Parental Rural-Urban Migration and Child Education

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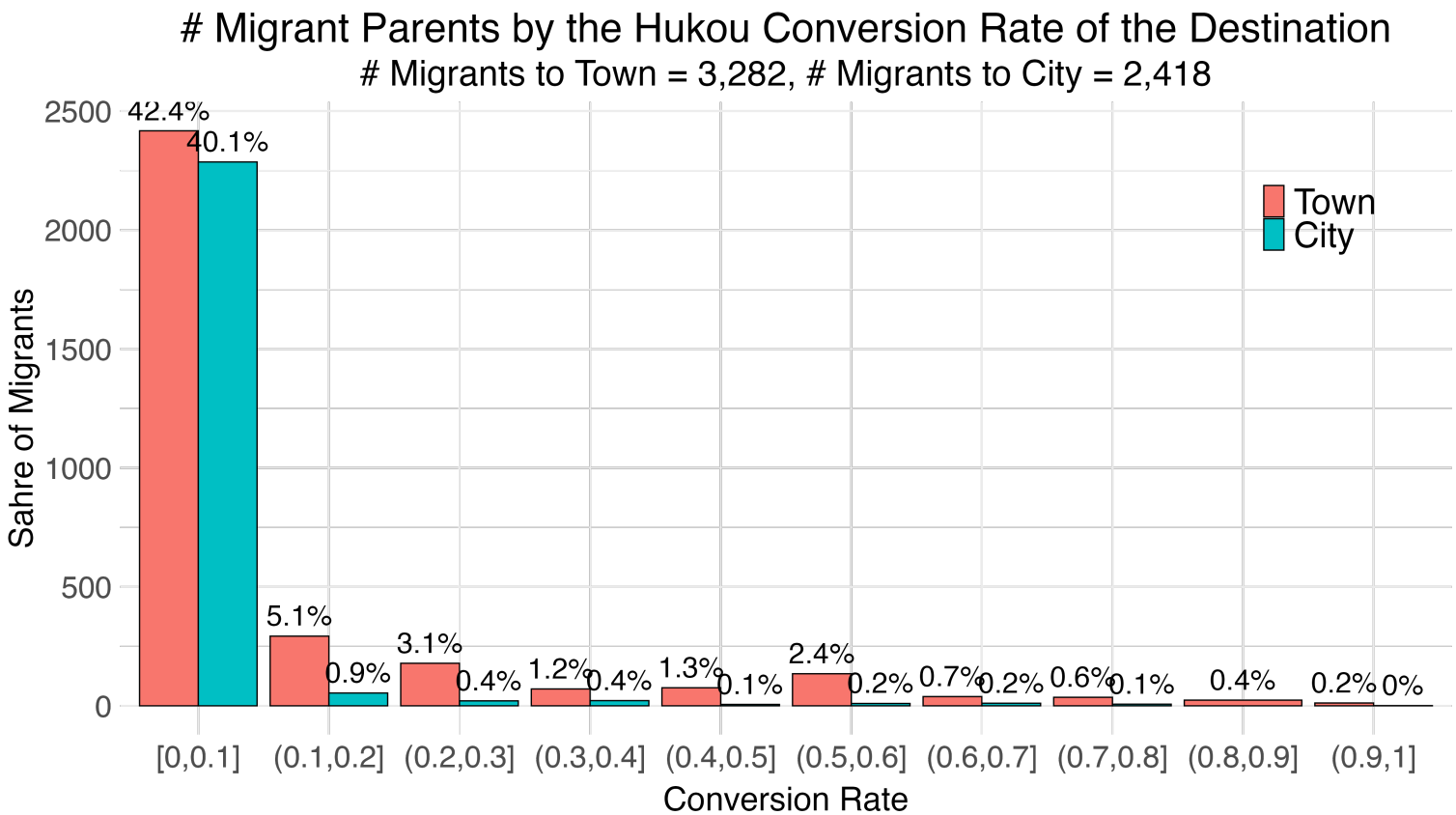
Migrants Disproportionately Move Toward Big Cities



- *Hukou* conversion rate: the share of migrants who had converted their household registration place to the local prefecture, negatively correlated with the *Hukou* stringency index
- Mega-cities: there are more than 10 cities in China with a population of over 10 million (high stringency)

Parental Migration and Child Education

- Mobility constraints restrict rural migrants' access to public goods, housing, and other amenities in urban areas.
- Whether or not to bring children to the destination?
- **What is the impact of parental rural-urban migration on children's educational outcomes?**
  - Do parents migrate for better educational opportunities for their children?
  - Do migrant parents invest the urban income premium in their children's education?
  - How do institutional constraints that limit rural-urban mobility affect this relationship?

