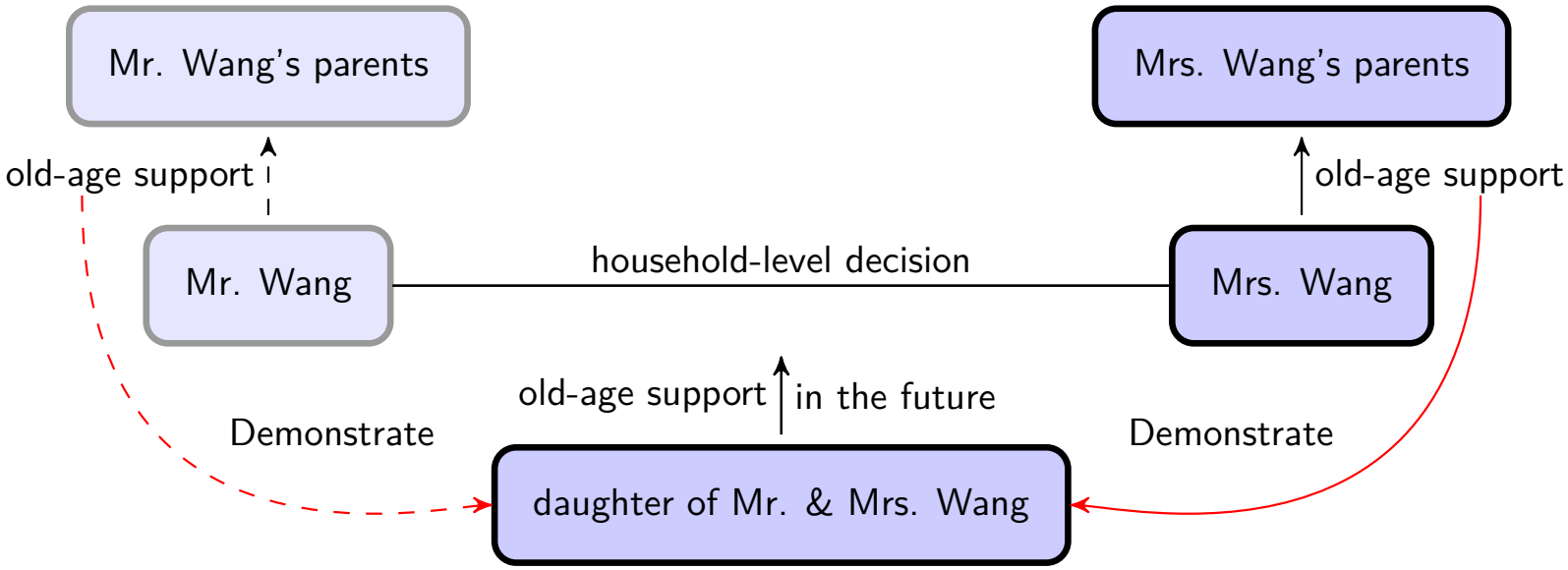
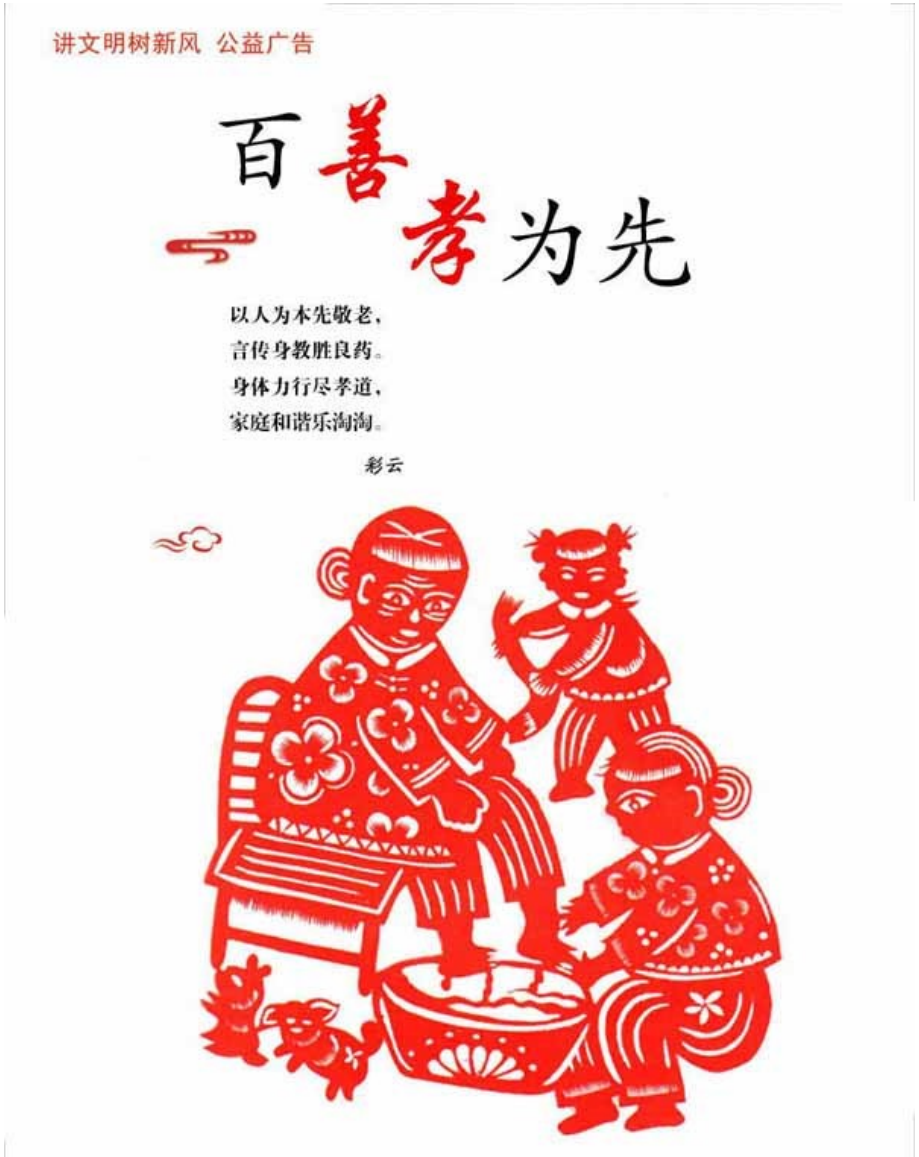


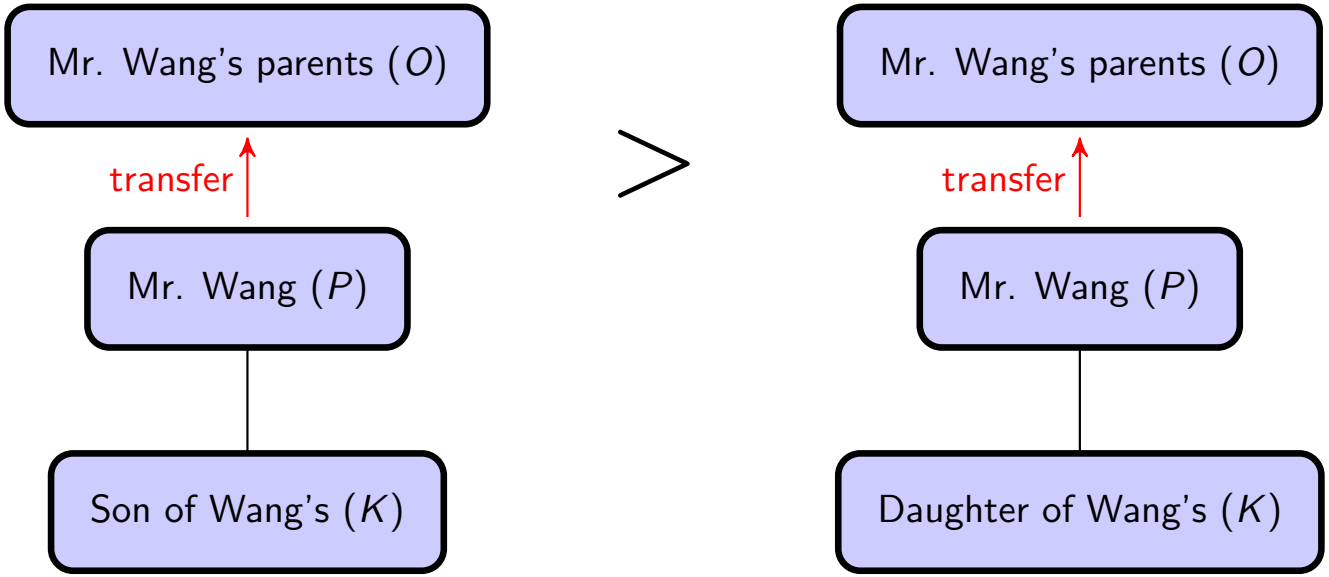
Public Service Announcement Posters in China

Public Service Announcement Posters in China



Expected empirical results

- If the mechanism is correct, then parents provide more old-age support to their own parents with more same-gender children



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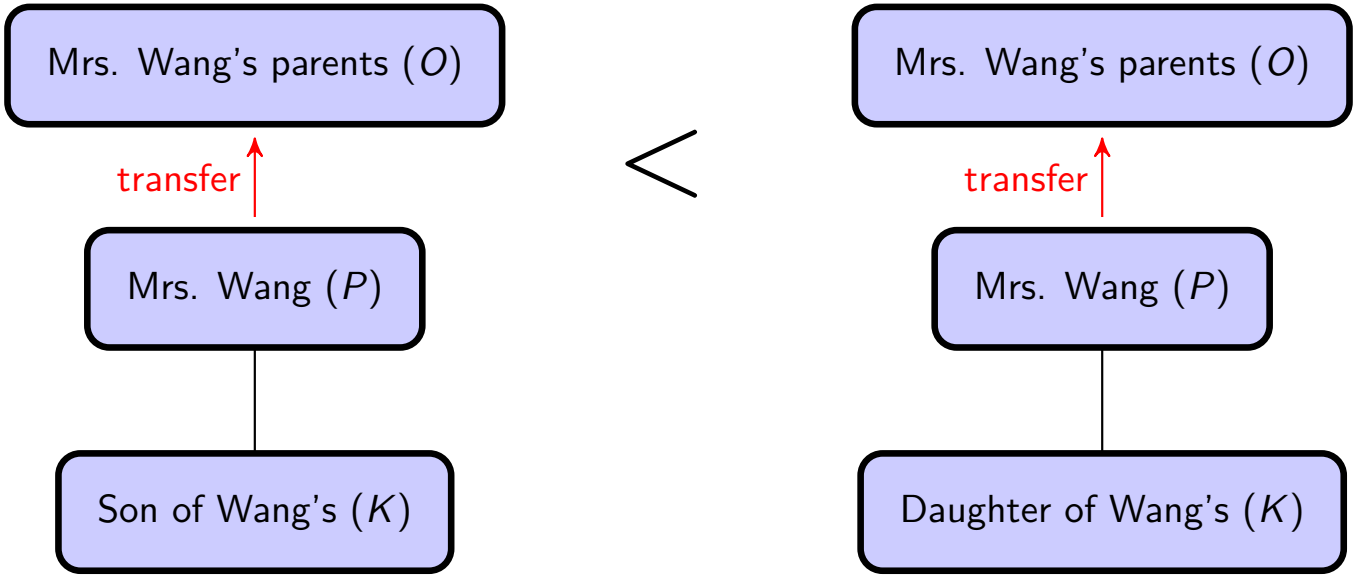


Contribution

- Provides novel evidence on the transmission of social norms
  - Three-generation: the demonstration effect
    - Cox and Stark, 1996; Wolff, 2001; Mitrut and Wolff, 2009
  - Common assumption: children provide old-age support
    - Altruism and Direct reciprocity: Becker and Lewis, 1973;
- Documents a normative shift
  - Adapting to socio-economic and demographic changes
  - Large urban-rural difference in China

Preview of main results and empirical strategy

- Support provided by parents to their own parents
  - Fathers with sons vs. fathers with daughters
    - 7.9% higher probability of providing financial support
  - Mothers with daughters vs. mothers with sons
    - 7.3% higher probability
  - Similar patterns in non-financial support
- Gender of children not random in China
- Using an IV that exploits two facts
  - Gender of the first child
  - Time variation in a policy ban on gender-selective abortions

Outline

Motivation and Background

Empirical results

Conclusion

Data background: CHARLS (2011) and CHFS (2013)

China Health and Retirement Longitudinal Survey (CHARLS)

- A survey of Chinese aged 45 or above
- Current waves: **2011**, 2013 and 2015
- Detailed inter-generational transfers data: 70% of rural samples

China Household Finance Survey (CHFS)

- A survey of Chinese for all age ranges
- Current waves: 2011, **2013** and 2015
- Focus on people's financial activities: 65% of urban samples

Outcome variables: old-age support from the mid-age generation (P) to their own parents (O)

Data description and structure

Ideal regression

The gender combination of the parents and the children

$$y_i = \alpha + \beta sex_ratioK_i + \gamma maleP_i + \delta(maleP_i \times sex_ratioK_i) + \mathbf{X_i'}\theta + \epsilon_i$$

- i for individual i in P
- y_i: the prob. and the amount of any transfers; visits paid to O
- $maleP_i$: dummy equals 1 if a male P_i
- sex_ratioK_i: actual sex ratio of K
- $\mathbf{X_i}$ is a vector of demographic variables for P_i and the elderly parents' of P_i (O) Summary stat.

