Restrictions on Migration Create Gender Inequality: The Story of China's Left-Behind Children

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Hukou: An Internal Passport in China

- Hukou determines a person's eligibility to
  - Pursue many activities
  - Access state-provided goods and services in a specific place
- Under *Hukou* system, each person is
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- Under *Hukou* system, each person is
  - classified as either rural or urban
  - assigned a locality of hukou registration
- No gender discrimination in intent or design
- 145 million rural-urban migrants in China (2005 census)
- 124 million are unskilled migrants with a rural *hukou*
- Migrants' access to public services severely restricted

Consequences of *Hukou*

- 69 million rural children left in rural areas by migrants
- 30% of all children born in rural areas (UNICEF 2018)

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- 30% of all children born in rural areas (UNICEF 2018)
- Most growing up without either parent present
- The issue is highly policy-relevant:
  - This is a direct result of hukou restrictions
  - The policy increases the cost of bringing children to cities
  - Exacerbated by 2014 "Migrant Population Control Policy"

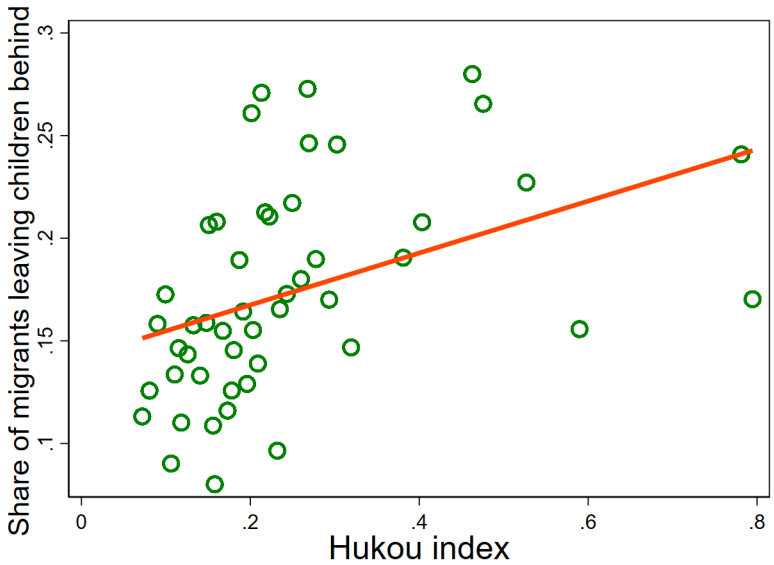
Restrictions Encourage Migrants to Leave Children Behind

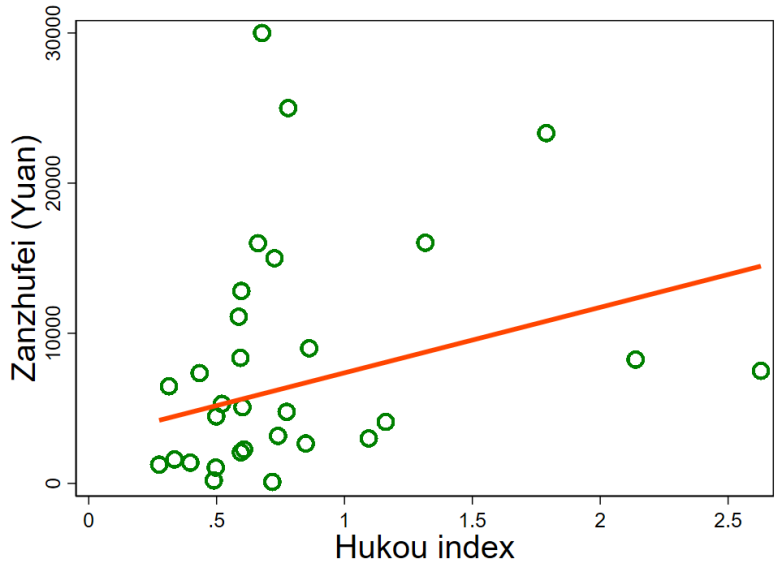
- Migrant parents have three choices:
  1. Pay *zanzhufei* to enroll children in urban public school
  2. Enroll children in lower-quality migrant schools
  3. Leave their children behind in poor rural areas

- Per-child *Zanzhufei* fee is large:
  - 10% of the average migrant's earnings
  - 1432 RMB for primary school, 2198 RMB for middle school
  - Accounts for 50% of total education expenditure

- Migrant schools are shut down popular migration destinations like Beijing.