Modelling Migration in Developing Countries

- Rural-urban migration in developing Countries
  - rural labor and urban manufacturing production Bartik/Shift-Share Instrument: Goldsmith-Pinkham et al. (2020), Imbert et al. (2022)
- Migration with mobility constraints
  - Inequality and Welfare loss Afridi et al. (2015), Khanna et al. (2021)
  - Non-family migration and remittances Antman (2011), Gao et al. (2022), Imbert et al. (2023a)
- Migration with or without family
  - couple Murard (2019)
  - children McKenzie et al. (2011), Antman (2012), Imbert et al. (2023a)

Modelling Migration in Developing Countries

- Rural-urban migration in developing countries
  - The rapid growth of urban areas: people moving to urban areas, rural areas becoming urban areas $\rightarrow$ no clear line between rural and urban areas
- Migration with mobility constraints
  - Migration and settlement $\rightarrow$ measure institutional costs and bilateral migration costs
- Migration with or without family
  - Bring children or leave them behind $\rightarrow$ A binary decision to leave a child behind is not enough to describe the input in child's edu

This Paper

- *Migrant*: living in an urban place without the local *Hukou*, the *floating* population
- Rural-Urban Division
  - Urban areas are divided into two types: *town* (refers to rural county seat, township, and suburb) and *city*.
  - County-level data is used (a 6-digit postal code identifies a county, digits 1-2 identify the province, digits 1-4 identify the prefecture).
  - Rural/Town/City: a county of type Rural/Town/City (this "type" is reported by the survey, based on the classification of National Bureau of Statistics of China).
- Migration with or without children: a nested model
  - the upper nest: parent's work location choice (migration)
  - the lower nest: child's school location choice (leaving children behind)

Policy Barriers for Migrants to Claim Citizenship in Destinations

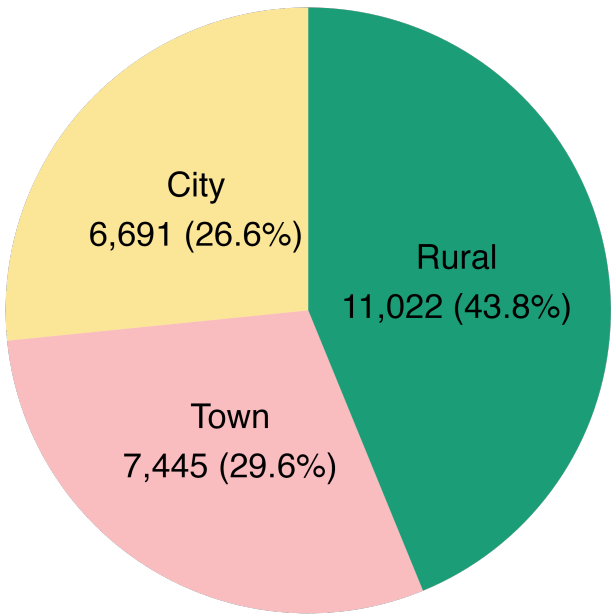
Hukou System: the Household Registration System

- For each household, the names of **all household members** and the following information are written on **one *Hukou* booklet**:
  - Household's address (province - prefecture - county - community: rural/urban - street - door). The access to local social welfare benefits is linked to the **location** of household registration.
  - **Type** of household (rural or urban, if the household was registered before 2014)
  - Other information not relevant to this analysis.
- To obtain a local ***Hukou***:
  - Through birth (born into the household, no *Jus soli*), marriage, or specific formal sector jobs (government officials and employees of certain state-owned enterprises, the individual can choose to be registered at the place of work)
  - By application (requirements vary by region/prefecture) to restrictive prefectures