Ideal regression: coefficients

The gender combination of the parents and the children

$$y_i = \alpha + \beta sex_ratioK_i + \gamma maleP_i + \delta(maleP_i \times sex_ratioK_i) + \mathbf{X_i'}\theta + \epsilon_i$$

- Let's assume a simple case: single child

	Son	Daughter	Within-P same-gender Δ
Father	$\alpha + \beta + \gamma + \delta$	$\alpha + \gamma$	$\beta + \delta$
Mother	$\alpha + \beta$	α	$-\beta$

OLS results: CHARLS

	OLS: CHARLS (mostly rural)		
VARIABLES	*any-transfer*	*amount*	*visit days*
maleP	0.0104	-95.90	14.51***
	(0.0281)	(233.8)	(5.201)
sex_ratioK	0.00471	-7.627	-4.680**
	(0.0172)	(136.6)	(2.352)
maleP × *sex_ratioK*	-0.0108	271.2	10.39***
	(0.0215)	(175.7)	(3.853)
sex_ratioK+	-0.006	263.6*	5.713*
maleP × *sex_ratioK*	(0.013)	(142.8)	(3.251)
P demographics	Yes	Yes	Yes
O demographics	Yes	Yes	Yes
hh-size	Yes	Yes	Yes
Observations	12,232	12,232	12,232
R-squared	0.205	0.050	0.628
Mean	0.401	831.2	118.7

Notes: Robust standard errors in parentheses, clustered at household-level in the *O* generation. Stars indicate statistical significance. *** p<0.01, ** p<0.05, * p<0.1. Note

Identification problems

- Gender selection problems in K
  - Increasing gender ratio for the newborns
  - Correlated with preferences, household income or other variables
- To address the endogeneity:
  - Gender of the first child
  - Time variation for a policy ban on sex-selective abortions

Identification strategy: Exploiting two facts

- Gender of the first child
  - Relatively close to natural birth rate
  - The first-born children have the lowest gender ratio at the national level (Ebenstein, 2010) ▸ Gender ratio by birth order
  - Still higher than natural ratio
- Time variation of the NFPC policy
  - Banned the sex-selective abortions and related technologies
  - Implemented from 2003
  - The gender ratio dropped since
    ▸ Estimated gender ratio using CHARLS and CHFS

Identification strategy: IV and its variation

Additional IV for CHARLS

- Interaction term as IV: trends of birth cohort
  - The gender of the first child in households and
  - Whether the households are affected by the policy ban
- Variation comes from the affected compliers
- Compliers conduct sex-selective abortions if no policy ban graphic illustration
  - Affected: want a son but have a girl
  - Unaffected: want a son and have a son by natural chance

IV results: CHARLS 2011 wave

subsample after 2003

	IV: CHARLS (mostly rural)		
VARIABLES	*any-transfer*	*amount*	*visit days*
maleP	-0.0802	-230.5	-29.89***
	(0.0499)	(316.5)	(11.24)
sex_ratioK	-0.0450	-273.3	-4.315
	(0.0437)	(399.4)	(7.493)
maleP × *sex_ratioK*	0.125**	472.9	76.49***
	(0.0579)	(442.2)	(14.13)
sex_ratioK + *maleP* × *sex_ratioK*	0.079***	200.0	72.17***
	(0.026)	(190.6)	(11.72)
P demographics	Yes	Yes	Yes
O demographics	Yes	Yes	Yes
hh-size	Yes	Yes	Yes
Observations	12,232	12,232	12,232
R-squared	0.201	0.050	0.610
Mean	0.401	831.2	118.7

Notes: Robust standard errors in parentheses, clustered at household-level in the *O* generation. Stars indicate statistical significance. *** p<0.01, ** p<0.05, * p<0.1. Note

first stage

different ways for measuring the transfer | transfers from *O* | cohabitation

Same father effects in CHFS?

- 65% of the urban samples
  - High pension coverage
  - Son preference less persistent

	Urban		Rural	
CHFS	No.	Percentage	No.	Percentage
Prefer sons	1,159	8.43%	621	9.25%
Prefer daughters	2,904	21.12%	672	10.01%
Same	9,685	70.45%	5,423	80.75%

  - More job opportunities for females
  - Mothers with higher intra-household bargaining power

- Prediction: possible mother effects might be driven by urban and single-child households

OLS results: CHFS

	OLS: CHFS (mostly urban)		
VARIABLES	*any-transfer*	*amount*	*visit days*
maleP	-0.0325**	-99.75	23.70***
	(0.0153)	(63.95)	(6.275)
sex_ratioK	-0.0119	-38.61	-1.326
	(0.00968)	(51.97)	(3.441)
maleP × *sex_ratioK*	0.00977	41.14	6.089
	(0.0116)	(62.96)	(5.324)
sex_ratioK+	-0.002	2.535	4.762
maleP × *sex_ratioK*	(0.009)	(38.86)	(4.208)
P demographics	Yes	Yes	Yes
O demographics	Yes	Yes	Yes
hh-size	Yes	Yes	Yes
Observations	19,509	19,509	19,509
R-squared	0.282	0.203	0.168
Mean	0.303	489.1	91.66

Notes: Robust standard errors in parentheses, clustered at household-level in the *P* generation. Stars indicate statistical significance. *** p<0.01, ** p<0.05, * p<0.1.

Detailed note

IV results: CHFS 2013 wave

subsample after 2003

	IV: CHFS (mostly urban)		
VARIABLES	*any-transfer*	*amount*	*visit days*
maleP	-0.0518	-237.7	-3.363
	(0.0448)	(173.5)	(16.57)
sex_ratioK	-0.0733**	-96.20	-46.92***
	(0.0343)	(135.4)	(10.82)
maleP × *sex_ratioK*	0.0412	259.2	49.37**
	(0.0645)	(291.9)	(24.53)
sex_ratioK+	-0.032	163.0	2.455
maleP × *sex_ratioK*	(0.045)	(203.9)	(17.92)
P demographics	Yes	Yes	Yes
O demographics	Yes	Yes	Yes
hh-size	Yes	Yes	Yes
Observations	19,509	19,509	19,509
R-squared	0.280	0.203	0.159
Mean	0.303	489.1	91.66

Notes: Robust standard errors in parentheses, clustered at household-level in the *P* generation. Stars indicate statistical significance. *** p<0.01, ** p<0.05, * p<0.1. Note

first stage

education for girls | transfers from *O* | cohabitation

Subsample check and heterogeneity analysis

	Father (CHARLS)	Mother (CHFS)
Income of *P*	Low	Low
Number of *K*	Non-single	Single/Non-single
Urban-rural	Rural	Urban
P's Pension	With/out	With/out
Ethnic community/group	*Han* (non-financial) & *non-Han* (both)	*Han* (both)

Notes: Detailed regressions ▸ income ▸ no. K ▸ urban-rural ▸ pension ▸ ethnic

- The mother demonstration effect: mainly **urban** samples
- Mechanism checks: ▸ altruism ▸ education ▸ direct reciprocities

Conclusion

- A social-norm transmission process
  - Important channel to sustain old-age support norm
- Parents provides 10-20% with same-gender children
  - The effects from fathers are more significant in rural
  - Mother effects in urban areas
- Indirect implications for the policy environment
  - How demography affects the social norm
  - "Home-based" old-age care in China
  - Decreasing fertility rate in developing countries
    - Increasing gender ratio
    - Suggest policies on increasing gender equality

Appendix I

Primary Source of Income of China's Elderly: 2005 and 2010

Back

	Urban			*Rural*		
Source of Income	Average	Male	Female	Average	Male	Female
Labour income	13.0	18.4	7.9	37.9	48.5	27.5
Pensions	45.4	56.9	34.6	4.60	8.1	1.3
Subsistence allowance	2.4	1.8	2.9	1.3	1.8	0.9
Insurnace and subsidy	0.3	0.3	0.2	0.1	0.2	0.0
Property income	0.5	0.5	0.5	0.2	0.2	0.1
Family support	37.0	20.7	52.3	54.1	39.3	68.5
Other	1.5	1.4	1.6	1.8	2.0	1.7

Source: NBS, 2006. Most significant share of support reported.

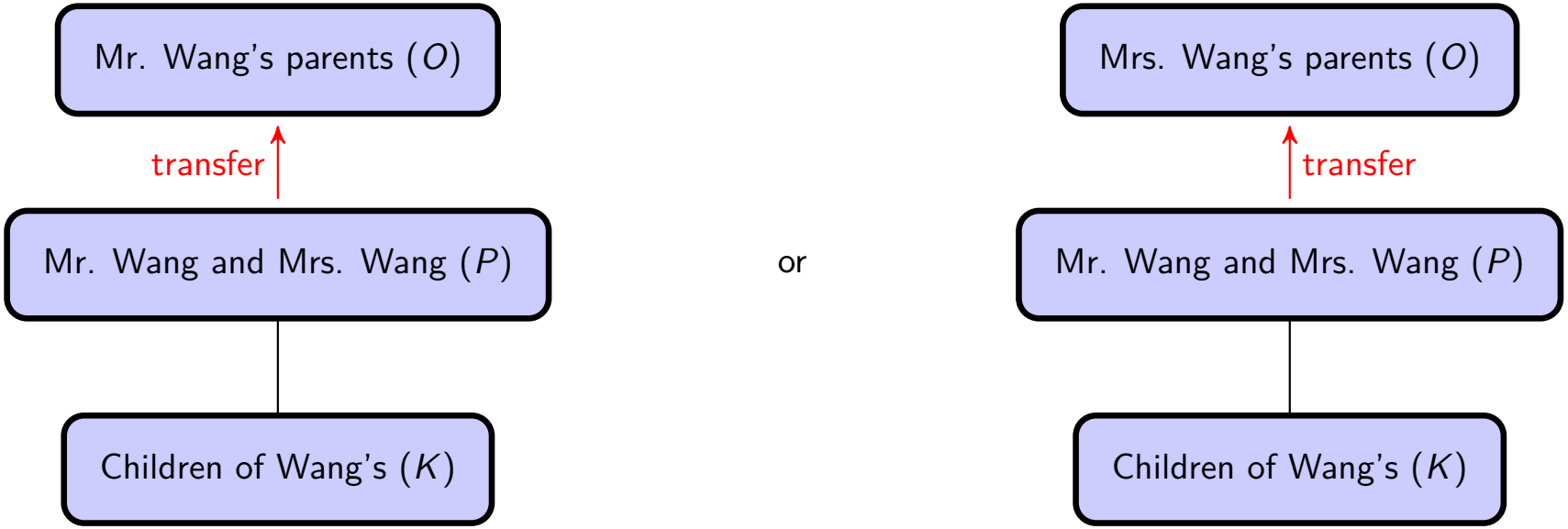
	Urban			*Rural*		
Source of Income	Average	Male	Female	Average	Male	Female
Labour income	6.16	9.72	3.75	41.18	50.53	32.14
Pensions	66.30	74.21	58.99	4.60	7.19	2.09
Subsistence allowance	2.33	1.76	2.87	4.48	5.14	3.85
Insurnace and subsidy	-	-	-	-	-	-
Property income	0.68	0.75	0.62	0.19	0.21	0.16
Family support	22.43	12.13	31.95	47.74	35.13	59.93
Other	1.64	1.44	1.83	1.81	1.79	1.83

Source: NBS, 2011. Most significant share of support reported.

Appendix I

Data Structure: CHFS, 2013 ▸ data description

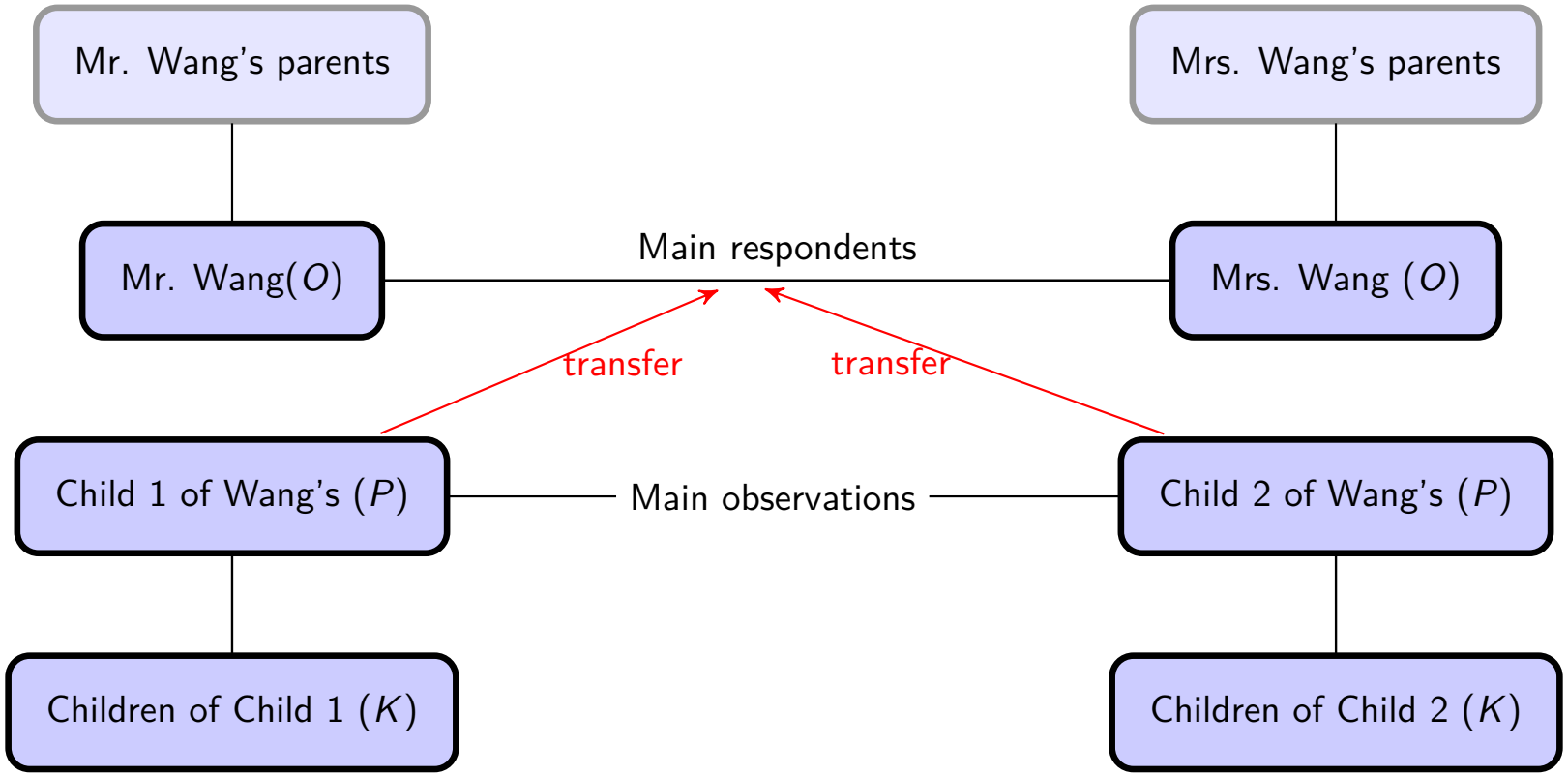
If Mr. Wang or Mrs. Wang is the main respondent for the household



