

ACCESS TO MIGRATION FOR RURAL HOUSEHOLDS

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Overview

Focus on microeconomic issues related to property rights and migration, much of her research is on China, in India, Mongolia, and the United Arab Emirates.



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Main work is about how corruption and politics affect resource allocation and efficiency. fellow selection at the China Academy of Science, air pollution, and the Sent-down Youth program during the Cultural Revolution.

WHAT'S THE TOPIC? & WHY TO RESEARCH?

- ▶ What's the topic?
 - ▶ A unique feature of China's history the “sent-down youth” program, **temporary** migration due to the **SDY program** created lasting **inter-province links**.
 - ▶ $s(\text{SDY sending provinces}) - p(\text{SDY recipient province})$
 lasting inter province links
 $p(\text{SDY recipient province}) - s(\text{SDY sending provinces})$
 two time varying pull measures (**Hukou Reform & Labor Demand Shock**)

WHAT'S THE TOPIC? & WHY TO RESEARCH?

- ▶ What's the topic?
 - ▶ A novel identification strategy:
Interact these links with two time-varying pull measures.
 The effects of access to internal migration
 s, increased access to migration—p, higher rates of migration
 - ▶ Why to use SDY flows to interact?
 —Overcome the associated **selection problems**.
 Absorb **time-invariant correlations** (the propensity to invest in risky activities, propensity to migrate) between sending and destination areas,
recover causal estimates of the impact of incentives to migrate.
 - ▶ Finding: Rural households in p
lower consumption volatility and **lower asset holding**,
 household production shifts into **high risk, high return activities**.
- ▶ Addresses the question of how **changing incentives to migrate**
 affect the **economic choices and outcomes** of agricultural
 households in communities sending the migrants.

WHAT'S THE TOPIC? & WHY TO RESEARCH?

- ▶ Why to research?
 - ▶ Focus of impact of migration on migrants and on workers in receiving communities, **the impact of migration opportunities on sending households and communities is less understood** but extremely important for reducing rural poverty and regional inequality.
 - ▶ Key advantages in the Chinese context.
 - Government **mandated** the **temporary** resettlement;
Able to examine whether ties persist once the original contacts have left.
 - Previous research: in the same direction;
Examine the effect of urban to rural movements on **subsequent rural to urban movements**.
 - Contribute: the study of the role of **interpersonal ties** in driving economic growth.
 - The **first** to demonstrate: SDY program created lasting linkages between the provinces that sent and received SDY.

WHAT'S THE TOPIC? & WHY TO RESEARCH?

- ▶ Why to research?
 - ▶ The **first** to use its interaction with ties created by the SDY program.
 - ▶ The first that analyzes the effect of incentives to migrate on **outcomes related to agricultural production decisions of rural households**;
Setting is novel—having detailed data.
 - ▶ Offer a new perspective on the impact of migration on **the well-being of remaining household members**—panel dataset spans 8 years.
 - ▶ Contribute to the growing literature on **internal migration**.

OVERVIEW

1. Conceptual Framework

2. Institutional Background

- The sent-down youth policy , Hukou system , Labor demand

3. Data

- National Fixed Point Survey , Sent-down youth flows
- Hukou reforms , Migrant Labor Demand Shocks

4. Identification and Estimation

- Variation from the Hukou Reforms
- Variation from Labor Demand Shocks

5. Empirical Validation

- Excludability of Hukou Reforms and Labor Demand Shocks
- Robustness Checks on SDY Flows
- Alternative Specifications for the Hukou Reforms

6. Main Results

- Consumption
- Income, labor and assets
- Investment in risky activities
- Quantitative assessment of precautionary channel
- Alternative explanations
- Instrumental variables estimates

7. Discussion

CONCEPTUAL FRAMEWORK

CONCEPTUAL FRAMEWORK

- ▶ Theoretically **ambiguous effects** of access to migration on investment, consumption, and welfare of rural households.
- ▶ Two **direct** channels:
 - ▶ Wealth effects
 - ▶ Insurance effects
- ▶ Two **indirect** channels:
 - ▶ Anticipation effects
 - ▶ General equilibrium effect on aggregate volatility

CONCEPTUAL FRAMEWORK

- ▶ Wealth effects
 - ▶ More consumption:remittances to household members,increase in wealth.
 - ▶ Income and investment in agricultural production:
 - No credit constrained prior to migration—leisure is a normal good,fall.
 - With credit constrained prior to migration—investment increase,rise.
 - ▶ High-risk, high-return assets:
 - Use constant relative risk aversion (CRRA) utility function, households exhibit decreasing absolute risk aversion, increase in wealth—increase
 - ▶ Remittances<the amount that the **migrant contributed** to house–hold earnings **before migration**:negative wealth effect,decline in consumption and risk-taking.

CONCEPTUAL FRAMEWORK

- ▶ Insurance effects
 - ▶ Increased investment in **high-return, risky activities**:
 - The overall portfolio becomes more **diversified**, insurance from having a migrant.
 - ▶ Reduce households' **overall investment/savings** due to a reduction in buffer-stock savings:
 - Direct risk: provide transfers.
 - Indirect risk: receive reduced remittances when migrants' income is low.

CONCEPTUAL FRAMEWORK

- ▶ Anticipation effects
 - ▶ Migration is a valuable ex post smoothing strategy.
Before sending a migrant.—Reduce consumption and/or increase labor supply, increase investment in risky assets and/or liquidate buffer stocks.
 - ▶ Effects of migration may also persist **after the migrants return.**
Changes in wealth, information, household dynamics.
- ▶ General equilibrium effect on aggregate volatility
 - ▶ Improved access to migration could increase the **local labor supply elasticity.**
—Change the outcomes of households that neither send a migrant nor anticipate ever sending a migrant.