Hukou Policy Restrictiveness correlates with both *Zanzhufei* and Share of Children Left-behind





Data come from *CMDS and CFPS.*

Bad school quality in rural areas

Table: The share of teachers by education levels

	Master or above	College	Pre-college	High school	Below high school
			Panel A: Junior middle school		
Urban	0.031	0.830	0.135	0.003	0.000
Rural	0.004	0.657	0.328	0.011	0.000
			Panel B: Primary school		
Urban	0.010	0.570	0.374	0.045	0.000
Rural	0.001	0.249	0.552	0.195	0.003

Data come from *Educational Statistics Yearbook of China 2013*

Bad school quality in rural areas cont

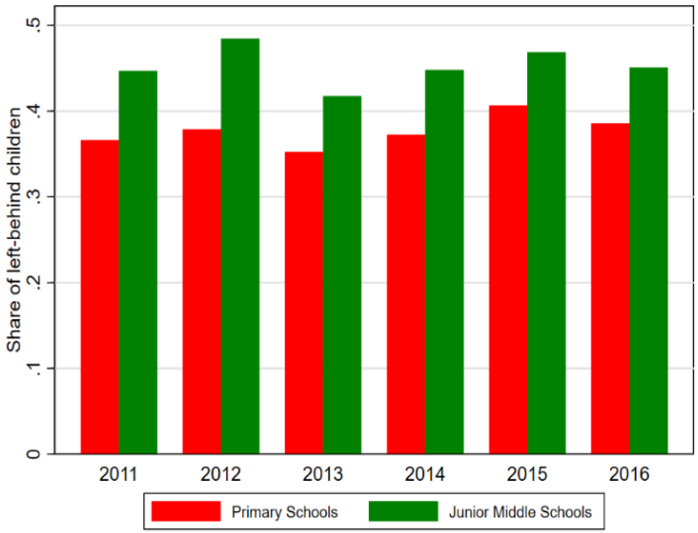
Table: The share of teachers by professional titles

	Special Grade (Excellent)	Level-1	Level-2	Level-3	No title
Panel A: Junior middle school					
Urban	0.218	0.436	0.270	0.009	0.068
Rural	0.114	0.405	0.372	0.026	0.083
Panel B: Primary school					
Urban	0.578	0.302	0.022	0.003	0.095
Rural	0.508	0.360	0.041	0.002	0.089

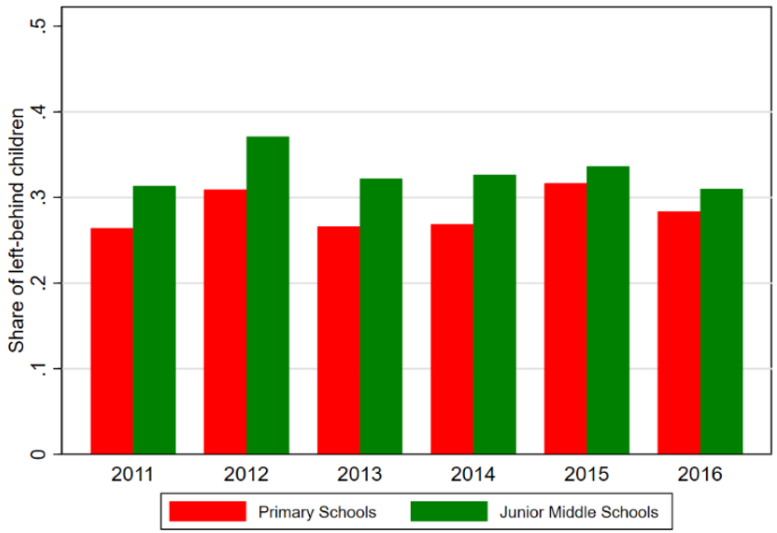
Data come from *Educational Statistics Yearbook of China 2013*

Enrollment Restrictions Are Stronger for Junior Middle Schools

a. Highly restrictive cities



b. Less restrictive cities



Data come from *China Migrants Dynamic Survey (CMDS).*

Further evidence

What do we do

1. Identify effect of *hukou* policy on leaving children behind
   - Does the propensity vary for sons vs daughters?
   - RD design based on school enrollment age thresholds
   - Natural experiment on new population control policies.
2. Are daughters compensated with more remittances?
3. Long-term consequences of separating from parents
   - IV strategy with import demand shocks in nearby cities
   - 2nd IV with rainfall shocks and historical migration ties
4. Mechanisms: Why do *hukou* mobility restrictions harm girls more?