Appendix I

Data Structure: CHARLS, 2011

data description | data reconstruction | Back



Appendix I

Data description: CHARLS Back

The Chinese Health and Retirement Longitudinal Study (CHARLS)

- A survey of Chinese aged 45 or above in 2011, 2013 and 2015
- Main wave: 2011 survey
  - 28 out of 34 provinces
  - 17,708 individuals in 10,257 households
  - Use the adult children of the main respondents as the main observations
- Contains data on people's family, work, retirement, wealth and health information
  - Detailed inter-generational transfers data available
  - more than 70% rural samples

Appendix I

Data reconstruction: CHARLS

Back

- The main respondents in the survey
  - those who aged above 45
- Reconstructing the data set
  - Making the child of the main respondents as the main observations
  - Cluster at household-level of the main respondents

Appendix I

Data description: CHFS Back

China Household Finance Survey (CHFS)

- A survey of Chinese for all age ranges
- Current waves: 2011, 2013 and 2015
  - 25 out of 34 provinces
  - 29,324 individuals in 8,438 households (2011) and 97,916 individuals in 28,142 households (2013)
  - No need to reconstruct the dataset, but no prefectual-level information
- Focus on people's financial activities
  - Around 65% of urban samples
  - More inter-generational transfer data available in wave 2013 and 2015
  - No prefectural-level data
- Mainly using wave 2013 and the household survey-respondent sample to match CHARLS's outcomes

Appendix I

Note for the CHARLS regression results Back OLS Back IV

- *Notes*: *Notes*: Robust standard errors in parentheses. Stars indicate statistical significance. *** p<0.01, ** p<0.05, * p<0.1. *maleP* is the gender of *P*. *sex_ratioK* is the gender ratio of *K* in the household of *P* and represents the mother demonstration effect. *sex_ratioK* + *maleP* × *sex_ratioK* shows the father demonstration effect. The three outcome variables are the dummy indicating whether parents provide any financial transfer to their elderly parents (*any-transfer*), the amount of any transfer provided (*amount*), and the number of days spent on visits paid to their elderly parents per year (*visit days*). The key controls are *P*'s household-size, gender, age, income education, *hukou* status, whether live in urban areas, siblings, marital status, occupation, distance from *O*, and *O*'s transfer to *P*, age, education, working status, retirement status, any deposit, *hukou* status, household income and hours of *O* taking care of *P*'s *K*, depending on the availability of the information in the CHARLS and the CHFS. The standard error is clustered at the prefectural city level for the CHARLS and the cluster-level is the province-level in the CHFS.

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Note for the CHFS regression results Back OLS Back IV

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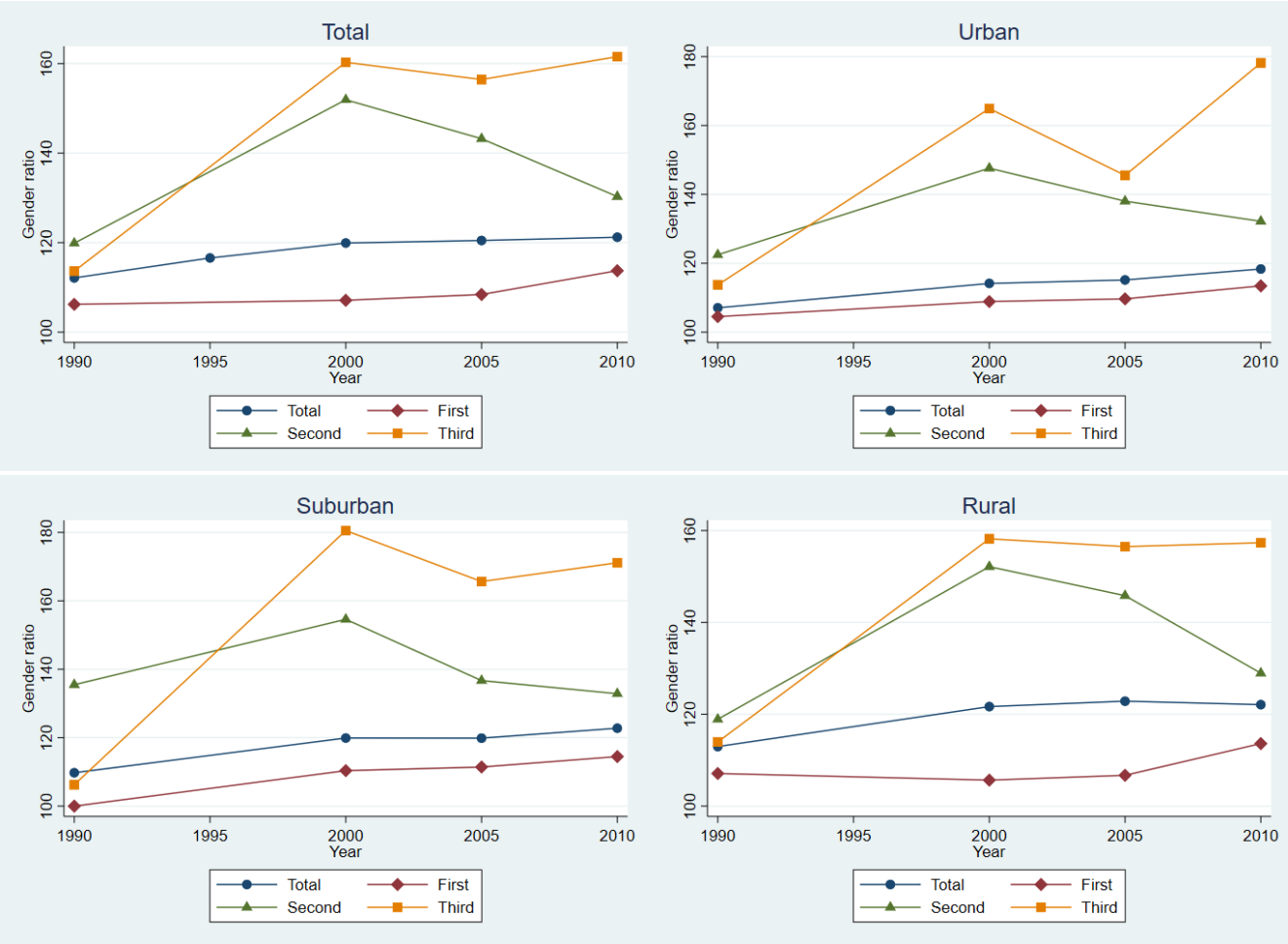
Appendix I

Gender ratios for the newborns in China: birth order

Back

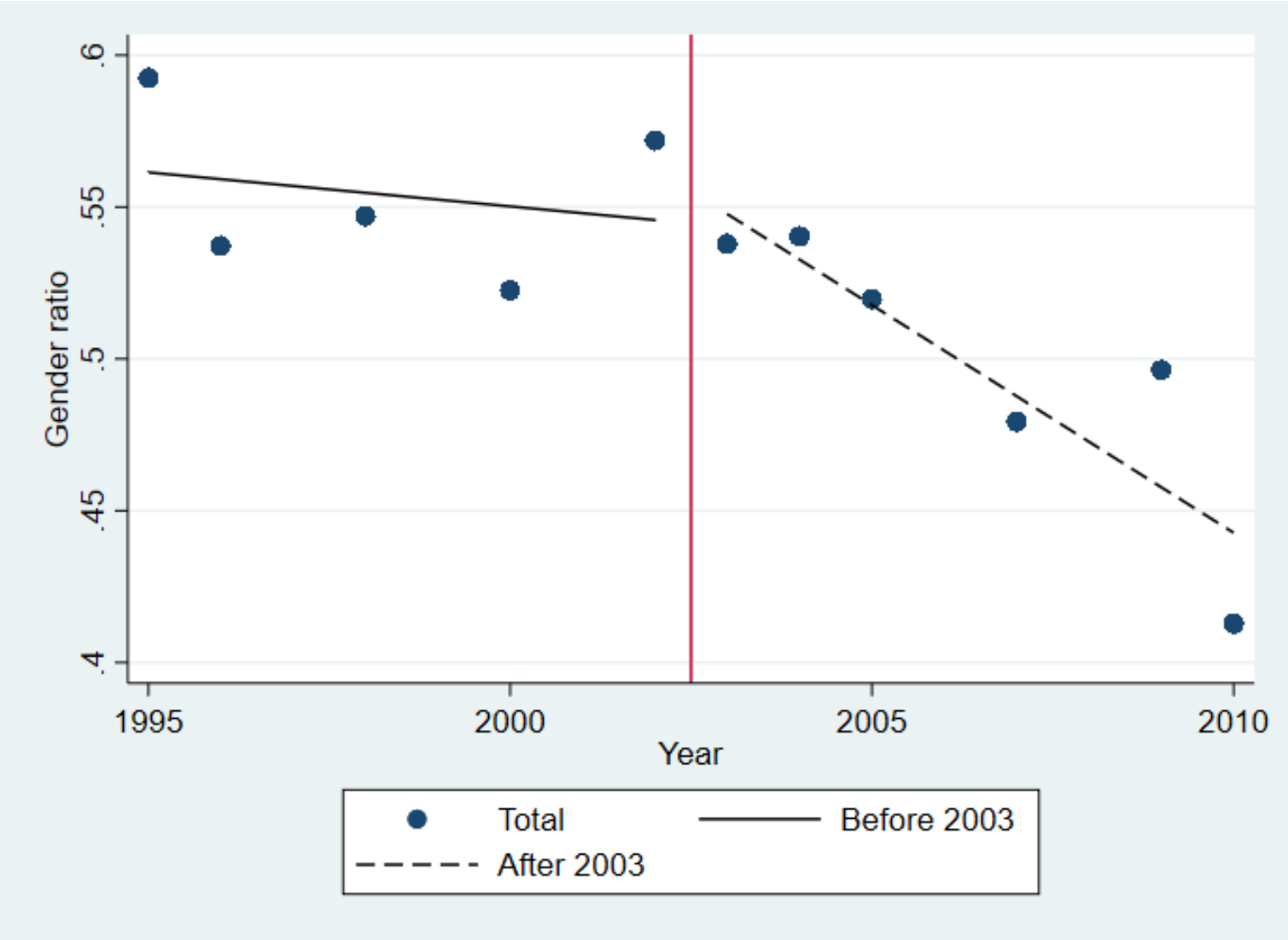


Data source: National Population Census. 1990, 1995, 2000, 2005 and 2010.