INSTITUTIONAL BACKGROUND

INSTITUTIONAL BACKGROUND

► The Sent-Down Youth Policy

- “sent-down youth” or zhiqing—Between 1962 and 1978, nearly 18 million urban youth, mainly aged 16 to 20, were sent to rural areas to live and work.
- To rural areas near their home city; Large cities, other provinces.
- The vast majority (over 90%) **returned**.
- Allocation of SDY to Destinations: gender and age, when.
- Persistence of SDY Ties: **Personal connections and knowledge**, increase the desirability as a possible **migration destination**. (7% married to local individuals.)

Figure A1: Direction of Sent-Down Youth Flows



Source of Map: Bonnin 2013

INSTITUTIONAL BACKGROUND

► Hukou System

- China's hukou, or household registration system, was set up in the 1950s as a system of monitoring population flows.
- 1958, began the dual-hukou system.
- An individual with a rural hukou cannot legally **work for a state-owned enterprise** or the **government** or **receive state services** in an urban area.
- In the early 90s, provinces began to open the conversion process to more people.
- Main reason.—increases in urban labor demand.
(improve demand for local real estate, and political incentives)
- Exploit: **The timing of these reforms varied across provinces and across time.**

► Labor Demand

- Urban labor demand grew rapidly in China over the period of our analysis (1995 to 2002).

DATA

NATIONAL FIXED POINT SURVEY

TABLE 1—SUMMARY STATISTICS

	Mean	Standard deviation	Observations
Migrant (0/1)	0.162	0.368	14,011
Migration (days)	29.763	79.224	14,011
Migration (days, not including zeros)	184.029	102.081	2,266
Year	1,995.639	1.691	14,016
Total consumption (per person)	508.444	428.214	13,793
Food consumption (per person)	262.434	150.914	13,686
Non-staple food consumption (per person)	145.830	131.372	13,703
Agricultural income (per worker)	2,846.757	2,329.061	11,456
Nonagricultural income (per worker)	3,343.349	5,156.641	11,457
Agricultural labor inputs (per worker)	166.936	97.908	11,438
Household laborers (aged 18–65)	2.421	0.978	11,319
Nonproductive assets (per worker)	1,079.634	1,532.838	11,495
Agricultural assets (per worker)	470.609	689.273	11,426
Nonagricultural assets (per worker)	98.405	1,059.414	11,322
Positive days on fruits (0/1)	0.220	0.414	14,013
Days on fruits (per worker, not including zeros)	29.101	44.657	2,820
Days on fruits (per worker)	5.584	17.533	11,460
Income from fruits (per worker)	120.310	494.498	11,432
Positive days on animal husbandry (0/1)	0.710	0.454	14,014
Days on animal husbandry (per worker, not including zeros)	55.905	45.079	9,049
Days on animal husbandry (per worker)	42.090	40.609	11,468
Income from animal husbandry (per worker)	699.334	970.264	11,433
High education (middle school degree or higher)	0.475	0.499	14,012

Note: The table presents summary statistics of the NFP data where each observation refers to the first period that a household appears in the data.

The Sent-Down Youth Policy

- ▶ Use 1995–2002, over 14,000 households from 234 villages in 19 provinces.
- ▶ Household agricultural production, consumption, asset accumulation, employment, and income.
- ▶ Have: migrant or not
- ▶ No: individual identity, where, when, do what.

SENT-DOWN YOUTH FLOWS

In the publication “Statistics on sent-down youth in China”.
 Total sent-down youth flows to the provinces in the NFP dataset
 aggregated over the sent-down youth period.

Table A3: Interprovince Sent-Down Flows and Distances

Sent down to:	Heilongjiang	Liaoning	Ningxia	Zhejiang	Hebei	Shanxi	Yunnan	Guizhou	Gansu	Xinjiang	Qinghai
Panel A: SDY Flows sent from											
Beijing	10.40	0.11	0.45	0	1.40	4.13	0.84	0	0	0	0
Hubei	0	0	0	0	0	0	0	0	0	0.80	0
Jiangsu	0	0	0	0	0	0	0	0	0	1.70	0
Shandong	0	0	0	0	0	0	0	0	0.72	0	0.74
Shanghai	16.98	0.06	0	3.20	0	0	5.66	1.06	0	10.00	0
Sichuan	0.40	0	0	0	0	0	4.10	0	0	0	0
Tianjin	6.70	0.29	0.20	0	11.87	0.73	0	0	1.19	0.91	0
Zhejiang	5.82	0	0.18		0	0	0	0	0	0.49	0
Panel B: Distances											
Beijing	13.89	3.83	10.11	12.16	0.44	4.21	21.18	17.07	12.47	26.47	19.44
Hubei	23.56	11.03	8.78	8.13	9.74	6.99	12.45	7.54	12.05	26.68	16.59
Jiangsu	18.95	11.47	13.74	3.87	7.87	8.54	19.37	14.24	16.99	31.95	22.78
Shandong	15.77	7.51	11.59	8.13	3.64	5.51	20.23	15.51	14.55	29.24	21.05
Shanghai	19.85	13.71	15.94	2.42	9.96	10.85	20.53	15.30	19.22	34.19	24.84
Sichuan	30.05	14.96	7.67	17.20	16.20	12.10	5.69	5.54	8.80	19.94	8.95
Tianjin	13.83	4.67	10.64	11.46	0.52	4.56	21.31	17.05	13.13	27.25	20.04
Zhejiang	22.25	15.16	16.26		11.72	11.87	19.15	13.90	19.59	34.50	24.69

Note: Panel A presents the total number of educated youth sent down from one province to another. The units are 10,000 people. Panel B presents the distance between provincial capitals in 100 kilometers.