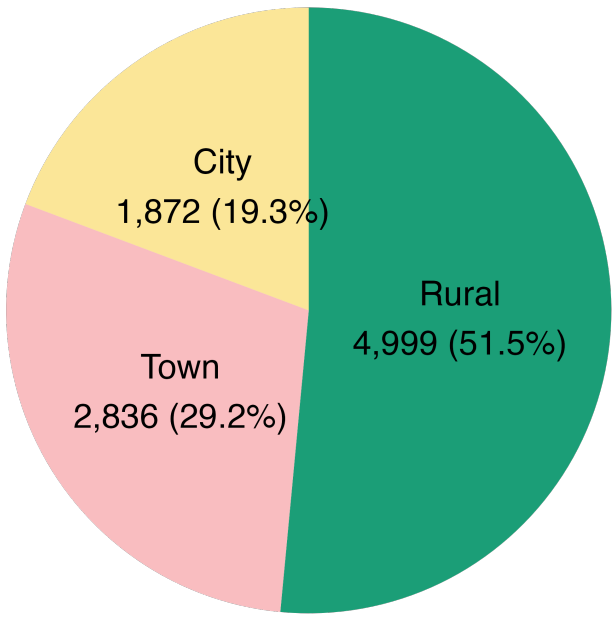
Internal Migration

- Parent's migration (across counties) destinations:
  1. Cities; 2. Township/County seat/Suburb; 3. Rural villages