Appendix I

Estimated gender ratio using CHARLS 2011 wave

Back

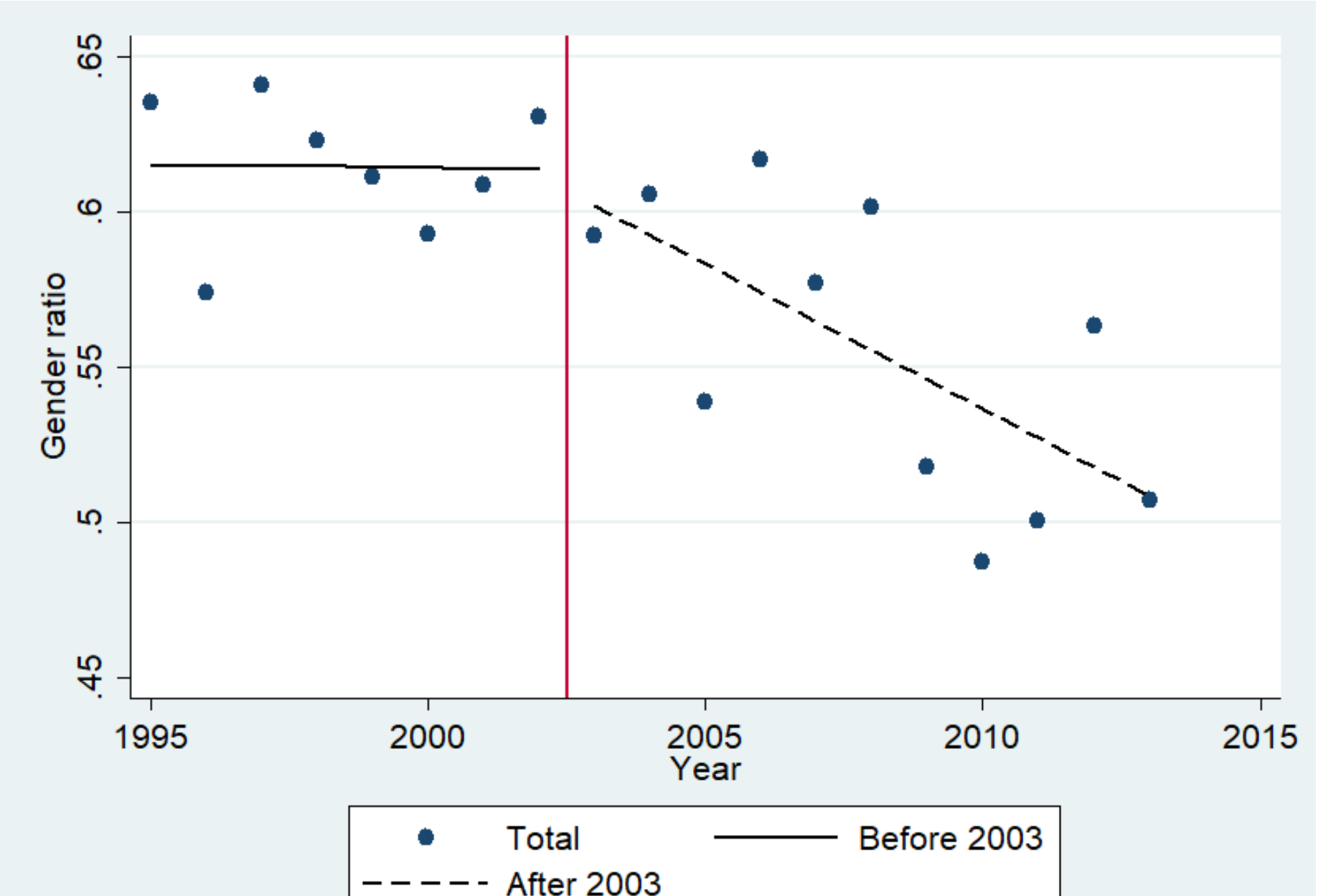


Appendix I

Estimated gender ratio of 1st child using CHFS 2013 wave Back

Appendix II

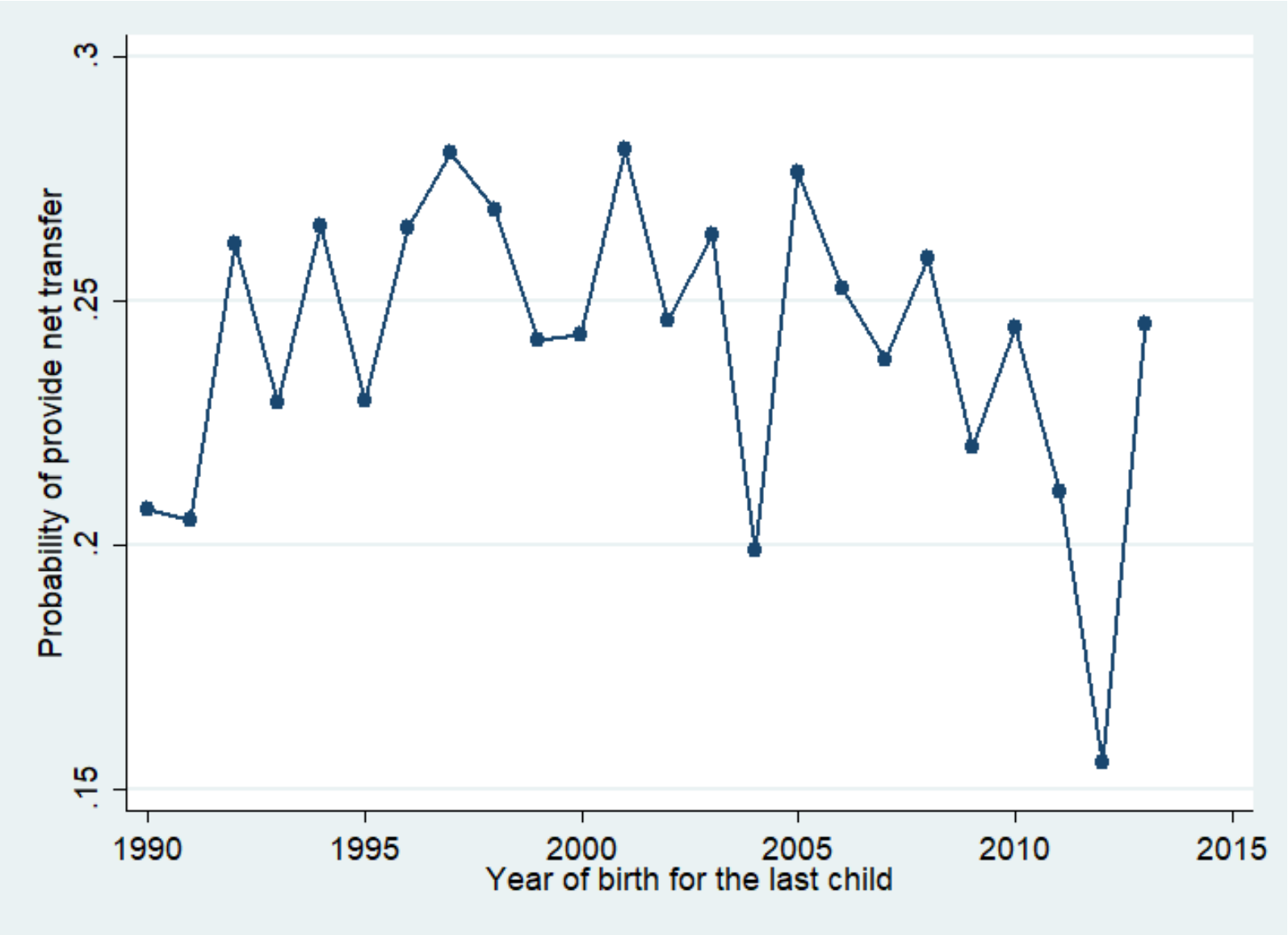
Estimated gender ratio of 1st child using CHFS 2013 wave Back



Appendix I

Trend of old-age provision by birth year of last child

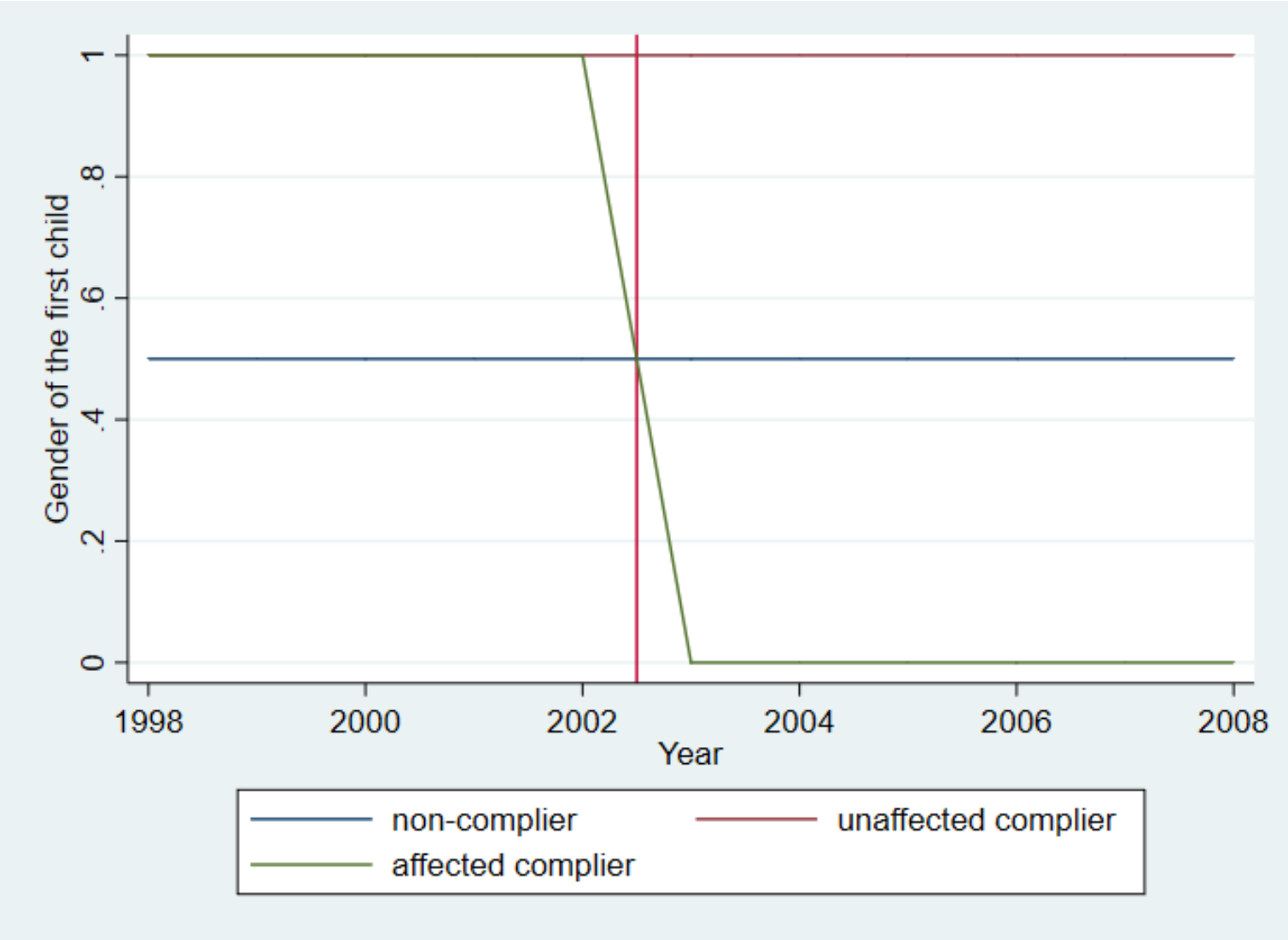
Back



Appendix I

Graphical Illustration of the compliers

Back



Appendix I

Construction of the prefectural level index Back

NFPC regulation: National-wide implementation in 2003

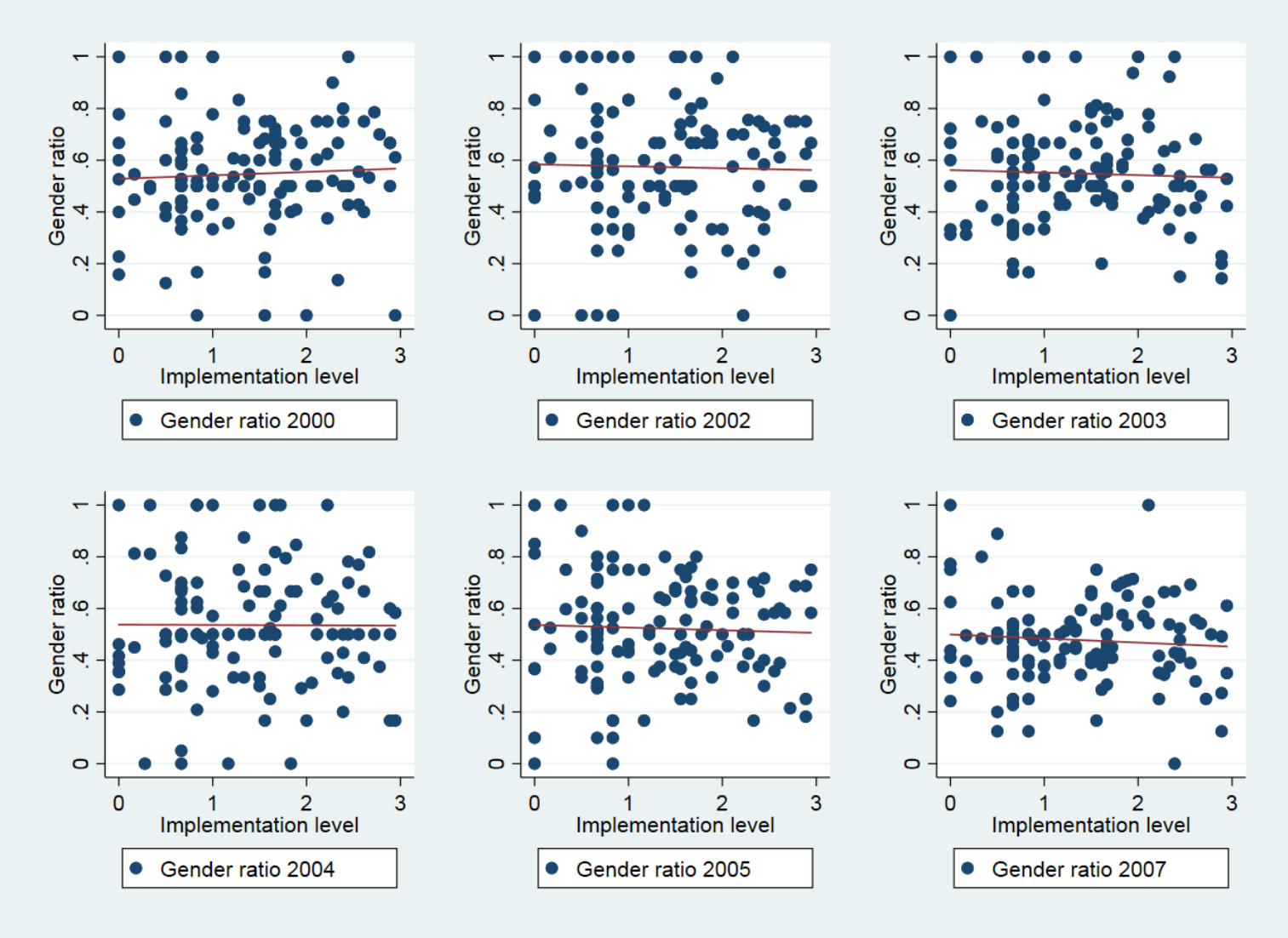
- In 2005, prefectural-level campaigns: promoting this regulation
  - How many years the cities have been enforcing the campaign
  - The starting year of the campaign
  - Together with whether the prefectural cities include the 2003 regulation in their local NFPC regulation
- Varies between 0 and 3
- Policy implementation level for prefectural cities
  - A index indicates the actual enforcement of the policy
  - Compliance-level: does the local-level enforcement start later than 2003, has the local government been implementing this policy on yearly-basis after 2003
  - Collected from the government websites and newspapers