Contribution to the literature

- Left-behind children in China:
  - We document the long-run outcomes in adulthood
  - Gendered effects in parental choices and child outcomes.
- Literature on sources of gender inequity:
  - New mechanism: Migration restrictions can produce or exacerbate gender inequality
  - Even if the policy has no explicit gender component
- Literature on migration and spatial productivity gaps:
  - Add gender dimension to the distributional consequences of frictions that prevent spatial mobility.

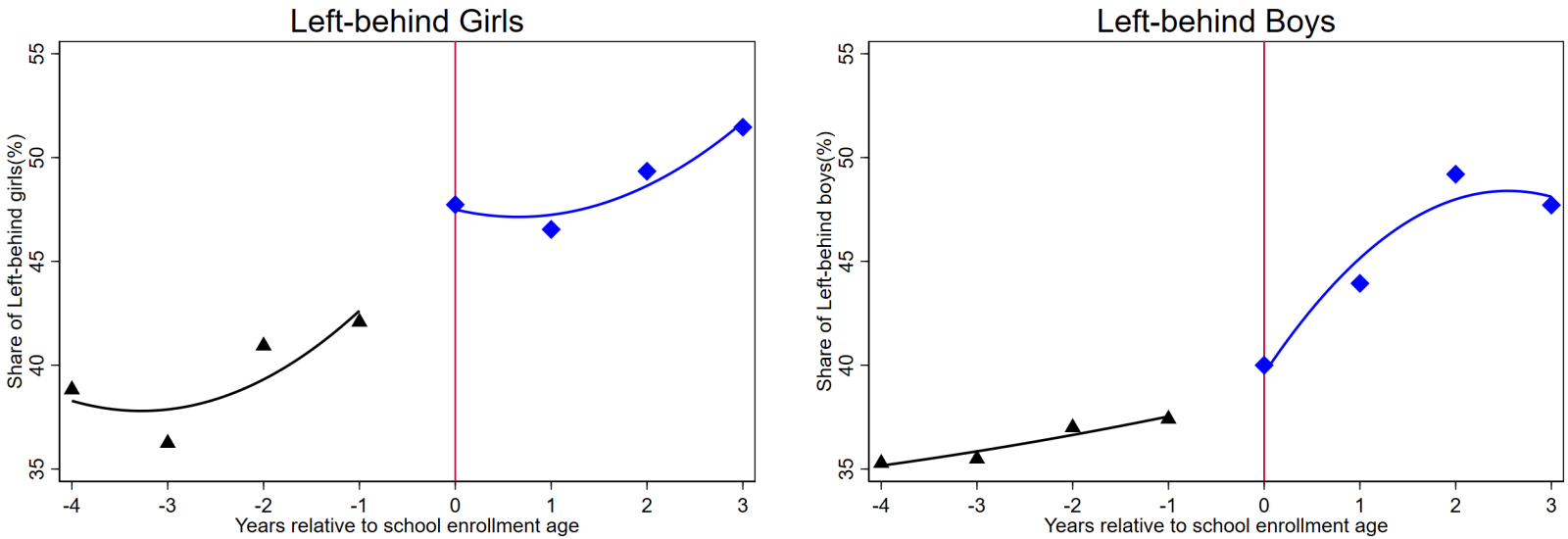
School Enrollment Age Regression Discontinuity (RD) Design

$$Left\ behind_{ijt} = \alpha_0 + \psi_1 Above_{it} \times High\ Hukou_{jt} + \psi_2 Above_{it} + \psi_3 T_j \times Above_{it} + \psi_4 T_j + \xi_{jt} + v_{ijt}$$

- $Left\ behind_{ijt}$ - an indicator for whether child i (whose migrant parents work in city j) are left in rural areas in year t
- $Above_{it}$ - an indicator for whether child i is above the enrollment age for junior middle school.
- $Highly\ Hukou_{jt}$ - an indicator for whether the stringency level of *hukou* restrictions is above the average city level.
- T_j - running variables
- ξ_{jt} - city-by-year FE