Migrant Adults, ages 19-50

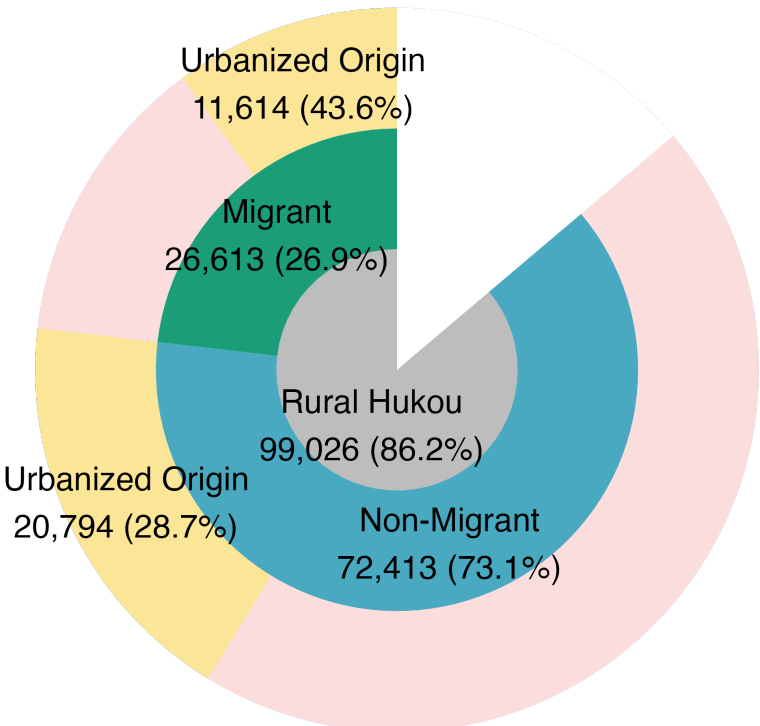


Migrant Parents of Children ages 6 to 18



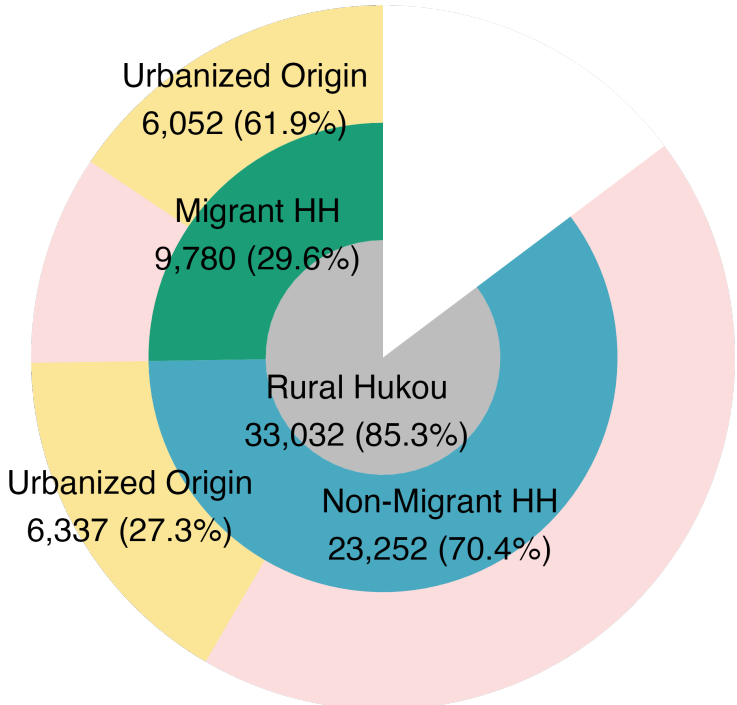
Urbanization and Migration

Adults ages 19-50



Note: 1. Rural or urban refers to the adult's *Hukou* type at birth or, if missing, at baseline (2010). 2. Migrant or non-migrant refers to whether the adult is a migrant. 3. Urbanized or not refers to whether the adult's *Hukou* place of residence is urbanized after birth.

Children ages 6-18



Note: 1. Rural or urban *Hukou* refers to the child's *Hukou* type at birth or, if missing, at baseline (2010). 2. Migrant or non-migrant refers to whether any of the child's parents or the child is a migrant.
3. Urbanized or not refers to whether the child's or either its parent's *Hukou* location is urbanized after its birth.

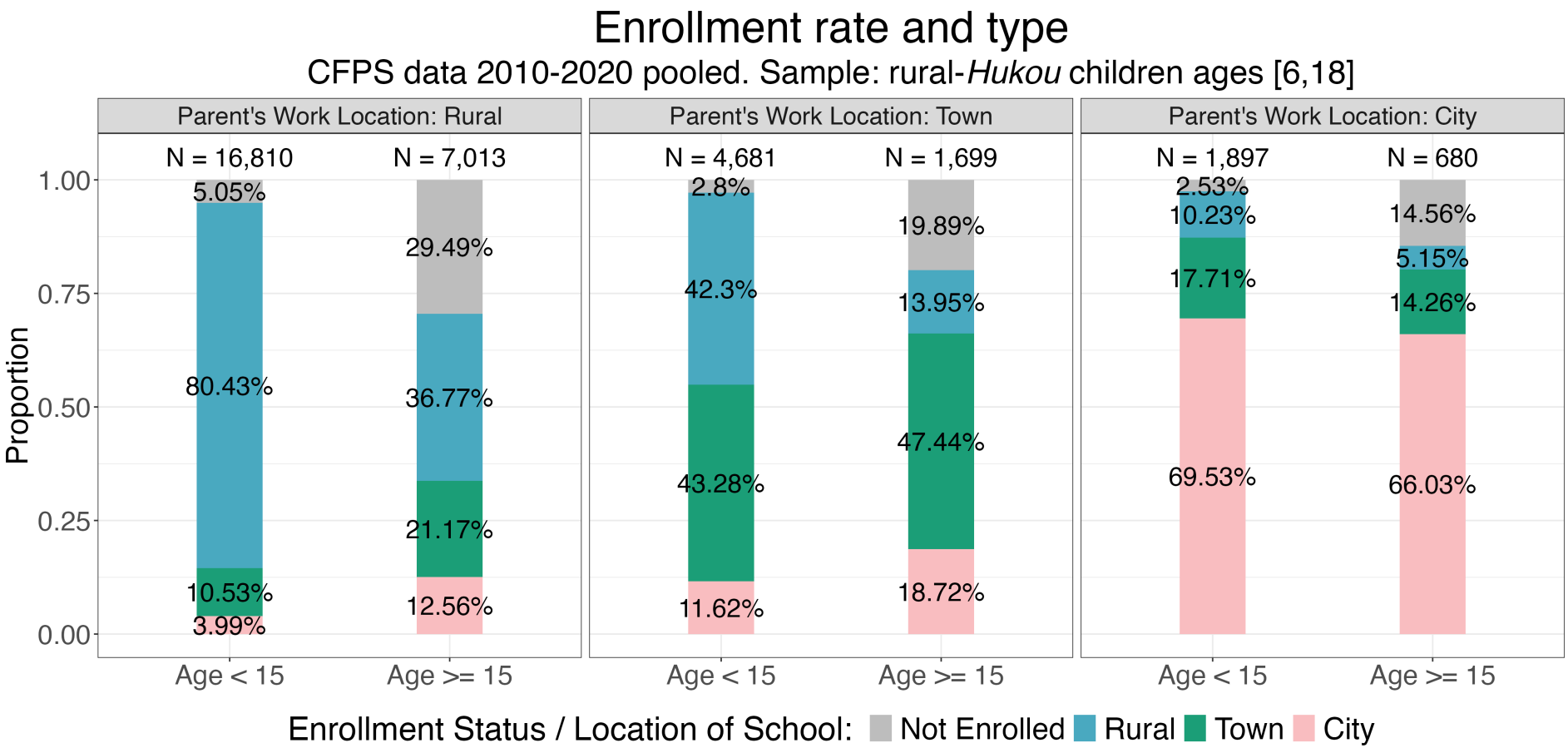
Schools and Children's Academic Performance?