Implementation level and gender ratio: prefecture-level

Appendix I

Construction of the prefectural level index and estimated prefectural-level gender ratios

Back



Appendix I

Summary statistics: Key variables

Back

	CHARLS				CHFS			
VARIABLES	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
whether *P* provides any transfers	0.402	0.490	0	1	0.303	0.460	0	1
amount of any transfer	831.0	4963	0	105,000	705.6	2938	0	150,000
visit days	118.7	145.9	0	365	91.67	145.38	0	365
gender of *P*	0.513	0.500	0	1	0.499	0.500	0	1
gender ratio of *K*	0.562	0.405	0	1	0.567	0.416	0	1
No. of *K*	1.643	0.774	1	8	1.503	0.776	1	9
age of *P*	39.73	9.287	21	65	48.17	10.71	21	65
income level of *P*	5.078	1.420	1	11	-	-	-	-
income of *P*	-	-	-	-	21779	43639	0	1649439
education of *P*	0.892	0.496	0	2	0.832	0.646	0	2
whether *P* has a rural *hukou*	0.680	0.466	0	1	0.546	0.498	0	1
P living in rural areas	0.652	0.476	0	1	0.332	0.471	0	1
No. of siblings of *P*	3.758	1.612	1	10	3.218	1.856	0	16
any transfers from *O*	0.037	0.190	0	1	0.144	0.351	0	1

Appendix I

First stage results and weak instrumental variable tests

Back CHARLS Back CHFS

VARIABLES	*sex_ratioK*	
	CHARLS	CHFS
sex_ratioK_1_2003	0.263***	0.430***
	(0.007)	(0.007)
prefectural_index	-0.039**	-
	(0.009)	-
P demographics	Yes	Yes
O demographics	Yes	Yes
Observations	12,232	19,509
F-test	199.88	512.63
Under-identification test		
Kleibergen-Paap rk LM statistic	65.17	25.715
Weak identification test		
Cragg-Donald Wald *F*-stat.	678.83	2100.56
Kleibergen-Paap Wald rk *F* test	199.88	512.63
Over-identification test		
Hansen J statistic	0.858	-

Notes: Robust standard errors in parentheses, clustered at household-level. Stars indicate statistical significance. *** p<0.01, ** p<0.05, * p<0.1. The coefficient presented here for first stage coefficients for the IV regression. *sex_ratioK_1_2003* is the gender of the first-born child in the family after 2003 together and *prefectural_index* is the index that indicating how strict the cities on the gender selection behaviours at prefectural-level. The controls are the same as the previous regressions.

Appendix I

Subsample after the policy

Back CHARLS Back CHFS

	IV: CHARLS (urban)			IV: CHFS (urban)		
VARIABLES	*any-transfer*	*amount*	*visit days*	*any-transfer*	*amount*	*visit days*
Low sr province						
maleP	-0.061*	125.3	8.933	-0.0408	-147.8	32.18***
	(0.033)	(256.7)	(7.284)	(0.0334)	(151.4)	(10.20)
sex_ratioK	-0.009	-246.0	8.458	-0.0315	-221.0	-6.319
	(0.039)	(215.1)	(7.221)	(0.0334)	(148.3)	(8.215)
maleP × *sex_ratioK*	0.043	203.9	34.38***	0.0378	259.1	-5.102
	(0.046)	(366.7)	(9.885)	(0.0497)	(220.0)	(13.33)
sex_ratioK+	0.033	-42.15	42.84***	0.063	38.1	-11.42
maleP × *sex_ratioK*	(0.023)	(263.2)	(6.796)	(0.035)	(160.4)	(10.60)
Observations	3,373	3,373	3,373	2,672	2,672	2,672
R-squared	0.200	0.091	0.689	0.147	0.222	0.364
High sr province						
maleP	0.00360	1008*	5.981	-0.061	27.58	55.64***
	(0.0397)	(586.4)	(8.647)	(0.050)	(219.5)	(13.60)
sex_ratioK	-0.0414	-12.66	-17.26**	0.044	-62.66	-9.184
	(0.0455)	(594.6)	(7.815)	(0.053)	(214.3)	(13.59)
maleP × *sex_ratioK*	0.0238	445.5	78.53***	0.000331	105.1	2.244
	(0.0529)	(834.9)	(12.02)	(0.076)	(315.4)	(21.98)
sex_ratioK+	-0.017	432.9	61.27***	0.044	42.44	-6.940
maleP × *sex_ratioK*	(0.029)	(426.7)	(8.979)	(0.050)	(221.0)	(17.28)
Observations	2,489	2,489	2,490	1,454	1,454	1,454
R-squared	0.264	0.053	0.717	0.193	0.289	0.375
P demographics	Yes	Yes	Yes	Yes	Yes	Yes
O demographics	Yes	Yes	Yes	Yes	Yes	Yes

Appendix I

Different ways to present the amount of transfer

Back CHARLS Back CHFS

VARIABLES	any net transfer	net total *amount*	*log* amount of transfer	percentage of income
		IV: CHARLS (mostly rural)		
maleP	-0.0969*	-35,144	-0.315	-0.0468**
	(0.0514)	(37,300)	(0.363)	(0.0226)
sex_ratioK	-0.0354	3,950	-0.141	-0.0178*
	(0.0439)	(4,241)	(0.290)	(0.0105)
maleP × *sex_ratioK*	0.129**	-1,141	0.719	0.0593*
	(0.0582)	(14,263)	(0.481)	(0.0335)
sex_ratioK+	0.094***	2,809	0.578*	0.041
maleP × *sex_ratioK*	(0.026)	(15,917)	(0.346)	(0.030)
Observations	12,232	12,232	12,232	12,232
R-squared	0.198	0.006	0.120	0.507
		IV: CHFS (mostly urban)		
maleP	-0.00450	382.3	-0.527*	-0.00497
	(0.0359)	(851.0)	(0.307)	(0.00649)
sex_ratioK	-0.0977***	-104.9	-0.361†	-0.00205
	(0.0264)	(925.4)	(0.224)	(0.00616)
maleP × *sex_ratioK*	-0.0375	-507.8	0.0676	-0.000853
	(0.0521)	(1,523)	(0.448)	(0.0104)
sex_ratioK+	-0.135***	-612.7	-0.293	-0.002
maleP × *sex_ratioK*	(0.036)	(788.7)	(0.309)	(0.007)
P demographics	Yes	Yes	Yes	Yes
P income level	Yes	Yes	Yes	No
O demographics	Yes	Yes	Yes	Yes
Observations	19,509	19,509	19,509	19,509
R-squared	0.056	0.009	0.202	0.040

Appendix I

Education investment on girls

Back

VARIABLES	the amount of the education investment	IV: CHFS (mostly urban) any education investment in K	percentage of edu. investment in total expense
maleP	-29.39	-0.0879**	-0.0342**
	(1,071)	(0.0422)	(0.0169)
sex_ratioK	-3,360***	0.0914**	-0.0838***
	(959.8)	(0.0416)	(0.0190)
maleP × *sex_ratioK*	791.2	0.143**	0.0437*
	(1,275)	(0.0669)	(0.0254)
maleP × *hh-size*	-323.0*	-0.00354	-0.00103
	(185.8)	(0.00952)	(0.00412)
hh-size	491.8***	0.0280***	0.00443
	(144.5)	(0.00688)	(0.00382)
amount of old-age support	-0.539	-	-
	(0.483)	-	-
any old-age support	-	0.0452***	-0.0299***
provided	-	(0.00997)	(0.00443)
sex_ratioK +	-2,568**	0.235***	-0.040*
maleP × *sex_ratioK*	(1,024)	(0.066)	(0.023)
(Male with sons-males with daughters)			
maleP +	761.7	0.055*	0.010
maleP × *sex_ratioK*	(478.2)	(0.031)	(0.011)
(Male with sons-females with sons)			
P demographics	Yes	Yes	Yes
O demographics	Yes	Yes	Yes
Observations	19,509	19,509	19,509
R-squared	0.308	0.144	0.051

Appendix I

Transfer received from the elderly parents

Back CHARLS Back CHFS

	IV: CHARLS (mostly rural)			IV: CHFS(mostly urban)		
VARIABLES	*any-transfer*	*amount*	*visit days*	*any-transfer*	*amount*	*visit days*
maleP	-0.121**	-325.3	-10.26	-0.0533	-240.2	-3.723
	(0.0595)	(312.8)	(9.130)	(0.0521)	(185.3)	(16.79)
sex_ratioK	-0.116**	-302.3	-2.654	-0.0127	5.500	-37.15***
	(0.0494)	(403.7)	(7.169)	(0.0374)	(135.3)	(10.36)
maleP × *sex_ratioK*	0.224***	649.7	47.79***	0.0422	261.0	50.83**
	(0.0772)	(448.7)	(11.04)	(0.0747)	(309.2)	(24.52)
hh-size	-0.00751	-26.42	-3.820*	-0.00589	-16.78	-10.09***
	(0.0136)	(74.95)	(2.000)	(0.00685)	(19.78)	(1.273)
maleP × *hh-size*	0.00385	355.5**	14.50***	-0.000755	41.74	17.12***
	(0.0136)	(145.8)	(2.750)	(0.00860)	(27.53)	(3.122)
sex_ratioK +	0.108***	347.4*	45.13***	0.030	266.4	13.67
maleP × *sex_ratioK*	(0.050)	(181.4)	(7.853)	(0.055)	(219.6)	(18.58)
Transfer from *O*	No	No	No	No	No	No
O taking care for *K*	No	No	No	No	No	No
P demographics	Yes	Yes	Yes	Yes	Yes	Yes
O demographics	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,232	12,232	12,232	12,232	12,232	12,232
R-squared	0.084	0.049	0.670	0.214	0.186	0.140

Appendix I

Cohabitation

Back CHARLS Back CHFS

VARIABLES	IV: CHARLS (mostly rural)	IV: CHFS (mostly urban)
	Ageing parents cohabitation	
maleP	-0.564***	0.003
	(0.047)	(0.031)
sex_ratioK	-0.039**	-0.059**
	(0.018)	(0.023)
maleP × *sex_ratioK*	0.883***	0.109**
	(0.064)	(0.048)
maleP × *sex_ratioK*	0.843***	0.049
+*sex_ratioK*	(0.061)	(0.034)
P demographics	Yes	Yes
O demographics	Yes	Yes
Observations	12,232	19,509
R-squared	0.183	0.141

Appendix I

Subsample Check: different income group

Back

VARIABLES	IV: CHARLS (mostly rural) *any-transfer*	*amount*	*visit days*	IV: CHFS (mostly urban) *any-transfer*	*amount*	*visit days*
Low income group						
maleP	-0.0982	-533.8*	-5.406	-0.0375	-339.8*	-18.91
	(0.0694)	(299.2)	(13.90)	(0.0599)	(205.2)	(19.64)
sex_ratioK	-0.0680	-226.6	5.073	-0.0757	-285.5	-86.57***
	(0.0623)	(151.2)	(10.75)	(0.0481)	(192.7)	(14.78)
maleP × *sex_ratioK*	0.131**	0.0166	0.122**	247.4	125.1	47.07***
	(0.0614)	(0.0296)	(0.0581)	(297.2)	(158.3)	(11.61)
sex_ratioK+	0.080**	376.4***	56.12***	-0.057	140.5	16.57
maleP × *sex_ratioK*	(0.031)	(196.7)	(11.67)	(0.062)	(249.3)	(22.45)
Observations	7,048	7,048	7,048	12,663	12,663	12,663
R-squared	0.177	0.021	0.626	0.288	0.168	0.177
High income group						
maleP	-0.0636	-107.4	-55.53***	-0.0538	-57.27	-7.504
	(0.0651)	(691.3)	(15.59)	(0.0568)	(236.4)	(25.08)
sex_ratioK	-0.0168	-320.0	-12.74	-0.0631	113.6	-3.169
	(0.0534)	(796.2)	(10.61)	(0.0432)	(204.0)	(11.90)
maleP × *sex_ratioK*	0.0935	569.3	114.2***	0.0457	-75.62	-1.974
	(0.0749)	(975.3)	(21.93)	(0.0875)	(411.6)	(33.00)
sex_ratioK+	0.077	249.3	101.5***	-0.017	37.94	-5.143
maleP × *sex_ratioK*	(0.046)	(507.0)	(19.06)	(0.059)	(290.6)	(25.97)
Observations	5,184	5,184	5,184	6,846	6,846	6,846
R-squared	0.238	0.080	0.160	0.259	0.220	0.126
P demographics	Yes	Yes	Yes	Yes	Yes	Yes
O demographics	Yes	Yes	Yes	Yes	Yes	Yes