More Girls Are Left Behind at the Junior School Enrollment Age

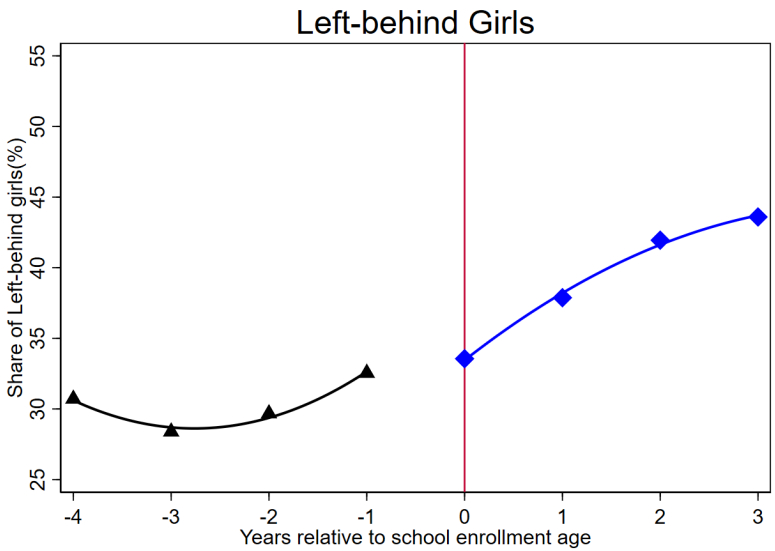
#1 Highly *Hukou*-Restricted Cities

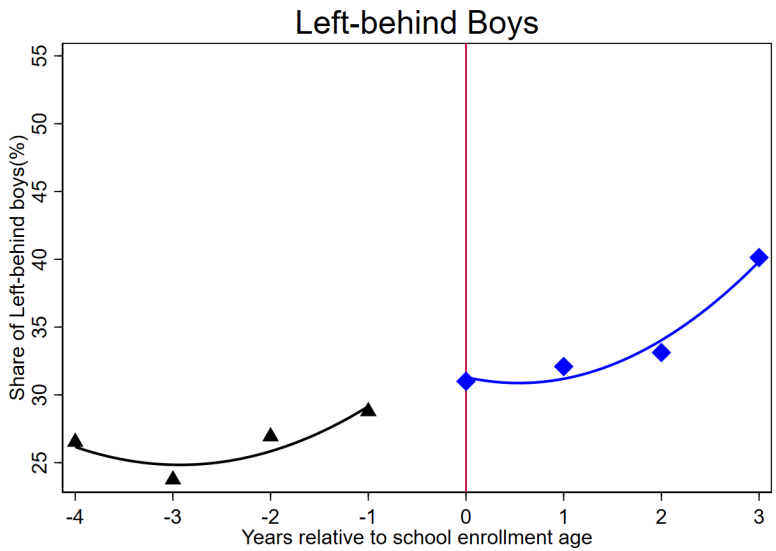


Data come from China *Migrants Dynamic Survey (CMDS)*.