OLS Regressions on Test Scores, Rural Children

	Dependent Variable: Test Score (t)			
	Word Score, z-score (t)		Math Score, z-score (t)	
	Ages [10,14]	Ages [15,18]	Ages [10,14]	Ages [15,18]
Word Score, z-score (t-2)	0.552***	0.670***		
	(0.059)	(0.039)		
Math Score, z-score (t-2)			0.664***	0.556***
			(0.084)	(0.033)
Edu. Expenses (t)	0.479**	0.696***	0.270	0.459***
	(0.156)	(0.077)	(0.170)	(0.071)
School Location (t), base = Not Enrolled				
. Rural School	0.111	−0.054	0.396***	0.244***
	(0.115)	(0.072)	(0.120)	(0.068)
. Town School	0.017	0.073***	0.037*	0.050*
	(0.020)	(0.017)	(0.018)	(0.020)
. City School	1.818**	0.468***	1.419**	0.991***
	(0.599)	(0.121)	(0.508)	(0.118)
Completes 9-yr. Edu. (Parent)	2.231***	0.937***	2.263***	1.777***
	(0.602)	(0.115)	(0.515)	(0.112)
Income (t, Parent)	2.155***	0.746***	2.082***	1.505***
	(0.607)	(0.118)	(0.518)	(0.119)
Constant	5.498***	6.176***	3.734***	5.198***
	(0.592)	(0.101)	(0.507)	(0.102)
Observations	880	3,471	883	3,222
R^2	0.184	0.170	0.195	0.241

*p<0.05; **p<0.01; ***p<0.001. Cluster-robust standard errors in parentheses. Clustering is at the individual level.
Sample: children ages [10,18]. Time variable: two-year waves. Data 2010 to 2020 pooled.
Test scores are the z-scores, adjusted for age and gender, of the scores from tests conducted by CFPS.
Income and expenses are in real terms, the unit is 10k CNY in 2010.

Where do children attend school?