Appendix I

Heterogeneity Analysis: different income group

Back

	IV: CHARLS (mostly rural)			IV: CHFS(mostly urban)		
VARIABLES	*any-transfer*	*amount*	*visit days*	*any-transfer*	*amount*	*visit days*
maleP	-0.104	-780.7**	-17.08	-0.0448	-354.0*	-29.87
	(0.0654)	(369.9)	(14.29)	(0.0592)	(199.6)	(18.96)
sex_ratioK	-0.0214	-153.4	8.847	-0.0789	-470.0**	-67.30***
(Low income mother	(0.0628)	(339.8)	(10.93)	(0.0514)	(212.2)	(14.98)
demonstrate effects)						
high income	0.0553	-600.1	24.80***	0.00333	-587.2***	-19.90*
	(0.0567)	(426.7)	(9.306)	(0.0400)	(186.2)	(11.44)
maleP × *sex_ratioK*	0.198**	1,136**	69.74***	0.0326	500.9	105.2***
	(0.0870)	(484.7)	(19.72)	(0.0904)	(335.2)	(29.20)
sex_ratioK × *high income*	-0.0451	-256.4	-22.31	0.0121	778.4**	41.26**
(Differences in mother	(0.0930)	(625.2)	(16.06)	(0.0728)	(361.8)	(19.03)
demonstrate effects)						
maleP × *high income*	0.130	1,202**	-42.42***	-0.0141	229.5	50.48**
	(0.0856)	(593.2)	(14.58)	(0.0721)	(254.8)	(22.78)
maleP × *sex_ratioK*	-0.276*	-1,676*	39.33*	0.0183	-513.5	-112.3***
× *high income*	(0.142)	(857.1)	(23.61)	(0.130)	(466.6)	(38.19)
High income father	-0.145**	-949.1*	95.61***	-0.016	295.8	-33.14
demonstrate effects	(0.068)	(502.8)	(16.47)	(0.062)	(289.8)	(26.55)
Low income father	0.176***	983.0***	78.58***	-0.046	30.91	37.92*
demonstrate effects	(0.043)	(311.8)	(15.94)	(0.063)	(265.1)	(22.25)
Differences in father	-0.321***	-1932.2***	17.02	0.030	264.9	-71.06**
demonstrate effects	(0.093)	(702.0)	(16.95)	(0.088)	(382.1)	(32.02)
High income mother	-0.066***	-409.7	-13.46	-0.067	308.4	-26.03*
demonstrate effects	(0.065)	(635.4)	(11.10)	(0.048)	(239.7)	(13.29)

Appendix I

Subsample Check: single child family

Back Back

VARIABLES	IV: CHARLS (mostly rural) *any-transfer*	*amount*	*visit days*	IV: CHFS (mostly urban) *any-transfer*	*amount*	*visit days*
Single child family						
maleP	-0.0437	26.27	0.900	-0.0751**	-121.7	31.15**
	(0.0379)	(299.0)	(8.138)	(0.0355)	(133.6)	(12.90)
sex_ratioK	-0.0540	-323.9	-0.0551	-0.0891**	50.33	-18.69*
	(0.0402)	(395.0)	(8.140)	(0.0348)	(155.5)	(10.46)
maleP × *sex_ratioK*	0.0852	431.4	51.12***	0.0737	94.86	12.40
	(0.0518)	(444.6)	(11.76)	(0.0588)	(252.6)	(21.59)
sex_ratioK+	0.031	107.4	51.07***	-0.015	145.2	-6.285
maleP × *sex_ratioK*	(0.025)	(255.3)	(8.782)	(0.038)	(265.5)	(15.85)
Observations	5,909	5,909	5,909	12,144	12,144	12,144
R-squared	0.209	0.064	0.650	0.270	0.210	0.148
Non-single child family						
maleP	-0.175*	19.53	-64.56**	0.0280	-405.2	-43.86
	(0.106)	(701.5)	(26.02)	(0.0934)	(383.3)	(47.88)
sex_ratioK	-0.0175	0.151	-13.72	-0.0266	-534.2**	-146.9***
	(0.111)	(674.3)	(17.47)	(0.0669)	(236.6)	(39.24)
maleP × *sex_ratioK*	0.184	29.52	145.0***	-0.110	766.6	167.0**
	(0.140)	(919.2)	(32.91)	(0.151)	(650.6)	(73.58)
sex_ratioK+	0.167***	29.67	131.3***	-0.137	232.4	20.09
maleP × *sex_ratioK*	(0.060)	(416.4)	(26.24)	(0.110)	(525.8)	(56.69)
Observations	6,323	6,323	6,323	7,365	7,365	7,365
R-squared	0.198	0.046	0.566	0.293	0.149	0.175
P demographics	Yes	Yes	Yes	Yes	Yes	Yes
O demographics	Yes	Yes	Yes	Yes	Yes	Yes

Appendix I

Heterogeneity Analysis: single child family

Back

	IV: CHARLS (mostly rural)			IV: CHFS(mostly urban)		
VARIABLES	*any-transfer*	*amount*	*visit days*	*any-transfer*	*amount*	*visit days*
maleP	-0.0623	1,069	-15.65	0.00656	-394.9	-28.71
	(0.104)	(998.0)	(20.78)	(0.0829)	(317.8)	(37.09)
sex_ratioK	0.0160	-209.2	-4.973	0.0329	-854.0***	-100.4***
(non-singleK HH mother	(0.115)	(777.9)	(17.51)	(0.0835)	(264.2)	(38.34)
demonstrate effects)						
singleK	0.0346	16.06	0.577	0.0822*	-472.6***	-23.44
	(0.0635)	(456.5)	(10.84)	(0.0441)	(160.4)	(22.81)
maleP × *sex_ratioK*	0.112	-605.5	118.8***	-0.0838	769.1	177.9**
	(0.198)	(1,706)	(38.17)	(0.161)	(634.6)	(70.41)
sex_ratioK × *singleK*	-0.0830	50.71	5.181	-0.141	1,020***	68.50
(Differences in mother	(0.125)	(766.7)	(19.55)	(0.0872)	(305.3)	(43.22)
demonstrate effects)						
maleP × *singleK*	-0.00938	-1,004	1.102	-0.0794	286.8	61.52*
	(0.128)	(1,170)	(20.48)	(0.0780)	(279.8)	(37.03)
maleP × *sex_ratioK*	0.0281	1,192	-44.64	0.162	-684.1	-166.7**
×*singleK*	(0.232)	(1,991)	(36.89)	(0.154)	(543.5)	(69.94)
singleK HH father	0.073	428.5	74.32***	-0.031	250.7*	-20.66
demonstrate effects	(0.049)	(409.4)	(11.42)	(0.036)	(146.2)	(15.62)
Non-singleK HH father	0.128	-814.6	113.7***	-0.051	-84.88	77.49
demonstrate effects	(0.129)	(1,053)	(30.72)	(0.119)	(567.3)	(63.71)
Differences in father	-0.055	1,243	-39.46	0.020	335.6	-98.16
demonstrate effects	(0.167)	(1,399)	(28.09)	(0.108)	(507.1)	(64.70)
singleK HH mother	0.029	-554.7	123.9**	-0.108***	165.7	-31.86***
demonstrate effects	(0.300)	(2,371)	(51.88)	(0.034)	(158.6)	(11.10)

Appendix I

Heterogeneity analysis: pension coverage of P (proxy) Back

	IV: CHARLS (mostly rural)			IV: CHFS (mostly urban)		
VARIABLES	*any-transfer*	*amount*	*visit days*	*any-transfer*	*amount*	*visit days*
maleP	-0.120*	35.20	-59.80***	0.0243	4.783	5.230
	(0.0626)	(514.2)	(12.73)	(0.0625)	(174.3)	(30.80)
sex_ratioK	-0.0808	-362.6	6.448	-0.0912	-375.5**	-59.71***
(Without pension mother demonstration effects)	(0.0565)	(585.4)	(10.15)	(0.0647)	(166.5)	(20.62)
pensionP	-0.0894	-300.8	8.126	0.0131	-152.5	-6.875
	(0.0580)	(341.1)	(8.636)	(0.0351)	(151.5)	(14.70)
maleP × *sex_ratioK*	0.183*	-171.5	106.1***	-0.0497	0.968	45.57
	(0.101)	(860.9)	(19.01)	(0.0981)	(309.3)	(47.91)
maleP × *pensionP*	0.0907	-498.3	39.13**	-0.0872	-249.2	-7.197
	(0.104)	(587.3)	(15.93)	(0.0592)	(235.1)	(32.88)
sex_ratioK × *pensionP*	0.0692	192.3	-17.39	0.0366	470.0*	22.06
(Difference in mother demonstration effects)	(0.0961)	(517.2)	(13.85)	(0.0594)	(272.1)	(25.15)
sex_ratioK × *maleP*	-0.109	1,172	-26.08	0.104	238.5	-0.917
×*pensionP*	(0.169)	(960.7)	(23.87)	(0.104)	(426.6)	(56.75)
With pension father	0.063	829.7**	69.07***	-0.000	334.0	7.002
demonstration effects	(0.058)	(392.2)	(17.35)	(0.057)	(259.1)	(22.69)
Without pension father	0.103	-534.1	112.5***	-0.140**	-374.4	-14.14
demonstration effects	(0.072)	(509.5)	(15.74)	(0.067)	(231.8)	(42.81)
Difference in father	-0.040	1363*	-43.47**	0.141	708.4**	21.14
demonstration effects	(0.118)	(803.7)	(17.60)	(0.088)	(329.4)	(52.64)
With pension mother	-0.012	-170.2	-10.94	-0.054**	94.55	-37.65***
demonstration effects	(0.072)	(342.8)	(10.30)	(0.027)	(203.8)	(13.28)

Appendix I

Heterogeneity analysis: living in a community with Minority

Back

	IV: CHARLS (mostly rural)		
VARIABLES	*any-transfer*	*amount*	*visit days*
maleP	-0.0591	-174.0	-49.90***
	(0.0725)	(494.5)	(17.56)
sex_ratioK	-0.0141	-559.5	-5.602
(Non-Mino. mother	(0.0780)	(535.2)	(10.25)
demonstration effects)			
minority	-0.0300	-412.2	-0.749
	(0.0677)	(411.8)	(9.165)
maleP × *sex_ratioK*	0.0469	540.2	104.3***
	(0.114)	(585.2)	(22.49)
sex_ratioK × *Minority*	-0.0760	695.4	6.357
(Difference in mother	(0.114)	(699.5)	(13.90)
demonstration effects)			
maleP × *Minority*	-0.0624	-1.668	20.78
	(0.0920)	(575.3)	(15.57)
sex_ratioK × *Minority*	0.183	-239.6	-35.77
× *maleP*	(0.163)	(864.3)	(22.90)
Mino. father	0.140***	436.4	69.29***
demonstration effects	(0.050)	(361.1)	(13.63)
Non-Mino. father	0.033	-19.33	98.70***
demonstration effects	(0.065)	(453.5)	(18.73)
Difference in father	0.107	455.8	-29.40
demonstration effects	(0.102)	(720.7)	(18.36)
Mino. mother	-0.029	1,235	110.6***
demonstration effects	(0.208)	(1,121)	(31.12)

Appendix I

Heterogeneity analysis: *P*'s ethnic group

Back

	IV: CHFS (mostly urban)		
VARIABLES	*any-transfer*	*amount*	*visit days*
maleP	-0.0558	-212.6	15.15
	(0.135)	(537.3)	(36.25)
sex_ratioK	-0.184	-93.91	-5.164
(Non-Han mother	(0.161)	(558.5)	(45.56)
demonstration effects)			
Han	-0.0462	-23.79	30.46
	(0.0677)	(411.8)	(9.165)
maleP × *sex_ratioK*	0.0618	253.8	16.61
	(0.226)	(935.7)	(66.02)
sex_ratioK × *Han*	0.126	7.621	-47.45
(Difference in mother	(0.166)	(556.6)	(46.18)
demonstration effects)			
maleP × *Han*	0.0133	-10.09	-24.61
	(0.136)	(506.5)	(38.11)
sex_ratioK × *Han*	-0.0355	-20.43	42.04
× *maleP*	(0.241)	(889.5)	(72.12)
Han father	-0.031	147.0	6.036
demonstration effects	(0.047)	(189.5)	(20.19)
Non-Han father	-0.122	159.8	11.44
demonstration effects	(0.191)	(690.2)	(46.56)
Difference in father	0.091	-12.81	-5.408
demonstration effects	(0.199)	(650.6)	(56.40)
Han mother	-0.058*	-86.28	-52.61***
demonstration effects	(0.034)	(130.7)	(11.19)

Appendix I

Subsample Check: with any older brother

Back

	IV: CHARLS (mostly rural)		
VARIABLES	*any-transfer*	*amount*	*visit days*
With older brothers			
maleP	-0.0795	-594.8	-49.85***
	(0.0742)	(616.8)	(16.75)
sex_ratioK	-0.0425	210.5	-7.118
	(0.0681)	(669.6)	(14.63)
maleP × *sex_ratioK*	0.132	595.4	96.13***
	(0.0806)	(829.5)	(20.22)
sex_ratioK+	0.090**	805.8	89.01***
maleP × *sex_ratioK*	(0.045)	(555.0)	(16.16)
Observations	5,283	5,283	5,283
R-squared	0.202	0.040	0.566
Without older brothers			
maleP	-0.0788	-63.51	-7.773
	(0.0558)	(479.5)	(11.14)
sex_ratioK	-0.0417	-588.3	1.403
	(0.0498)	(466.3)	(8.813)
maleP × *sex_ratioK*	0.121*	451.5	49.05***
	(0.0654)	(542.4)	(14.51)
sex_ratioK+	0.078**	-136.7	50.45***
maleP × *sex_ratioK*	(0.031)	(198.3)	(10.43)
Observations	6,912	6,912	6,912
R-squared	0.207	0.065	0.647
P demographics	Yes	Yes	Yes
O demographics	Yes	Yes	Yes