HUKOU REFORMS

TABLE A1—CITY-LEVEL *Hukou* REFORMS: 1993–2002

Province	Reform year	Description	Document name	Issue date
Beijing	1998	A migrant can get hukou in pilot satellite cities of Beijing if she buys an apartment and has a stable job.	JingZhengBanFa[1997] No.74	December 31, 1997
	2002	A migrant can get hukou in 14 satellite cities and 33 towns if she has* an apartment and a stable job.	JingZhengFa[2002] No.25	September 23, 2002
Zhejiang	1998	A migrant can get hukou in Hangzhou City, the capital of Zhejiang province, if she buys an apartment and has a stable job in Hangzhou.	HangZhengBan[1998] No.31	September 20, 1998
	2000	A migrant can get hukou in most cities in Zhejiang province (entry conditions are not specified in great detail).	ZheZheng[2000] No.7	September 1, 2000
	2002	A migrant should get hukou in most cities if she has* an apartment and also a stable job.	ZheZhengBanFa[2002] No. 12	March 29, 2002
Shanghai	1994	A migrant can get a temporary Shanghai hukou if she has* an apartment and a stable job.	Shanghai LanYin hukou Guanli Zanxing Guiding	February 1, 1994
	1998	A revision of the 1994 law by decreasing the entry bar further. ^{1a}	HuFuFa[1998] No.47	October 25, 1998
	2002	A migrant can apply for <Shanghai Resident Permit> if he has special skills, and this permit allows the holder to enjoy most benefits a Shanghai citizen has.	HuFuFa[2002] No. 122	April 30, 2002
Jiangsu	1995	A migrant can get a temporary city hukou if she has** an apartment in Nanjing City.	NingZhengBanFa[1995] No. 79	June 14, 1995
	2001	A migrant can get a city hukou if she has* an apartment or a stable job.	XuZhengFa[2001] No. 38	April 30, 2001
	2002	A migrant can get a city hukou if she has* an apartment or a stable job in most cities in Jiangsu province.	SuZhengFa[2002] No. 142	November 22, 2002
Shandong	1993	A migrant can get hukou in Yingkou City if she buys an apartment.	Yingkou Lanyin hukou Guanli Zanxing Guiding	December 1993
	2000	A migrant can get a city hukou in Shandong if she has* an apartment in most small- and medium-size cities.	LaZhengFa[2000] No.7	January 14, 2000
	2001	A migrant can get a city hukou in Shandong province if she has* an apartment and a stable job. This is a further reform with respect to the 2000 reform.	LaZhengFa[2001] No.107	October 10, 2001

* Renting or buying an apartment are allowed.

** Employer-provided dormitories are included.

^{1a} In the 1994 reform, if one wants to buy an apartment to obtain a Shanghai hukou, she has to buy at least 100 square meters; in 1998 this number was decreased to 70 square meters for Puxi and 65 square meters for Pudong. Also in 1998, Puxi was redefined to include several more remote areas: Jiading, Minhang, Baoshan, Jinshan, Songjiang, Nanhui, Fengxian, Qingpu, and Chongming.

► Source:several databases, each of which covers local and national laws, rules, and regulations in China.

(Peking University's Chinalawinfo, Xihu Law Library (www.law-lib.com), Beijing Lawstar Tech Limited Company (www.law-star.com) and Zhengbao Online Education Company's database)

► Key words:
for the hukou system used are hukou and huji;
for reform or administration are gaige and guanli.

MIGRANT LABOR DEMAND SHOCKS

- ▶ Data from the National Bureau of Statistics (2013).
- ▶ GDP across two sectors—manufacturing and construction—in a destination province.
- ▶ Top two industries in which rural migrants are employed, is a measure of the potential demand for migrant labor in a given province.

IDENTIFICATION AND ESTIMATION

IDENTIFICATION AND ESTIMATION

- ▶ Identification strategy
 - ▶ Interaction:
 - SDY flows**—Cross-sectional variation resulting from **the fact** that SDY-recipient provinces received SDY in different magnitudes.
 - Time variation**—Resulting from hukou reforms and labor demand shocks in SDY sending provinces.
- ▶ Province fixed effects.
 - ▶ Absorb time-invariant ties—preexisting cultural or transportation links between s and p
- ▶ Year fixed effects.

IDENTIFICATION AND ESTIMATION

► Variation from the Hukou Reforms

- $Z_{pt}^{\text{hukou}} = \sum_{u \leq t} \sum_s f_{s \rightarrow p} h_{su}$ (1)
 $f_{s \rightarrow p}$ — historical level of SDY flows
 h_{su} — a hukou reform at time u in province s
 Z_{pt}^{hukou} — cumulative weighted sum; weights — $f_{s \rightarrow p}$
- Key idea: greater flows of SDYs (from s to p) — hence stronger historical ties — a reform (in s) has a larger effect on the decision of households (in p) migrate to s .

► Variation from Labor Demand Shocks

- $Z_{pt}^{\text{demand}} = \sum_s f_{s \rightarrow p} d_{st}$ (2)
 $f_{s \rightarrow p}$ — the same
 d_{st} — the level of the demand shock at time t in province s
 Z_{pt}^{demand} — weighted sum; weights — $f_{s \rightarrow p}$
- Key idea: greater flows of SDYs (from s to p) — hence stronger historical ties — a demand shock (in s) has a larger effect on the decision of households (in p) migrate to s .