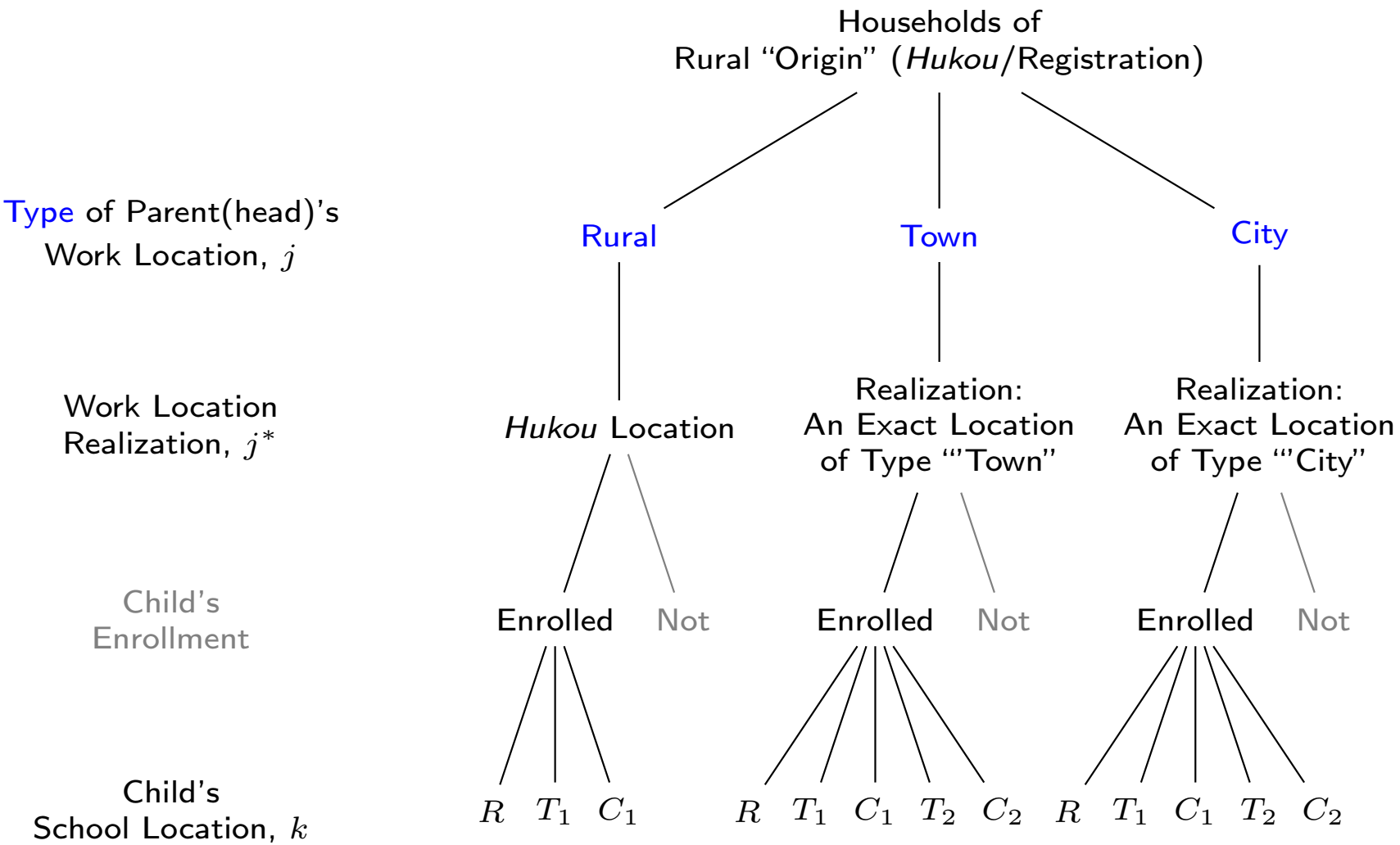


Note: ***1***. Rural or urban refer to the child's *Hukou* type at birth or, if missing, at baseline (2010). ***2***. Compulsory education in China: 6 years of primary school and 3 years of junior secondary school, usually beginning at age 6 and ending at age 15. ***3***. The completion rate of nine-year compulsory education in China was 94% as of 2014 (National Bureau of Statistics of China, 2015).

- 7 out of 166 counties have no primary school; 77 have no secondary school.
- In all counties, there are fewer secondary school seats than primary school seats.

Household's Decision

The Nested Logit Structure



- R: the *Hukou* Location;
- T_1 or C_1: Location closest to ***Hukou*** with type of "Town" or "City";
- T_2 or C_2: Location closest to **parent(head)'s work location** with type of "Town" or "City".

Household's Decision

The Upper Nest: Work Location

- Decision on the **type of parent(head)'s work location**

$$d_1 = j,\ j \in \{\textit{Rural},\ \textit{Town},\ \textit{City}\}$$

- Given type j, **one exact location (county) j^* is realized**:
  - the *Hukou* location if $j = \textit{Rural}$;
  - a random draw if $j = \textit{Town}$ or *City* from the distribution $f_i(j^*|j) = \frac{M_{O_i,j^*}}{M_{O_i,j}}$, O_i: *Hukou* location of household i, M: baseline migration stock.
- The problem of this stage:

$$\max_{d_1} \left\{ \sum_j d_{1j} \cdot \left[\gamma_j \cdot x^{(1)} + \sum_{j^*} p_{j^*|j} \cdot (\beta \cdot y_{j^*} + \rho_j \cdot V_{j^*}) \right] \right\}$$

where $d_{1j} = \mathbb{1}\{d_1 = j\}$, V_{j^*} is the log-sum of limb j^*, and

- $x^{(1)}$: demographics of parent(head) and household;
- y_{j^*}: gains from and costs of migration.