Appendix I

Heterogeneity Analysis: with any older brother

Back

	IV: CHARLS (mostly rural)		
VARIABLES	*any-transfer*	*amount*	*visit days*
maleP	-0.138**	-483.6	-30.12**
	(0.0549)	(421.6)	(13.41)
sex_ratioK	-0.0851	-662.8	4.674
(Without older brothers mother demonstrate)	(0.0578)	(473.8)	(9.214)
older bro	-0.0370	-559.4	17.30
	(0.0564)	(437.7)	(10.88)
maleP × sex_ratioK	0.239***	851.1	73.15***
	(0.0729)	(604.3)	(18.52)
sex_ratioK × older bro	0.104	1,013	-17.87
(Differences in mother demonstrate effects)	(0.0980)	(718.1)	(17.44)
maleP × older bro	0.212***	519.7	-24.12
	(0.0736)	(725.1)	(15.26)
maleP × sex_ratioK × older bro	-0.358***	-721.7	97.87***
	(0.125)	(1,183)	(16.26)
With older brothers father demonstrate	-0.101	479.5	97.87***
	(0.063)	(754.3)	(16.26)
Without older brothers father demonstrate	0.154***	188.3	77.82***
	(0.035)	(256.5)	(14.61)
Differences in father demonstrate effects	-0.255***	291.2	20.05
	(0.078)	(909.5)	(14.35)
With older brothers mother demonstrate	0.343**	1,864	55.27*
	(0.151)	(1,142)	(30.70)

Appendix I

Subsample check: urban-rural differences

back

	IV: CHARLS (mostly rural)			IV: CHFS (mostly urban)		
VARIABLES	*any-transfer*	*amount*	*visit days*	*any-transfer*	*amount*	*visit days*
Urban						
maleP	-0.0306	-973.8	-16.20	-0.0658*	-318.9*	-9.214
	(0.0621)	(758.0)	(16.74)	(0.0391)	(188.2)	(16.84)
sex_ratioK	0.00798	-475.3	1.422	-0.0846**	-193.8	-30.11***
	(0.0614)	(931.6)	(16.47)	(0.0386)	(154.7)	(9.295)
maleP × *sex_ratioK*	0.0471	657.9	34.88*	0.0681	357.3	25.96
	(0.0779)	(1,074)	(20.65)	(0.0613)	(319.1)	(24.20)
sex_ratioK+	0.055	182.7	36.31**	-0.016	163.5	-4.149
maleP × *sex_ratioK*	(0.048)	(504.4)	(15.61)	(0.042)	(236.4)	(19.56)
Observations	3,869	3,869	3,869	12,979	12,979	12,979
R-squared	0.231	0.067	0.587	0.260	0.200	0.132
Rural						
maleP	-0.125**	105.4	-30.25*	0.115	286.8	-79.63
	(0.0620)	(377.7)	(15.61)	(0.130)	(288.7)	(49.30)
sex_ratioK	-0.0677	-141.7	-3.406	0.0443	287.3	-155.2***
	(0.0550)	(321.2)	(8.393)	(0.0944)	(216.2)	(37.84)
maleP × *sex_ratioK*	0.179***	226.9	91.59***	-0.226	-445.5	240.9***
	(0.0688)	(391.1)	(18.96)	(0.172)	(410.6)	(67.97)
sex_ratioK+	0.111***	85.27	88.18***	-0.181	-158.1	85.71*
maleP × *sex_ratioK*	(0.030)	(209.3)	(15.21)	(0.113)	(306.1)	(46.12)
Observations	8,363	8,363	8,363	6,530	6,530	6,530
R-squared	0.195	0.046	0.622	0.312	0.076	0.217
P demographics	Yes	Yes	Yes	Yes	Yes	Yes
O demographics	Yes	Yes	Yes	Yes	Yes	Yes

Appendix I

Heterogeneity Analysis: urban-rural differences

back

	IV: CHARLS (mostly rural)			IV: CHFS(mostly urban)		
VARIABLES	*any-transfer*	*amount*	*visit days*	*any-transfer*	*amount*	*visit days*
maleP	-0.108*	-773.6*	-39.24**	0.0675	118.6	-95.96*
	(0.0618)	(406.0)	(15.80)	(0.131)	(314.6)	(51.21)
sex_ratioK	-0.0640	-495.6	-4.914	0.00835	-522.6*	-16.54
(Rural mother	(0.0605)	(423.5)	(8.866)	(0.127)	(275.8)	(39.53)
demonstrate effects)						
urban	-0.0904	-320.3	12.19	0.0987	-131.6	23.86
	(0.0615)	(494.2)	(11.21)	(0.0852)	(178.5)	(24.47)
maleP × *sex_ratioK*	0.133	1,234**	99.33***	-0.154	-251.1	259.7***
	(0.0828)	(622.2)	(20.21)	(0.196)	(482.3)	(75.87)
sex_ratioK × *urban*	0.0489	674.6	17.13	-0.0905	526.2	-46.43
(Differences in mother	(0.103)	(858.2)	(18.51)	(0.150)	(336.5)	(40.78)
demonstrate effects)						
maleP × *urban*	0.0511	1,358*	15.15	-0.125	-391.4	92.35*
	(0.0751)	(765.2)	(13.60)	(0.116)	(336.2)	(48.16)
maleP × *sex_ratioK*	-0.0125	-2,108*	-50.96**	0.219	604.9	-233.3***
×*urban*	(0.131)	(1,219)	(21.06)	(0.196)	(580.7)	(77.24)
Urban father	0.104*	-694.7	60.59***	-0.017	357.3	-36.54*
demonstrate effects	(0.062)	(519.9)	(14.63)	(0.042)	(251.1)	(21.54)
Rural father	0.068*	738.5**	94.41***	-0.145	-773.7*	243.1***
demonstrate effects	(0.041)	(308.1)	(17.54)	(0.133)	(408.0)	(66.24)
Differences in father	0.036	-1,433**	-33.82*	0.128	1,131**	-279.7***
demonstrate effects	(0.088)	(703.3)	(18.08)	(0.132)	(533.4)	(73.37)
Urban mother	0.181	1,908	116.5***	-0.082*	3.561	-62.98***
demonstrate effects	(0.163)	(1,199)	(28.88)	(0.044)	(154.7)	(11.19)

Appendix I

Subsample check: urban-singleton households

Back Sub. Back mother demon.

	IV: CHARLS (mostly rural)			IV: CHFS (mostly urban)		
VARIABLES	*any-transfer*	*amount*	*visit days*	*any-transfer*	*amount*	*visit days*
Urban-singleton						
maleP	-0.00299	-592.9	8.020	-0.0816**	-180.6	8.082
	(0.0568)	(722.7)	(12.85)	(0.0328)	(131.2)	(13.64)
sex_ratioK	-0.0157	-244.4	7.033	-0.0896***	-13.23	-24.11**
	(0.0670)	(911.7)	(15.49)	(0.0343)	(158.8)	(10.14)
maleP × *sex_ratioK*	0.00379	877.1	19.02	0.0921	173.6	26.14
	(0.0830)	(1,215)	(18.31)	(0.0580)	(255.3)	(22.34)
sex_ratioK+	-0.012	632.7	26.04**	0.002	160.3	2.028
maleP × *sex_ratioK*	(0.045)	(622.6)	(12.56)	(0.039)	(157.7)	(17.27)
Observations	2,466	2,466	2,466	9,364	9,364	9,364
R-squared	0.230	0.085	0.612	0.254	0.206	0.128
Others						
maleP	-0.142**	55.45	-29.65**	0.0655	-301.6	-6.517
	(0.0593)	(346.3)	(14.86)	(0.103)	(369.0)	(38.15)
sex_ratioK	-0.0634	-279.4	-3.850	-0.0101	-258.5	-122.7***
	(0.0526)	(430.1)	(8.439)	(0.0650)	(181.0)	(29.26)
maleP × *sex_ratioK*	0.184***	391.7	92.12***	-0.149	477.7	127.6**
	(0.0681)	(504.5)	(17.89)	(0.140)	(538.1)	(53.40)
sex_ratioK+	0.121***	112.2	88.26***	-0.158	219.1	4.876
maleP × *sex_ratioK*	(0.030)	(179.7)	(14.27)	(0.099)	(436.5)	(40.35)
Observations	9,766	9,766	9,766	10,145	10,145	10,145
R-squared	0.195	0.043	0.610	0.293	0.136	0.196
P demographics	Yes	Yes	Yes	Yes	Yes	Yes
O demographics	Yes	Yes	Yes	Yes	Yes	Yes

Appendix I

Altruism

Back

	IV: CHARLS (mostly rural)		
VARIABLES	*any-transfer*	*amount*	*visit days*
maleP	-0.0877	-249.4	-30.60*
	(0.0624)	(372.4)	(17.26)
sex_ratioK	-0.0520	-572.3	5.128
(Low-income O's mother	(0.0664)	(445.7)	(11.20)
demonstrate effect)			
income of O	-0.0141	-529.4	16.14
	(0.0592)	(418.1)	(10.13)
sex_ratioK × income of O	0.00973	804.0	-15.20
(Differences in mother	(0.0938)	(688.9)	(17.02)
demonstrate effects)			
maleP × sex_ratioK	0.141*	646.0	80.50***
	(0.0840)	(590.1)	(22.24)
maleP × income of O	0.0169	91.57	-14.40
	(0.0831)	(672.2)	(15.66)
maleP × sex_ratioK	-0.0384	-469.8	12.06
× income of O	(0.146)	(1,153)	(23.06)
High-income O's father	0.060	407.9	82.49***
demonstrate effect	(0.072)	(577.5)	(12.36)
Low-income O's father	0.089**	73.66	85.63***
demonstrate effect	(0.043)	(340.5)	(17.35)
Differences in father	-0.029	334.2	-3.143
demonstrate effects	(0.100)	(825.1)	(15.14)
High-income O's mother	-0.042	231.7	-10.07
demonstrate effect	(0.059)	(608.5)	(11.48)
Observations	12,232	12,232	12,233
R-squared	0.202	0.050	0.601

Appendix I

Direct reciprocity: Sequential

Back

	IV: CHARLS (mostly rural)		
VARIABLES	*any-transfer*	*amount*	*visit days*
maleP	-0.0996*	-417.1	-22.01
	(0.0562)	(337.8)	(15.09)
sex_ratioK	-0.0459	-244.3	-2.669
	(0.0438)	(388.1)	(7.441)
maleP × *sex_ratioK*	0.126**	424.7	88.30***
	(0.0582)	(429.2)	(15.88)
awayage	0.0675**	-13.89	-0.0725
	(0.0291)	(140.0)	(4.325)
awaytime	-0.0110	35.12	0.200
	(0.00903)	(82.48)	(1.040)
ln(*edu_expense*)	0.00175	125.0*	0.0899
	(0.00421)	(72.07)	(0.586)
edu level	-0.00137	24.90	9.006***
	(0.0194)	(128.2)	(3.137)
maleP × *awayage*	-0.0824***	202.5	-7.187
	(0.0319)	(274.8)	(5.885)
maleP × *awaytime*	0.00531	-116.7	0.0528
	(0.0110)	(95.28)	(2.161)
maleP × *ln*(*edu_expense*)	-0.00768	-99.08	-1.089
	(0.00471)	(93.84)	(0.775)
maleP × *edu-level*	0.0283	292.3	-13.92***
	(0.0223)	(211.8)	(5.011)
sex_ratioK+	0.080***	180.4	85.63***
maleP × *sex_ratioK*	(0.027)	(191.9)	(13.83)
P demographics	Yes	Yes	Yes
O demographics	Yes	Yes	Yes
Observations	12,232	12,232	12,232
R-squared	0.202	0.051	0.642

Appendix I

Direct reciprocity: Non-sequential

Back

VARIABLES	IV: CHARLS (mostly rural)			IV: CHFS(mostly urban)		
	any-transfer	*amount*	*visit days*	*any-transfer*	*amount*	*visit days*
maleP	-0.121**	-325.3	-10.26	-0.0533	-240.2	-3.723
	(0.0595)	(312.8)	(9.130)	(0.0521)	(185.3)	(16.79)
sex_ratioK	-0.116**	-302.3	-2.654	-0.0127	5.500	-37.15***
	(0.0494)	(403.7)	(7.169)	(0.0374)	(135.3)	(10.36)
maleP × *sex_ratioK*	0.224***	649.7	47.79***	0.0422	261.0	50.83**
	(0.0772)	(448.7)	(11.04)	(0.0747)	(309.2)	(24.52)
hh-size	-0.00751	-26.42	-3.820*	-0.00589	-16.78	-10.09***
	(0.0136)	(74.95)	(2.000)	(0.00685)	(19.78)	(1.273)
maleP × *hh-size*	0.00385	355.5**	14.50***	-0.000755	41.74	17.12***
	(0.0136)	(145.8)	(2.750)	(0.00860)	(27.53)	(3.122)
sex_ratioK +	0.108***	347.4*	45.13***	0.030	266.4	13.67
maleP × *sex_ratioK*	(0.050)	(181.4)	(7.853)	(0.055)	(219.6)	(18.58)
Transfer from *O*	No	No	No	No	No	No
O taking care for *K*	No	No	No	No	No	No
P demographics	Yes	Yes	Yes	Yes	Yes	Yes
O demographics	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,232	12,232	12,232	12,232	12,232	12,232
R-squared	0.084	0.049	0.670	0.214	0.186	0.140