VARIATION FROM THE HUKOU REFORMS

TABLE A2—SDY FLOWS AND *Hukou* REFORMS AFFECTING SHANXI

Panel A. Provinces sending SDY to Shanxi and reform dates

Sending province	SDY to Shanxi	Hukou reform dates
Beijing	41,300	1998, 2002
Tianjin	7,300	None

Panel B. Measure of access to migration for Shanxi

Year	$Z_{Shanxi,t}$	Source
1995	0	—
1996	0	—
1997	0	—
1998	41,300	Beijing
1999	41,300	—
2000	41,300	—
2001	41,300	—
2002	82,600	Beijing

EMPIRICAL VALIDATION

THE IMPACT OF REFORMS AND LABOR DEMAND SHOCKS ON MIGRATION

► Estimating equation

- $\text{migrant}_{ipt} = \alpha + \beta Z_{pt}^j + \gamma_i + \delta_t + \epsilon_{ipt} \quad (3)$
 - migrant t_{ipt} —a binary variable for whether the household had a migrant in the past year
 - Z_{pt}^j — Z_{pt}^{hukou} or Z_{pt}^{demand}
 - γ_i —household fixed effects
 - δ_t —year indicators
 - ϵ_{ipt} —error term, clustered at the province level

VARIATION FROM THE HUKOU REFORMS

Both hukou reforms and labor demand shocks(in s)—significant changes in the likelihood—rural households(in p) will send members to migrate.

TABLE 2—THE IMPACT OF PULL FACTORS INTERACTED WITH SDY FLOWS ON MIGRATION

	(1)	(2)
Reform tally \times SDY flows	0.009 (0.003)	
Demand shock \times SDY flows		0.018 (0.007)
<i>p</i> -value	0.003	0.016
Observations	89,374	89,373

Notes: The dependent variable is a binary measure of whether the household has a migrant. The regressions include household fixed effects, year indicators, and a constant term. The regressors are Z^{hukou} and Z^{demand} defined in equations (1) and (2). Standard errors clustered by province are in parentheses. The *p*-value indicates the significance of the coefficient, using the $G - L$ degrees of freedom correction for number of provinces.

EXCLUDABILITY OF HUKOU REFORMS AND LABOR DEMAND SHOCKS

$$y_{s,t} = \alpha + \beta x_{p,t-1} \times SDY_{s \rightarrow p} + \delta_s + \delta_t + \epsilon_{pst}$$

$y_{s,t}$ —an indicator for a reform being implemented or the demand shock measure in the following year.

$x_{p,t-1}$ —the lag of the logarithm of GDP per capita or the growth rate of GDP per capita.

TABLE 3—DIFFERENCES IN THE LEVEL AND GROWTH RATE OF GDP PER CAPITA

	Hukou reform		Demand shocks	
	SDY (1)	Own (2)	SDY (3)	Own (4)
<i>Panel A. Level</i>				
P log GDP per capita \times SDY flows	0.0056 (0.0140)		0.0009 ^{••} (0.0005)	
S log GDP per capita		0.7765 ^{••} (0.3438)		5.2429 ^{•••} (0.6352)
Observations	75	112	140	143
<i>Panel B. Growth</i>				
P Growth rate \times SDY flows	-0.0154 (0.0357)		0.0084 ^{••} (0.0051)	
S Growth rate		-0.5568 (0.6265)		-3.8035 ^{•••} (1.1723)
Observations	75	112	140	143

EXCLUDABILITY OF HUKOU REFORMS AND LABOR DEMAND SHOCKS

$$y_{s,t} = \alpha + \beta x_{s,t-1} + \delta_s + \delta_t + \epsilon_{st}$$

$y_{s,t}$ —the same.

$x_{s,t-1}$ —the GDP measure in the province itself.

Using hukou reforms and labor demand shocks **in other provinces**, linked via past SDY flows, to identify the impact of access to migration
—Avoiding this **failure of the exclusion restriction** and are able to **recover unbiased estimates**.

TABLE 3—DIFFERENCES IN THE LEVEL AND GROWTH RATE OF GDP PER CAPITA

	<i>Hukou reform</i>		<i>Demand shocks</i>	
	SDY (1)	Own (2)	SDY (3)	Own (4)
<i>Panel A. Level</i>				
ρ log GDP per capita \times SDY flows	0.0056 (0.0140)		0.0009 [•] (0.0005)	
ρ log GDP per capita		0.7765 ^{••} (0.3438)		5.2429 ^{•••} (0.6352)
Observations	75	112	140	143
<i>Panel B. Growth</i>				
ρ Growth rate \times SDY flows	-0.0154 (0.0357)		0.0084 ^{••} (0.0051)	
ρ Growth rate		-0.5568 (0.6265)		-3.8035 ^{•••} (1.1723)
Observations	75	112	140	143

Notes: The data for log GDP per capita is from the National Bureau of Statistics. In columns 1 and 3, the dependent variable refers to the GDP measure in the SDY-linked province. In col-

ROBUSTNESS CHECKS ON SDY FLOWS

Dependent variable—the same with (3), if has a migrant.

SDY flows may be correlated with other variables that drive the results.

—distance and trade flows between provinces;

—the factor endowments of origin and destination provinces.