More Girls Are Left Behind at the Junior School Enrollment Age

#2 Less *Hukou*-Restricted Cities



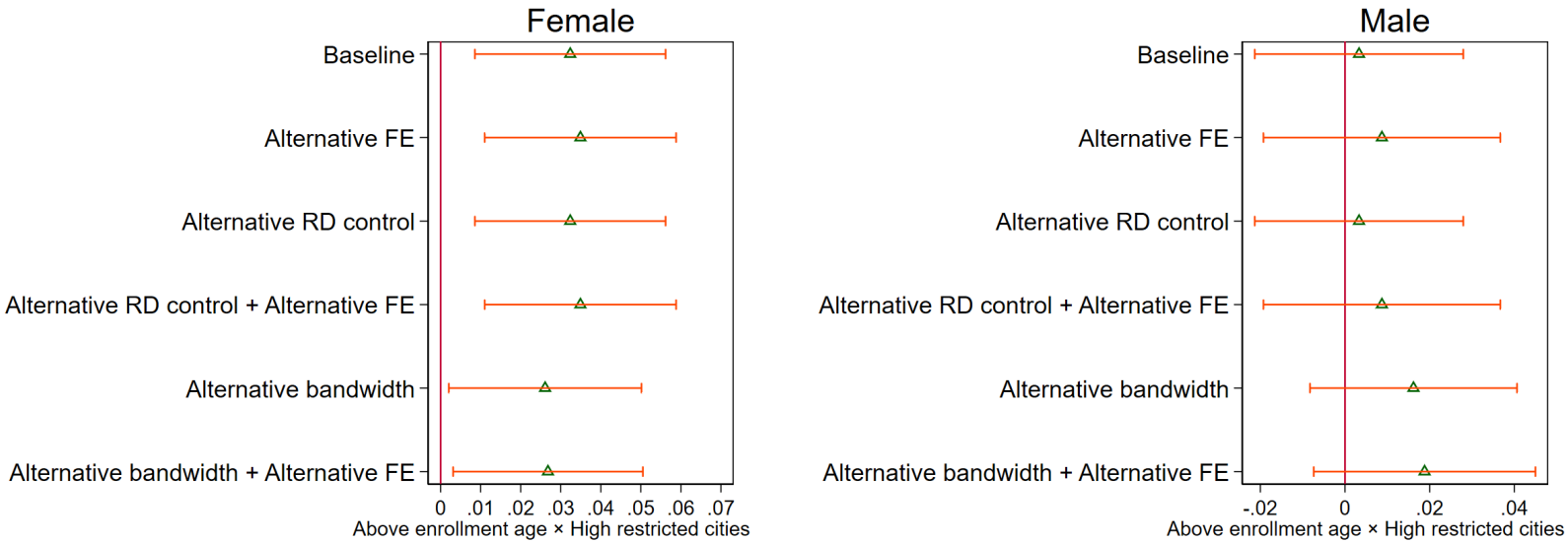


Data come from *China Migrants Dynamic Survey (CMDS).*

RD Results based on School Enrollment Age

	Dependent Variable: Indicator for leaving the child in rural hometown			
	Female		Male	
Above enrollment age × Highly restricted cities (=1)(ψ_1)	0.0349**	0.0354**	0.00871	0.00984
	(0.0145)	(0.0144)	(0.0170)	(0.0167)
Above enrollment age (ψ_2)	-0.00375	-0.00644	0.000643	0.000597
	(0.0176)	(0.0178)	(0.0153)	(0.0152)
P-value of ($\psi_1 + \psi_2$)	0.0178	0.0157	0.609	0.558
Mean of Dep. Var.	0.35	0.35	0.34	0.34
City FE×Year FE×*Hukou* Province FE	Yes	Yes	Yes	Yes
Cohort FE	No	Yes	No	Yes
Age Bandwidth	2	2	2	2
Control function for the running variable	Linear	Linear	Linear	Linear

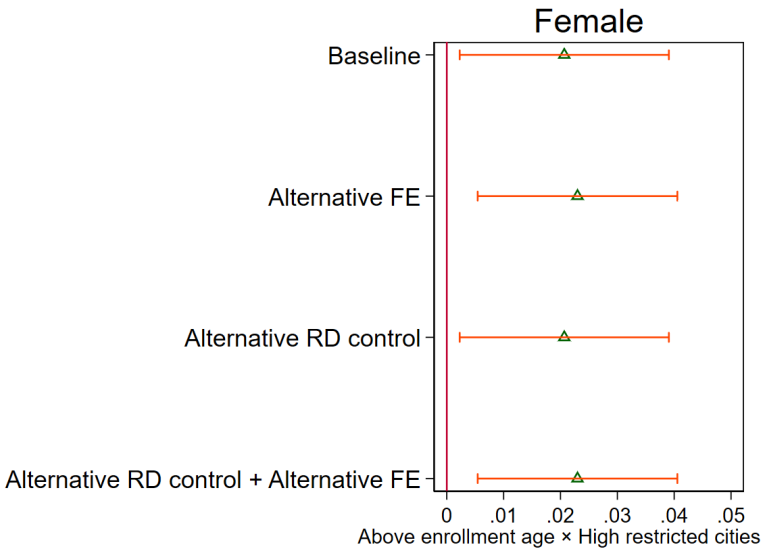
Robustness



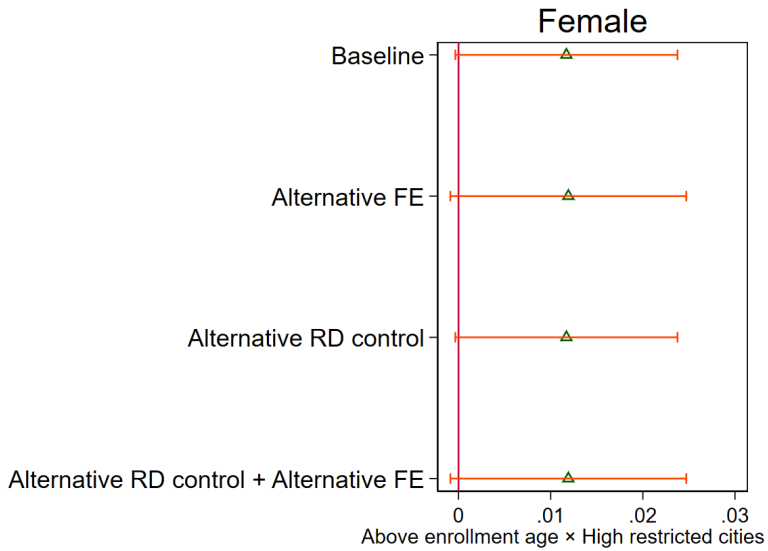
- Add household control: Household income and father's education attainment
- Alternative FE: City FE*Year FE + *Hukou* Province FE*Year FE
- Alternative RD control: Local quadratic regression
- Alternative Bandwidth: Extend bandwidth to 3 years