Appendix I

Direct reciprocity: Non-sequential

Back

	IV: CHARLS (mostly rural)			IV: CHFS(mostly urban)		
VARIABLES	*any-transfer*	*amount*	*visit days*	*any-transfer*	*amount*	*visit days*
maleP	-0.0962*	-283.6	-29.82***	-0.0518	-237.7	-3.363
	(0.0505)	(320.7)	(11.18)	(0.0448)	(173.5)	(16.57)
sex_ratioK	-0.0503	-291.0	-4.282	-0.0733**	-96.20	-46.92***
	(0.0434)	(403.1)	(7.485)	(0.0343)	(135.4)	(10.82)
maleP × *sex_ratioK*	0.138**	518.3	76.39***	0.0412	259.2	49.37**
	(0.0577)	(450.1)	(14.08)	(0.0645)	(291.9)	(24.53)
hh-size	-0.0115	-34.99	-3.152	-0.00878	-21.63	-10.35***
	(0.0135)	(73.16)	(2.005)	(0.00599)	(18.06)	(1.259)
maleP × *hh-size*	0.00947	343.5**	16.65***	-0.00180	39.99	16.52***
	(0.0133)	(147.5)	(2.907)	(0.00789)	(26.58)	(3.048)
sex_ratioK +	0.088***	227.3	72.11***	-0.032	163.0	2.455
maleP × *sex_ratioK*	(0.028)	(190.6)	(11.70)	(0.045)	(203.9)	(17.92)
transfer from *O* to *P*	-0.0491	-401.3	-3.679	0.357***	598.4***	62.91***
	(0.0322)	(267.9)	(5.636)	(0.0151)	(49.66)	(4.418)
O taking care for *K*	7.61e-06***	0.0627***	0.000929	-	-	-
	(2.40e-06)	(0.0240)	(0.000614)	-	-	-
transfer from *O* to *K*	0.173***	568.7***	-0.273	-	-	-
	(0.0178)	(214.0)	(2.715)	-	-	-
P demographics	Yes	Yes	Yes	Yes	Yes	Yes
O demographics	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,232	12,232	12,232	19,509	19,509	19,509
R-squared	0.201	0.050	0.610	0.280	0.203	0.159
Mean	0.401	831.2	118.7	0.303	489.1	91.66

Appendix I

Basic layout: first period

Back

- The father earns Y_1^F and the mother earns Y_1^M
- n children in the household and the gender ratio of the children is ϕ
  - Assume n and ϕ are exogenous
- If no bargaining,
  - the father would provide a fraction τ_1^F
  - the mother: τ_1^M
- Each derives discounted utilities from the transfer
  - The discount factor is δ

Appendix I

frame

Basic layout: intra-household bargaining ▸ BacK

- Depending on the income,
  - The weight for utilities is $\rho = \mathcal{P}(\frac{Y_1^F}{Y_1^M})$
  - ρ_1 is increasing in $\frac{Y_1^F}{Y_1^M}$
  - $0 \leq \rho_1 \leq 1$
  - $Y_1^F = Y_1^M$, $\rho_1 = 0.5$
- The father consume c_1^F with the weight ρ_1
- The mother consume c_1^M with the weight $1 - \rho_1$

Appendix I

Basic layout: second period ▸ BacK

- Receive transfers from the sons and the daughters
- The transfer in the second period is affected by τ_1^F and τ_1^M.
  - Assume same-gender effects only ▸ Model with both gender effects
  - $\tau_2^F = \mathcal{T}_2^F(\tau_1^F)$
  - $\tau_2^M = \mathcal{T}_2^M(\tau_1^M)$
  - Both functions are strictly concave
- In the second period, no income for the father and mother, so assume no bargaining

Appendix I

The basic model with saving

Back

- In the basic model, I assume no saving
- In this model, I add the saving component to the basic model
- The new optimisation problem:

$$\max_{\tau_1^F, \tau_1^M, s_1} \quad U = u(c_1) + \delta u(e_1) + \beta u(c_2)$$

$$s.t.$$

$$c_1 + \frac{c_2}{1+r_2} \leq Y_1(2 - \tau_1^F - \tau_1^M) + \frac{Y_2}{1+r_2}(\tau_2^F \phi n + \tau_2^M (1-\phi) n)$$

$$e_1 = Y_1(\tau_1^F + \tau_1^M)$$

Appendix I

The basic model with saving

Back

- Three FOCs: $U_1 = \frac{\mathrm{d}U}{\mathrm{d}\tau_1^F} = 0$, $U_2 = \frac{\mathrm{d}U}{\mathrm{d}\tau_1^M} = 0$, and $U_4 = \frac{\mathrm{d}U}{\mathrm{d}s_1} = 0$
- The total differentiation equations of FOCs for τ_1^{F*}, τ_1^{M*}, and s^* are:

$$
\begin{aligned}
U_{11}\mathrm{d}\tau_1^{F*} + U_{12}\mathrm{d}\tau_1^{M*} + U_{13}\mathrm{d}\phi + U_{14}\mathrm{d}s_1^* = 0 \\
U_{21}\mathrm{d}\tau_1^{F*} + U_{22}\mathrm{d}\tau_1^{M*} + U_{23}\mathrm{d}\phi + U_{24}\mathrm{d}s_1^* = 0 \\
U_{41}\mathrm{d}\tau_1^{F*} + U_{42}\mathrm{d}\tau_1^{M*} + U_{34}\mathrm{d}\phi + U_{44}\mathrm{d}s_1^* = 0
\end{aligned}
$$

Appendix I

The basic model with saving

Back

When $\tau_2^F - \tau_2^M > 0$, then $U_{34} < 0$ and :

$$\frac{\mathrm{d}\tau_1^{F*}}{\mathrm{d}\phi} = \frac{bq - dp}{bc - ad},$$
$$\frac{\mathrm{d}\tau_1^{M*}}{\mathrm{d}\phi} = \frac{aq - cp}{ad - bc};$$

$$a = U_{11} - \frac{U_{14}U_{41}}{U_{44}} < 0; \qquad b = U_{12} - \frac{U_{24}U_{14}}{U_{44}} < 0;$$
$$c = U_{21} - \frac{U_{14}U_{42}}{U_{44}} < 0; \qquad d = U_{22} - \frac{U_{24}U_{42}}{U_{44}} < 0;$$
$$p = \frac{U_{14}U_{43}}{U_{44}} - U_{13} < 0; \qquad q = \frac{U_{24}U_{43}}{U_{44}} - U_{23}.$$

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- The sign for q is not clear
- If $Y_1(1+r_2) - Y_2\tau_2^{M'}(1-\phi)n < 0$, then $q > 0$ is positive
- If not, when c_2 is large enough, $q > 0$
- If $q > 0$,
  - $bq - dp < 0$ and $aq - cp < 0$;
- $\frac{\mathrm{d}\tau_1^{F*}}{\mathrm{d}\phi} > 0$; $\qquad \frac{\mathrm{d}\tau_1^{M*}}{\mathrm{d}\phi} < 0$

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The basic model with saving

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When $\tau_2^F - \tau_2^M < 0$, then $U_{34} > 0$ and

$$\frac{\mathrm{d}\tau_1^{F*}}{\mathrm{d}\phi} = \frac{bq - dp}{bc - ad},$$
$$\frac{\mathrm{d}\tau_1^{M*}}{\mathrm{d}\phi} = \frac{aq - cp}{ad - bc};$$

$$a = U_{11} - \frac{U_{14}U_{41}}{U_{44}} < 0; \qquad b = U_{12} - \frac{U_{24}U_{14}}{U_{44}} < 0;$$
$$c = U_{21} - \frac{U_{14}U_{42}}{U_{44}} < 0; \qquad d = U_{22} - \frac{U_{24}U_{42}}{U_{44}} < 0;$$
$$p = \frac{U_{14}U_{43}}{U_{44}} - U_{13}; \qquad q = \frac{U_{24}U_{43}}{U_{44}} - U_{23} > 0.$$

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- The sign of p is not clear
- If $Y_1(1+r_2) - Y_2\tau_2^{M'}(1-\phi)n < 0$, then $p > 0$.
- If not, when c_2 is large enough, $p > 0$
- If $p > 0$, then
  - $bq - dp < 0$ and $aq - cp < 0$
- $\frac{\mathrm{d}\tau_1^{F*}}{\mathrm{d}\phi} > 0; \qquad \frac{\mathrm{d}\tau_1^{M*}}{\mathrm{d}\phi} < 0$

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Intra-household bargaining with gender effect

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Generalised intra-household bargaining setting

- Both parents would affect the future transfer of the next generation
- $\tau_2^F = \mathcal{T}_2^F(\tau_1^F, \tau_1^M)$
- $\tau_2^M = \mathcal{T}_2^M(\tau_1^F, \tau_1^M)$
- Still strictly concave functions
- The same-gender parent have larger influences
  - $\frac{\mathrm{d}\tau_2^F}{\mathrm{d}\tau_1^F} > \frac{\mathrm{d}\tau_2^F}{\mathrm{d}\tau_1^M}; \quad \frac{\mathrm{d}\tau_2^M}{\mathrm{d}\tau_1^M} > \frac{\mathrm{d}\tau_2^M}{\mathrm{d}\tau_1^F}; \quad \frac{\mathrm{d}\tau_2^M}{\mathrm{d}\tau_1^M} > \frac{\mathrm{d}\tau_2^F}{\mathrm{d}\tau_1^M}; \quad \frac{\mathrm{d}\tau_2^F}{\mathrm{d}\tau_1^F} > \frac{\mathrm{d}\tau_2^M}{\mathrm{d}\tau_1^F}$
  - $|\frac{\mathrm{d}^2\tau_2^F}{\mathrm{d}\tau_1^{F2}}| > |\frac{\mathrm{d}^2\tau_2^F}{\mathrm{d}\tau_1^F \mathrm{d}\tau_1^M}|; \quad |\frac{\mathrm{d}^2\tau_2^M}{\mathrm{d}\tau_1^{M2}}| > |\frac{\mathrm{d}^2\tau_2^M}{\mathrm{d}\tau_1^F \mathrm{d}\tau_1^M}|$

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Intra-household bargaining with gender effect

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The comparative statics:

$$\frac{\mathrm{d}\tau_1^{F*}}{\mathrm{d}\phi} = \frac{U_{12}U_{23} - U_{13}U_{22}}{U_{11}U_{22} - U_{12}U_{21}} > 0;$$
$$\frac{\mathrm{d}\tau_1^{M*}}{\mathrm{d}\phi} = \frac{U_{11}U_{23} - U_{13}U_{21}}{U_{12}U_{21} - U_{11}U_{22}} < 0;$$

If the function $u(\cdot)$ is specified as a log or a CRRA function and

- $U_{11}U_{22} > U_{12}U_{21}$
- $\tau_2^F < \tau_2^M$
  - $U_{13} > 0$ and $U_{23} < 0$ if $\tau_2^M \tau_{t+1,M}^{F'} - \tau_2^F \tau_{t+1,M}^{M'} < 0$
- $\tau_2^F > \tau_2^M$:
  - $U_{23} < 0$ and $U_{13} > 0$ if $\tau_2^M \tau_{t+1,F}^{F'} - \tau_2^F \tau_{t+1,F}^{M'} > 0$

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Total differentiate U_1 and U_2:

$$U_{11}\mathrm{d}\tau_1^{F*} + U_{12}\mathrm{d}\tau_1^{M*} + U_{13}\mathrm{d}\phi = 0;$$
$$U_{21}\mathrm{d}\tau_1^{F*} + U_{22}\mathrm{d}\tau_1^{M*} + U_{23}\mathrm{d}\phi = 0,$$

where

- Two FOCs: $U_1 = \frac{\mathrm{d}U}{\mathrm{d}\tau_1^F}$ and $U_2 = \frac{\mathrm{d}U}{\mathrm{d}\tau_1^M}$
- $U_{11} = \frac{\mathrm{d}^2U}{\mathrm{d}\tau_1^{F*2}}; \quad U_{13} = \frac{\mathrm{d}^2U}{\mathrm{d}\tau_1^{F*}\mathrm{d}\phi}$
- $U_{22} = \frac{\mathrm{d}^2U}{\mathrm{d}\tau_1^{M*2}}; \quad U_{23} = \frac{\mathrm{d}^2U}{\mathrm{d}\tau_1^{M*}\mathrm{d}\phi}$
- $U_{12} = U_{21} = \frac{\mathrm{d}^2U}{\mathrm{d}\tau_1^{F*}\mathrm{d}\tau_1^{M*}}$
- The asterisks denote optimal values from FOCs

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Extreme case:

- If the function $u(\cdot)$ is specified as a log or a CRRA function
- $Y_1^F \geq Y_1^M$, then $\eta_1 = 2$
  - $\frac{\mathrm{d}\tau_1^{F*}}{\mathrm{d}\phi} = -\frac{U_{13}}{U_{11}} > 0.$
  - $\frac{\mathrm{d}\tau_1^{M*}}{\mathrm{d}\phi} = 0$
- $Y_1^F < Y_1^M$, then $\eta_1 = 0$
  - $\frac{\mathrm{d}\tau_1^{M*}}{\mathrm{d}\phi} = -\frac{U_{23}}{U_{22}} < 0.$
  - $\frac{\mathrm{d}\tau_1^{F*}}{\mathrm{d}\phi} = 0$

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Generalised model: the comparative statics

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If the function $u(\cdot)$ is specified as a log or a CRRA function, the comparative statics:

$$\frac{\mathrm{d}\tau_1^{F*}}{\mathrm{d}\phi} = \frac{U_{12}U_{23} - U_{13}U_{22}}{U_{11}U_{22} - U_{12}U_{21}} > 0;$$
$$\frac{\mathrm{d}\tau_1^{M*}}{\mathrm{d}\phi} = \frac{U_{11}U_{23} - U_{13}U_{21}}{U_{12}U_{21} - U_{11}U_{22}} < 0;$$

- The father's transfer increase with more sons
- The mother's transfer decrease with more sons
- $|\frac{\mathrm{d}Y_1^F\tau_1^{F*}}{\mathrm{d}\phi}| > |\frac{\mathrm{d}Y_1^M\tau_1^{M*}}{\mathrm{d}\phi}|$ if $Y_1^F > Y_1^M$
- $|\frac{\mathrm{d}Y_1^F\tau_1^{F*}}{\mathrm{d}\phi}| < |\frac{\mathrm{d}Y_1^M\tau_1^{M*}}{\mathrm{d}\phi}|$, otherwise