TABLE 4—ROBUSTNESS CHECKS: THE IMPACT OF THE PULL FACTORS INTERACTED WITH SDY FLOWS WITH CONTROLS

	(1)	(2)	(3)	(4)
<i>Panel A. Hukou reforms</i>				
Reform tally \times SDY flows	0.014 (0.002) [0.000]	0.012 (0.003) [0.001]	0.013 (0.002) [0.000]	0.012 (0.004) [0.013]
Reform tally \times <u>distance</u>		0.001 (0.001) [0.337]		
Reform tally \times <u>trade flows</u>			-0.033 (0.013) [0.031]	
Time-varying sector effects	No	No	No	<u>Yes</u>
Observations	58,807	58,807	58,807	58,807
<i>Panel B. Demand shocks</i>				
Demand shock \times SDY flows	0.027 (0.006) [0.001]	0.019 (0.008) [0.037]	0.027 (0.005) [0.000]	0.030 (0.007) [0.002]
Demand shock \times <u>distance</u>		0.000 (0.000) [0.164]		
Demand shock \times <u>trade flows</u>			-0.000 (0.000) [0.021]	
Time-varying sector effects	No	No	No	<u>Yes</u>
Observations	58,806	58,806	58,806	58,806

ROBUSTNESS CHECKS ON SDY FLOWS

Whether the results are driven by **spatial correlations** in the labor demand shocks or hukou reforms.

TABLE 5—ESTIMATES REMOVING THE EFFECTS OF THE PULL FACTORS BY DISTANCE

	No bordering (1)	≥ 1,000 km (2)	≥ 2,000 km (3)
<i>Panel A. Hukou reforms</i>			
Reform tally × flows	0.010 (0.003)	0.010 (0.002)	0.013 (0.004)
<i>p</i> -value	0.001	0.000	0.002
Observations	89,374	89,374	89,374
<i>Panel B. Demand shocks</i>			
Demand shock × flows	0.022 (0.006)	0.024 (0.006)	0.027 (0.007)
<i>p</i> -value	0.001	0.001	0.001
Observations	89,373	89,373	89,373

Notes: The dependent variable is a binary measure of whether the household has a migrant. The regressions include household fixed effects, year indicators, and a constant term. The time-varying sector effects allow for time-varying effects of initial sectoral composition by interacting indicators for activity in three sectors (agriculture, production (including manufacturing and construction), and service), in 1995 with indicators for each year. Standard errors clustered by province are in parentheses. The *p*-value indicates the significance of the coefficient, using the *G* – *L* degrees of freedom correction for number of provinces.

ALTERNATIVE SPECIFICATIONS FOR THE HUKOU REFORMS

TABLE A5—ALTERNATIVE MEASURES AND SPECIFICATIONS FOR SDY-LINKED *Hukou* REFORMS ON MIGRATION

	(1)	(2)	(3)	(4)
Post reform \times SDY flows	0.036 (0.010) [0.002]			
Reform tally \times SDY flows		0.013 (0.003) [0.000]	0.019 (0.005) [0.001]	0.018 (0.006) [0.009]
Reform tally \times SDY flows \times years since reform		0.018 (0.003) [0.000]		
Reform tally _{<i>t</i>+1} \times SDY flows			0.003 (0.004) [0.522]	0.003 (0.005) [0.559]
Reform tally _{<i>t</i>+2} \times SDY flows				0.000 (0.005) [0.941]
Observations	89,374	89,374	77,899	66,258

Notes: The dependent variable is a binary measure of whether the household has a migrant. The regressor in column 1 only looks at the first reform in each province (rather than accumulating each additional reform within a province). Column 2 adds an interaction of Z^{hukou} and years since the last reform. Columns 3 and 4 add lagged values of Z^{hukou} . The regressions include household fixed effects, year indicators, and a constant term. Standard errors clustered by province are in parentheses. The *p*-values, in square brackets, indicate the significance of the coefficient, using the *G* – *L* degrees of freedom correction for number of provinces.

MAIN RESULTS

MAIN RESULTS

$$y_{ipt} = \alpha + \beta Z_{pt}^j + \gamma_i + \delta_t + \epsilon_{ipt} \quad (6)$$

y_{ipt} —outcome of interest

γ_i —household fixed effects

δ_t —year fixed effects

j —either h ukou or demand

CONSUMPTION

TABLE 6—ESTIMATES OF MIGRATION INCENTIVES ON THE LEVEL AND CHANGE IN CONSUMPTION

	log total consumption		log food consumption		log non-staple food	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Level of consumption</i>						
Reform tally \times SDY flows	0.013 (0.009)		0.013 [•] (0.006)		0.014 (0.010)	
Demand shock \times SDY flows		0.017 (0.020)		0.013 (0.016)		0.006 (0.022)
<i>p</i> -value	0.149	0.412	0.058	0.421	0.166	0.773
Observations	87,458	87,455	87,496	87,493	87,497	87,494
<i>Panel B: Variability of consumption (absolute value first differences)</i>						
Reform tally \times SDY flows		-0.004 (0.004)	-0.010 ^{••} (0.003)		-0.016 ^{•••} (0.003)	
Demand shock \times SDY flows		-0.005 (0.012)		-0.024 ^{•••} (0.005)		-0.044 ^{•••} (0.005)
<i>p</i> -value	0.319	0.660	0.003	0.000	0.000	0.000
Observations	74,221	74,221	74,218	74,218	74,214	74,214
<i>Panel C: Variability of consumption (indicator for drops > 15%)</i>						
Reform tally \times SDY flows		-0.007 ^{••} (0.003)	-0.008 ^{••} (0.002)		-0.013 ^{•••} (0.003)	
Demand shock \times SDY flows		-0.012 (0.008)		-0.022 ^{•••} (0.003)		-0.036 ^{•••} (0.008)
<i>p</i> -value	0.013	0.165	0.000	0.000	0.001	0.000
Observations	75,910	75,909	75,910	75,909	75,910	75,909

Notes: The dependent variables are per capita measures of consumption. The regressions include household fixed effects, year indicators, and a constant term. The standard errors are clustered at the province level. The *p*-value indicates the significance of the coefficient, using the *G* – *L* degrees of freedom correction for number of provinces.