One parent versus both parents are away

a. Without both parents



b. With one of the parents



- Baseline: City FE*Year FE + *Hukou* Province FE
- Alternative FE: City FE*Year FE + *Hukou* Province FE*Year FE
- Add household control: Household income and father's education attainment

DDD Regression: Combining Boys and Girls

	(1)	(2)	(3)	(4)
	Dependent variable: Indicator for leaving the child in rural hometown			
Female × Above Enrollment Age × Highly restricted cities (=1)	0.0282*	0.0279*	0.0282*	0.0279*
	(0.0152)	(0.0151)	(0.0152)	(0.0151)
Observations	71,925	71,925	71,925	71,925
Adjusted R-squared	0.157	0.158	0.157	0.158
Household Control	Yes	Yes	Yes	Yes
City FE × Year FE	Yes	Yes	Yes	Yes
Cohort FE	No	Yes	No	Yes
Age Bandwidth	2	2	2	2
Control function for the running variable	Linear	Linear	Quadratic	Quadratic

An Alternative RD Design

The 2014 Policy Shock: China urged mega cities–those with a population of over five million in the central district area-to strictly control migrant population.

$$\begin{aligned} Left\ behind_{ijt} = \alpha_0 + \alpha_1 Above_{it} \times I\left(Pop > 5million\right)_j \times I(t > 2014) \\ + \alpha_2 Above_{it} \times I\left(Pop > 5million\right)_j + \alpha_3 Above_{it} \times \\ I(t > 2014) + \alpha_4 Above_{it} + \xi_{jt} + \eta_n + v_{ijt} \end{aligned}$$

Alternative RD Results based on the 2014 Mega City Population Control Policy

Dependent Variable: Indicator for leaving the child in rural hometown				
	Female		Male	
Above enrollment age ×I(Population>5 million) × I(Year>2014)	0.0700***	0.0772**	-0.0429	-0.0314
	(0.0220)	(0.0306)	(0.0363)	(0.0267)
Above enrollment age ×I(Population>5 million)	-0.00355	-0.00946	0.0186	0.00909
	(0.0222)	(0.0197)	(0.0139)	(0.0153)
Above enrollment age (ψ_2) × I(Year>2014)	-0.0495**	-0.0491	0.0342	0.0434
	(0.0214)	(0.0291)	(0.0262)	(0.0277)
Above enrollment age (ψ_2)	0.0314*	0.0453**	-0.0240	-0.0200
	(0.0173)	(0.0172)	(0.0166)	(0.0186)
Observations	10,296	10,296	13,812	13,812
Adjusted R-squared	0.163	0.192	0.137	0.169
City FE×Year FE	Yes	No	Yes	No
City FE×Year FE×Hukou Province FE	No	Yes	No	Yes
Cohort FE	Yes	Yes	Yes	Yes
Age Bandwidth	2	2	2	2
City Size Bandwidth	3	3	3	3

If financial resources more important than parental time, this may not be bad for daughters

- Migration improves parents' earning capacity
- Migrant parents can compensate daughters by sending remittances back to the rural area
- The net effect on children depends whether the parents' time or money is more important for the child's human capital accumulation

Left-behind Girls Receive Significantly Less Remittance Than Boys

Dependent variable: IHS of Remittance				
Panel A: Primary School Age				
Female	-0.0980*	-0.0971*	-0.0952*	-0.0925*
	(0.0530)	(0.0530)	(0.0558)	(0.0559)
Panel B: Junior Middle School Age				
Female	-0.134**	-0.135**	-0.165**	-0.164**
	(0.0653)	(0.0642)	(0.0702)	(0.0689)
City FE×Year FE	Yes	Yes	No	No
City FE×Year FE×Hukou Province FE	No	No	Yes	Yes
Cohort FE	No	Yes	No	Yes

Long-term Consequences of Separating from Parents at School Age

$$Y_{icn} = \beta_0 + \beta_1 Left\ behind_{icn} + \xi_c + \eta_n + \varepsilon_{it}$$