Household's Decision

The Lower Nest: School Location

- Decision on **child school location**

$$d_2 = k,\ k \in \{\text{Rural (R, } \textit{Hukou} \text{ Location)},\ \text{Town } (T_1) \text{ or City } (C_1) \text{ Closest to } \textit{Hukou} \text{ Location},\ \text{Town } (T_2) \text{ or City } (C_2) \text{ Closest to Work Location } j^*\}$$

- The problem of work location choice:

$$\max_{d_2} \left[\sum_k d_{2k} \cdot \left(\alpha_j \cdot z_{j^*k} + \mu_{jk} \cdot x^{(2)} + \varepsilon_{j^*k} \right) \right], \quad \forall j$$

where $d_{2k} = \mathbb{1}\{d_2 = k\}$ and the deterministic component of utility depends on:

- $x^{(2)}$: demographics of child and household;
- z_{j^*k}: gains from and costs of child edu.

Two-stage LIML Estimation

School location stage:

- $\frac{\hat{\alpha}}{\rho_j}$ and $\frac{\hat{\mu}}{\rho_j}$ from maximizing the log-likelihood of a conditional Logit model

$$\ln L_2 = \sum_i \sum_j \sum_{j^*} \sum_k d_{ij^*k} \ln p_{ik|j^*}$$

where

- k: school location, $k \in \{R, T_1, T_2, C_1, C_2\}$,

$$p_{k|j^*} = \frac{\exp\left[\left(\alpha_j \cdot z_{j^*k} + \mu_{jk} \cdot x^{(2)}\right)/\rho_j\right]}{\sum_{l=1}^{K_j^*} \exp\left[\left(\alpha_j \cdot z_{j^*l} + \mu_{jl} \cdot x^{(2)}\right)/\rho_j\right]}$$

Two-stage LIML Estimation

Work location stage:

- $\hat{\beta}$, $\hat{\gamma}_j$, and $\hat{\rho}_j$ from maximizing the log-likelihood of a conditional Logit model

$$\ln L_1 = \sum_i \sum_j d_{ij} \ln p_{ij}$$

where

- j: type of work location, $j \in \{R, T, C\}$;

$$p_j = \frac{\exp\left[\gamma_j \cdot x^{(1)} + \sum_{j^*} p_{j^*|j} \cdot (\beta \cdot y_{j^*} + \rho_j \cdot V_{j^*})\right]}{\sum_{m=1}^{J} \exp\left[\gamma_m \cdot x^{(1)} + \sum_{m^*} p_{m^*|m} \cdot (\beta \cdot y_{m^*} + \rho_m \cdot V_{m^*})\right]}$$

$$V_{j^*} = \ln\left\{\sum_{l=1}^{K_j^*} \exp\left[\left(\alpha_j \cdot z_{j^*l} + \mu_{jl} \cdot x^{(2)}\right)\Big/\rho_j\right]\right\}$$

- j^*: a specific county in type j realized with probability:

$$p_{j^*|j} = \frac{M(O, j^*)}{\sum_{\{\tilde{j}:\, \text{type}(\tilde{j})=j\}} M(O, \tilde{j})}$$

O: *Hukou* location of the household; M: baseline migration stock

Migration Costs

***Hukou* Stringency Index** derived from Zhang et al. (2019)

- An index that **measures how difficult it is to obtain a *Hukou* of the destination location**.
- Equals zero for all towns.

***Hukou* Conversion Rate** Imbert et al. (2023b)

- The share of migrants who had converted their *Hukou* registration place to the local prefecture by the last wave of the survey:

$$C_l = \frac{\sum_i \mathbb{1}\{\mathtt{d}_i = l\} \cdot \mathbb{1}\{\mathtt{hk}_{i,a_0} \neq l\} \cdot \mathbb{1}\{\mathtt{hk}_{i,T} = l\}}{\sum_i \mathbb{1}\{\mathtt{d}_i = l\} \cdot \mathbb{1}\{\mathtt{hk}_{i,a_0} \neq l\}}$$

  `d`: living location; `hk`: *Hukou* location
  a_0: year of birth, T: year of the last observation in the survey
- Has variation for towns; Can be made bilateral.

Data

- Longitudinal survey: China Family Panel Studies (CFPS), by Peking University, China
- The CFPS baseline (2010) sample covers 25 provincial-level administrative regions (31 in total), representing 95% of China's population.

CFPS Sample sizes

	Number of sampled individuals aged			
Wave	[0,5]	[6,14]	[15,18]	[19,50]
2010	3,615	4,984	1,982	19,148
2012	3,551	4,640	2,099	21,461
2014	3,595	4,575	1,949	21,331
2016	2,988	4,566	2,295	20,408
2018	2,240	4,821	1,602	18,276
2020	859	3,981	1,251	13,928