$\ln \log \text{cit} - \log \text{city}$

INCOME, LABOR AND ASSETS

► Income

The results for the level and variability of income do not follow the effects on consumption.

TABLE 7—ESTIMATES OF MIGRATION INCENTIVES ON THE LEVEL AND CHANGE IN INCOME

	Agricultural income		Nonagricultural income	
	(1)	(2)	(3)	(4)
<i>Panel A. Level of income</i>				
Reform tally \times SDY flows	0.012 (0.012)		0.012 (0.013)	
Demand shock \times SDY flows		0.050 [•] (0.027)		−0.029 (0.025)
<i>p</i> -value	0.345	0.086	0.384	0.262
Observations	72,524	72,523	72,457	72,457
<i>Panel B. Variability of income (absolute value first differences)</i>				
Reform tally \times SDY flows	0.014 [•] (0.008)		−0.015 [•] (0.008)	
Demand shock \times SDY flows		0.001 (0.015)		−0.032 ^{••} (0.018)
<i>p</i> -value	0.098	0.931	0.064	0.085
Observations	60,086	60,086	59,988	59,988
<i>Panel C. Variability of income (indicator for drops > 15%)</i>				
Reform tally \times SDY flows	−0.002 (0.004)		−0.003 (0.004)	
Demand shock \times SDY flows		−0.010 (0.009)		−0.007 (0.009)
<i>p</i> -value	0.639	0.285	0.412	0.447
Observations	75,910	75,909	75,910	75,909

Notes: The dependent variables are the log of per capita measures of income. The regressions include household fixed effects, year indicators, and a constant term. The standard errors are clustered at the province level. The *p*-value indicates the significance of the coefficient, using the *G* – *L* degrees of freedom correction for number of provinces.

INCOME, LABOR AND ASSETS

► Labor

Examine the effect of migration opportunities on the amount of labor used in household activities.

—Migrants spend only half of the year away.

TABLE 8—ESTIMATES OF MIGRATION INCENTIVES ON LABOR

	log agricultural labor inputs		Number of household laborers	
	(1)	(2)	(3)	(4)
Reform tally \times SDY flows	0.001 (0.009)		-0.003 (0.008)	
Demand shock \times SDY flows		0.019 (0.019)		-0.016 (0.025)
<i>p</i> -value	0.878	0.316	0.718	0.531
Observations	72,528	72,527	72,614	72,612

Notes: The regressions include household fixed effects, year indicators, and a constant term. The standard errors are clustered at the province level. The *p*-value indicates the significance of the coefficient, using the $G - L$ degrees of freedom correction for number of provinces.

INCOME, LABOR AND ASSETS

► Assets

Migration may be costly and financed by the liquidation of low-yielding assets.

TABLE 9—ESTIMATES OF MIGRATION INCENTIVES ON ASSETS

	Nonproductive assets		Agricultural assets		Nonagricultural assets	
	(1)	(2)	(3)	(4)	(5)	(6)
Reform tally \times SDY flows	-0.037 (0.007)		-0.040 (0.015)		-0.027 (0.009)	
Demand shock \times SDY flows		-0.058 (0.013)		-0.066 (0.035)		-0.042 (0.022)
<i>p</i> -value	0.000	0.000	0.016	0.080	0.008	0.066
Observations	72,570	72,567	72,739	72,736	34,401	34,399

Notes: The dependent variable is the log of assets. The regressions include household fixed effects, year indicators, and a constant term. The standard errors are clustered at the province level. The *p*-value indicates the significance of the coefficient, using the *G* – *L* degrees of freedom correction for number of provinces.

INVESTMENT IN RISKY ACTIVITIES

- ▶ A corollary: households receiving better access for migration—invest in assets and activities that have a higher expected return, but are riskier.
- ▶ Examine two high-risk activities:
growing fruits (orchard fruits, pods, and tea), and raising animals.

TABLE 10—COEFFICIENT OF VARIATION BY INCOME CATEGORIES

	Agricultural income (1)	Nonagricultural income (2)	Fruit income (3)	Animal income (4)
<i>Panel A. Unconditional CV</i>				
Coefficient of variation	1.335	3.415	6.189	6.723
Observations	91,193	91,193	91,193	91,193
<i>Panel B. Within household CV</i>				
Coefficient of variation	0.641	0.758	1.855	1.213
Observations	12,163	12,207	5,341	11,144

Notes: The coefficient of variation is the standard deviation divided by the mean. In panel A, it is calculated using the unconditional mean and standard deviation across all observations in the data. In panel B, it is calculated using the mean and standard deviation within households for households that have at least two years of positive income in the category.

INVESTMENT IN RISKY ACTIVITIES

- Households reallocating their portfolios toward higher-risk, higher-return activities in response to the insurance provided by the option of sending migrants.