- $Left\ behind_{icn}$ - an indicator for whether individual i was left in location c and year n was k during the age of junior middle school.
- ξ_c – birth location FE
- $\eta_{n,t} \times Female$- birth cohorts FE

IV: World Import Demand (WID) × *hukou* restrictions across destinations

$$Left\ behind_{icn,t} = \gamma_0 + \gamma_1 WID_{c,t} \times Des\_High\ hukou_c + \gamma_2 WID_{c,t} + \xi_c + \eta_n + \varepsilon_{it}$$

- $WID_{c,t}$ - the exposure to world import demand shocks across nearby cities
- $Des\_High\ hukou_c$ - an indicator for whether migrants from birthplace c face stringent *hukou* restrictions in nearby cities

$$WID_{ct} = \sum_d \left(\frac{1}{dist_{dc}}\right) \left(\sum_k WorldIM_{k,t-2,t} \times \frac{EX_{k,d}}{\sum_j EX_{k,j}}\right)$$

- $WorldIM_{k,t-2,t}$: Changes in world-import demand by industry between t- t-2
- $\frac{EX_{k,d}}{\sum_j EX_{k,j}}$: Initial export shares in 1997

First-stage results

Long-term Educational Outcomes

	Years of Schooling		IHS of Years of Schooling		Pass High School Entrance Exams (=1)	
Indicator for leaving the child behind	-2.863***	-3.005***	-0.277***	-0.290**	-0.411*	-0.446*
	(0.561)	(0.697)	(0.0769)	(0.0980)	(0.194)	(0.232)
F stat	50.97	43.33	50.97	43.33	37.28	36.29
Observations	1,335	1,335	1,335	1,335	946	946
Mean of Dep. Var.	11.37	11.37	3.07	3.07	0.67	0.67
SD of Dep. Var.	3.510	3.510	0.381	0.381	0.469	0.469
Household Controls	No	Yes	No	Yes	No	Yes
Township FE	Yes	Yes	Yes	Yes	Yes	Yes

Long-term Health and Labor Outcomes

	Low Income Group (=1)		Disadvantaged Rural Status (=1)		Obesity (BMI>30)	
Indicator for leaving the child behind	0.397**	0.397**	0.347***	0.352***	0.109**	0.108**
	(0.153)	(0.152)	(0.0590)	(0.0694)	(0.0345)	(0.0358)
F stat	47.51	37.67	47.51	37.67	47.51	37.67
Observations	1,379	1,379	1,379	1,379	1,379	1,379
Mean of Dep. Var.	0.71	0.71	0.91	0.91	0.026	0.026
SD of Dep. Var.	0.452	0.452	0.291	0.291	0.160	0.160
Household Controls	No	Yes	No	Yes	No	Yes
Township FE	Yes	Yes	Yes	Yes	Yes	Yes

Underlying mechanisms

- *Hukou* restrictions exacerbate the effects of the son preference
- The returns to education may be lower for females than males
- Sons are potentially more productive than daughters

Larger Effects for Girls with Male Siblings

	Dependent Variable: Indicator for leaving the child in rural hometown			
	Have male siblings		Don't have male siblings	
Above enrollment age × Highly restricted cities (=1)(ψ_1)	0.0346*	0.0354**	0.0239	0.0249
	(0.0175)	(0.0176)	(0.0194)	(0.0193)
Above enrollment age (ψ_2)	0.0113	0.0115	0.000691	-0.00367
	(0.0252)	(0.0253)	(0.0206)	(0.0205)
P-value of ($\psi_1 + \psi_2$)	0.0504	0.0462	0.222	0.201
Observations	13,591	13,591	14,490	14,490
Adjusted R-squared	0.225	0.226	0.205	0.205
Mean of Dep. Var.	0.41	0.41	0.33	0.33
Household Control	Yes	Yes	Yes	Yes
City FE×Year FE	No	No	No	No
City FE×Year FE×*Hukou* Province FE	Yes	Yes	Yes	Yes
Cohort FE	No	Yes	No	Yes
Age Bandwidth	2	2	2	2
Control function for the running variable	Linear	Linear	Linear	Linear

Larger Effects for Households from Provinces with Male-biased Sex Ratio

	Dependent variable: Indicator for leaving the child in rural hometown			
Above enrollment age×Highly restricted cities(=1)	0.0680***	0.0664***	0.0820***	0.0812***
×High Baseline Sex Ratio(=1)	(0.0222)	(0.0222)	(0.0169)	(0.0168)
Observations	31,066	31,066	31,066	31,066
Adjusted R-squared	0.101	0.102	0.206	0.207
Household Control	Yes	Yes	Yes	Yes
City FE×Year FE	Yes	Yes	No	No
City FE×Year FE×Hukou Province FE	No	No	Yes	Yes
Cohort FE	No	Yes	No	Yes
Age Bandwidth	2	2	2	2
Control function for the running variable	Linear	Linear	Linear	Linear

Rural parents who have a strong son preference tend to make a sex selection for second births (Almond et al., 2019).