TABLE 11—ESTIMATES OF MIGRATION INCENTIVES ON LABOR AND INCOME IN HIGH-RISK ACTIVITIES

	Animal husbandry		Fruit		Low-risk agriculture	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A. Labor days</i>						
Reform tally \times SDY flows	0.080 (0.015)		0.038 (0.013)		-0.009 (0.015)	
Demand shock \times SDY flows		0.161 (0.036)		0.060 (0.039)		0.001 (0.034)
<i>p</i> -value	0.000	0.000	0.008	0.139	0.575	0.986
Observations	72,395	72,393	71,961	71,959	72,490	72,489
<i>Panel B. Income</i>						
Reform tally \times SDY flows	0.117 (0.027)		0.049 (0.019)		-0.022 (0.024)	
Demand shock \times SDY flows		0.219 (0.057)		0.068 (0.053)		0.034 (0.053)
<i>p</i> -value	0.000	0.001	0.020	0.217	0.377	0.523
Observations	72,309	72,307	71,914	71,912	72,758	72,757

Notes: In panel A, the dependent variable is the logarithm of the number of days in that activity plus one. In panel B, the dependent variable is the logarithm of income plus one. The regressions include household fixed effects, year indicators, and a constant term. The standard errors are clustered at the province level. The *p*-value indicates the significance of the coefficient, using the *G* – *L* degrees of freedom correction for number of provinces.

QUANTITATIVE ASSESSMENT OF PRECAUTIONARY CHANNEL

As in **Dynan (1993)**, estimate of a small precautionary motive.

Model

Consumer i 's problem at time t :

$$\max_{C_{i,t+j}} E_t \left[\sum_{j=0}^{T-t} (1 + \delta)^{-j} U(C_{i,t+j}) \right]$$

Subject to:

$$A_{i,t+j+1} = (1 + r_i) A_{i,t+j} + Y_{i,t+j} - C_{i,t+j}, \quad A_{it} \text{ given}, A_{i,T+1} = 0$$

Following first-order condition for $j = 1$:

$$\left(\frac{1+r_i}{1+\delta} \right) E_t [U'(C_{i,t+1})] = U'(C_{it})$$

Second-order Taylor expansion of $U'(C_{i,t+1})$ around $U'(C_{it})$:

$$E_t \left[\frac{C_{i,t+1} - C_{it}}{C_{it}} \right] = \frac{1}{\xi} \left(\frac{r_i - \delta}{1 + r_i} \right) + \frac{\rho}{2} E_t \left[\left(\frac{C_{i,t+1} - C_{it}}{C_{it}} \right)^2 \right]$$

$\xi = -C_{it} (U''/U')$ —coefficient of relative risk aversion

$\rho = -C_{it} (U'''/U'')$ —the coefficient of relative prudence

QUANTITATIVE ASSESSMENT OF PRECAUTIONARY CHANNEL

Consistent with reasonable parameters for the utility function.

Migration affording increased options for self-insurance and thus reducing the need for precautionary savings.

Table A7: The Impact of Pull Factors Interacted with SDY Flows on Food Consumption Growth

	(1)	(2)
Panel A: Log-consumption Growth		
Reform Tally \times Flows	-0.018 (0.002)	
Demand Shock \times Flows		-0.044 (0.013)
p-value	0.000	0.002
N	74232	74229
Panel B: Squared Log-consumption Growth		
Reform Tally \times Flows	-0.024 (0.008)	
Demand Shock \times Flows		-0.042 (0.008)
p-value	0.009	0.000
N	74223	74220
P-1		
Implied Relative Risk Aversion	0.54	1.12
P		
Implied Relative Prudence	1.54	2.12

Notes: The dependent variable in Panel A is the log-consumption growth, while in Panel B the dependent variable is its square. The regressions include household fixed effects, year indicators and a constant term. The variable *ReformTally*

ALTERNATIVE EXPLANATIONS

- ▶ Labor Market Frictions.
The loss of a laborer.—affects the production decision of households.
- ▶ Decline in Aggregate Volatility.

TABLE A6—ESTIMATES OF MIGRATION INCENTIVES AND AGGREGATE WAGE VOLATILITY

	Coefficient variation		Absolute first difference		Drop over 15%	
	(1)	(2)	(3)	(4)	(5)	(6)
Reform tally \times SDY flows	−0.019 (0.023)		−0.009 (0.016)		−0.007 (0.011)	
Demand shock \times SDY flows		−0.066 (0.058)		−0.041 (0.037)		−0.005 (0.022)
<i>p</i> -value	0.423	0.271	0.574	0.283	0.515	0.832
Observations	609	609	575	575	575	575

Notes: Each observation is a village-year. The coefficient of variation is across households in the village. The regressions include village fixed effects, year indicators, and a constant term. The standard errors are clustered at the province level. The *p*-value indicates the significance of the coefficient, using the *G* – *L* degrees of freedom correction for number of provinces.

INSTRUMENTAL VARIABLES ESTIMATES

$$y_{ipt} = \alpha + \beta migrant_{ipt} + \gamma_i + \delta_t + \epsilon_{ipt}$$

- ▶ Reduced-form estimates—anticipating effects, spillover effects
IV estimates are likely to be upward-biased.

INSTRUMENTAL VARIABLES ESTIMATES

Table A8: IV Estimates of Migration on the Level and Change in Consumption

	Log Total Consumption		Log Food Consumption		Log Non-Staple Food	
	<i>IV: Hukou</i>	<i>Demand</i>	<i>Hukou</i>	<i>Demand</i>	<i>Hukou</i>	<i>Demand</i>
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Level of Consumption						
Migrant	1.362	0.919	1.355	0.749	1.440	0.354
	(0.841)	(0.962)	(0.601)	(0.785)	(0.981)	(1.156)
p-value	0.123	0.352	0.037	0.353	0.159	0.763
N	87453	87453	87491	87491	87492	87492
Panel B: Variability of Consumption (First Differences)						
Migrant	-0.691	-0.380	-1.458	-1.741	-2.242	-2.986
	(0.568)	(0.781)	(0.736)	(0.973)	(1.031)	(1.563)
p-value	0.240	0.632	0.063	0.090	0.043	0.072
N	74221	74221	74218	74218	74214	74214
Panel C: Variability of Consumption (Indicator for Drops > 15 percent)						
Migrant	-1.149	-0.865	-1.366	-1.556	-2.031	-2.596
	(0.416)	(0.529)	(0.648)	(0.816)	(1.042)	(1.438)
p-value	0.013	0.119	0.049	0.073	0.067	0.088
N	75909	75909	75909	75909	75909	75909

Notes: The dependent variables are per capita measures of consumption. The regressions include household fixed effects, year indicators and a constant term. The standard errors are clustered at the province level. The p-value indicates the significance of the coefficient, using the $G - L$ degrees of freedom correction for number of provinces.

INSTRUMENTAL VARIABLES ESTIMATES

Table A9: IV Estimates of Migration on Labor

	Log Agricultural Labor Inputs		Number of Household Laborers	
	<i>IV: Hukou</i>	<i>Demand</i>	<i>Hukou</i>	<i>Demand</i>
	(1)	(2)	(3)	(4)
Migrant	0.127 (0.800)	1.019 (1.006)	-0.298 (0.853)	-0.854 (1.518)
p-value	0.875	0.324	0.731	0.581
N	72527	72526	72612	72611

Notes: The regressions include household fixed effects, year indicators and a constant term. The standard errors are clustered at the province level. The p-value indicates the significance of the coefficient, using the $G-L$ degrees of freedom correction for number of provinces.

INSTRUMENTAL VARIABLES ESTIMATES

Table A10: IV Estimates of Migration on the Level and Change in Income

	Agricultural Income		Non-Agricultural Income	
	<i>IV: Hukou</i>	<i>Demand</i>	<i>Hukou</i>	<i>Demand</i>
	(1)	(2)	(3)	(4)
Panel A: Level of Income				
Migrant	1.128 (1.117)	2.621 (1.476)	1.124 (1.399)	-1.517 (1.435)
p-value	0.326	0.093	0.432	0.305
N	72523	72522	72456	72456
Panel B: Variability of Income (First Differences)				
Migrant	2.000 (1.939)	0.104 (1.192)	-2.063 (1.122)	-2.227 (1.578)
p-value	0.316	0.931	0.083	0.175
N	60086	60086	59988	59988
Panel C: Variability of Income (Indicator for Drops > 15 percent)				
Migrant	-0.309 (0.652)	-0.738 (0.770)	-0.515 (0.662)	-0.487 (0.700)
p-value	0.641	0.350	0.447	0.496
N	75909	75909	75909	75909

Notes: The regressions include household fixed effects, year indicators and a constant term. The standard errors are clustered at the province level. The p-value indicates the significance of the coefficient, using the $G-L$ degrees of freedom correction for number of provinces.

INSTRUMENTAL VARIABLES ESTIMATES

Table A11: IV Estimates of Migration on Assets

	Non-Productive Assets		Agricultural Assets		Non-Agricultural Assets	
	<i>IV: Hukou</i>	<i>Demand</i>	<i>Hukou</i>	<i>Demand</i>	<i>Hukou</i>	<i>Demand</i>
	(1)	(2)	(3)	(4)	(5)	(6)
Migrant	-3.773 (1.414)	-3.284 (1.429)	-3.772 (1.875)	-3.466 (2.359)	-2.544 (0.937)	-1.788 (0.836)
p-value	0.016	0.034	0.059	0.159	0.014	0.046
N	72567	72566	72736	72735	34400	34399

Notes: The regressions include household fixed effects, year indicators and a constant term. The standard errors are clustered at the province level. The p-value indicates the significance of the coefficient, using the $G-L$ degrees of freedom correction for number of provinces.

INSTRUMENTAL VARIABLES ESTIMATES

Table A12: IV Estimates of Migration on Labor and Income in High-Risk Activities

	Animal Husbandry		Fruit	
	(1)	(2)	(3)	(4)
Panel A: Labor Days				
Migrant	7.610	8.322	3.800	3.286
	(2.013)	(3.170)	(2.216)	(3.252)
p-value	0.001	0.017	0.104	0.326
N	72393	72392	71959	71958
Panel B: Income				
Migrant	11.139	11.355	4.951	3.705
	(3.944)	(4.904)	(2.991)	(3.999)
p-value	0.011	0.033	0.115	0.366
N	72307	72306	71912	71911

Notes: The regressions include household fixed effects, year indicators and a constant term. The standard errors are clustered at the province level. The p-value indicates the significance of the coefficient, using the $G-L$ degrees of freedom correction for number of provinces.

DISCUSSION

DISCUSSION

- ▶ Compare the long-run changes in barriers to migration associated with hukou reforms to short-run labor demand shocks that alter the returns to migration—very similar.
 - ▶ The type of migration is still largely temporary or seasonal;
 - ▶ Migrants in China frequently return home.
- ▶ Increased access and returns to internal migration are beneficial for rural households.
 - ▶ Food consumption becomes less variable;
 - ▶ low-yielding assets are liquidated.
 - increase households' cash on hand; finance the costly migration of a household member.
- ▶ Our results suggest that efforts to promote internal migration are likely to benefit agricultural households.