Other Mechanisms

- Females have a higher (rather than a lower) rate of return to education than males
- Our empirical pattern is not systematically affected by gender wage gaps.
- The effects of leaving children behind do not differ systematically by gender.

Conclusion

- Some "unintended" consequences of mobility restrictions:
  - Migrants more likely to separate from daughters than sons
  - Separating from parents and growing up in poor rural area translates into long-term socioeconomic disadvantages
  - Girls are hurt throughout their lives
  - Girls receive less money *and* less time from parents
- *Hukou* restrictions magnify the effects of pre-existing gender bias (which child is left behind is a parental choice)
- Global Implications
  - *Hokhau* policy in Vietnam (Cameron 2012)
  - Informal barriers to accessing urban education in India (Pandey 2021)
  - Most of the world's 272 million international migrants discouraged or explicitly disallowed from bringing families (Mobarak et al 2021)

Potential implications on economic inefficiency

- Improved access to economic opportunities for females and ethnic minorities has boosted economic growth in the U.S. (Duflo, 2012; Hsieh et al., 2019)
- Limited access to education resources faced by rural girls may undermine economic development in China.

Enrollment Restrictions Are Much Stronger for Junior Middle Schools

Table: Migrant households' spending on education

	Primary school	Junior middle school
Zanzhufei specific for migrant children	1432.005	2198.48
Total education expenditure (excluding *Zanzhufei*)	1444.093	2339.375

Data come from *Chinese Household Income Project Survey (CHIPS) 2007 and 2008*.

Go back

Enrollment Restrictions Are Much Stronger for Junior Middle Schools

Table: Migrant children in Guangzhou disappear as they enter junior middle school

		2008	2012	2015
Primary school	Num of migrant children	376963	434473	458216
	Share of migrant children	43.69%	52.82%	48.86%
Junior middle school	Num of migrant children	86089	121426	127815
	Share of migrant children	21.09%	32.51%	37.97%
High school Entrance Exam	Num of migrant children	—	23762	31969
	Share of migrant children	—	20.06%	28.87%

Data come from the *Annual Report on Education for China's Migrant Children (2016)*

Go back

First-stage results

	(1)	(2)	(3)	(4)
	Indicator for leaving the child in rural hometown			
WID	-0.141	-0.152		
	(0.319)	(0.321)		
WID × High hukou restrictions	1.053***	1.048***		
	(0.153)	(0.171)		
Log rainfall			0.384***	0.376***
			(0.0698)	(0.0692)
Log rainfall × Migration ties			-3.588***	-3.518***
			(0.332)	(0.408)
Observations	1,379	1,379	1,414	1,414
Adjusted R-squared	0.126	0.125	0.126	0.125
F stat	47.55	37.70	116.8	74.26
Household Controls	No	Yes	No	Yes
Township FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Go back

Rural Girls Are More Likely to Be Left Behind Compared to Rural Boys

	Male	Female	P-value of diff	Adjusted P-value of diff
Panel A: Junior middle school age at highly restrictive cities:				
Three people in the city	0.448	0.434	0.015	0.000
Leaving the child in rural hometown with one of the parents	0.135	0.133	0.558	0.525
Leaving the child in rural hometown without both parents	0.323	0.347	0.000	0.000
Panel B: Junior middle school age at less restrictive cities:				
Three people in the city	0.538	0.541	0.639	0.104
Leaving the child in rural hometown with one of the parents	0.110	0.103	0.045	0.490
Leaving the child in rural hometown without both parents	0.228	0.239	0.021	0.004
Panel C: Primary school age at highly restrictive cities:				
Three people in the city	0.527	0.526	0.839	0.080
Leaving the child in rural hometown with one of the parents	0.110	0.106	0.043	0.085
Leaving the child in rural hometown without both parents	0.250	0.258	0.012	0.000
Panel D: Primary school age at less restrictive cities				
Three people in the city	0.593	0.594	0.820	0.081
Leaving the child in rural hometown with one of the parents	0.093	0.092	0.819	0.181
Leaving the child in rural hometown without both parents	0.182	0.186	0.195	0.001