Online Appendix:

Access to Migration for Rural Households

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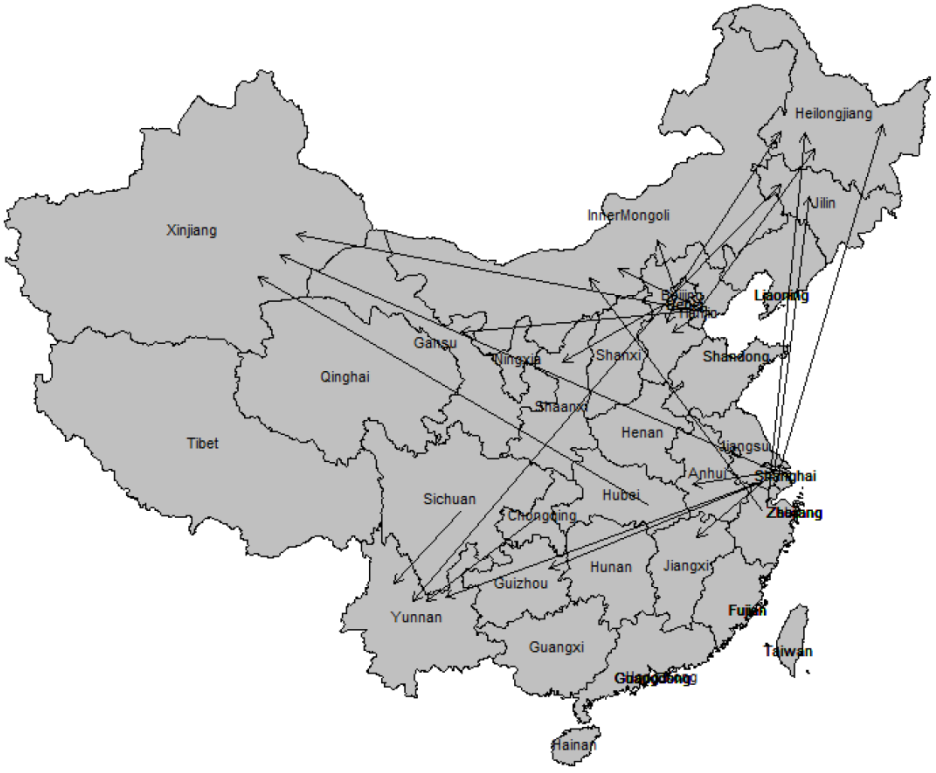
Figure A1: Direction of Sent-Down Youth Flows



Source of Map: Bonnin 2013

Table A1: Summary Statistics by Migration Status

	Ever Migrate Household			Never Migrate Household			
	Mean	Std Dev	N	Mean	Std Dev	N	p-values
Year	1,995.384	1.188	7,304	1,995.916	2.070	6,712	0.000
Total Consumption (per person)	497.208	415.889	7,213	520.761	441.033	6,580	0.001
Food Consumption (per person)	261.401	148.816	7,182	263.574	153.201	6,504	0.400
Non-Staple Food Consumption (per person)	142.723	129.924	7,186	149.255	132.876	6,517	0.004
Agricultural Income (per worker)	2,778.807	2,259.484	6,253	2,928.420	2,407.705	5,203	0.001
Non-Agricultural Income (per worker)	3,095.183	4,655.876	6,254	3,641.645	5,686.787	5,203	0.000
Agricultural Labor Inputs (per worker)	170.582	94.939	6,235	162.567	101.187	5,203	0.000
Household Laborers	2.485	1.004	6,175	2.344	0.941	5,144	0.000
Non-Productive Assets (per worker)	944.118	1,401.237	6,278	1,242.711	1,663.133	5,217	0.000
Agricultural Assets (per worker)	429.959	634.351	6,241	519.538	747.202	5,185	0.000
Non-Agricultural Assets (per worker)	49.583	921.917	6,205	157.609	1,202.724	5,117	0.000
Positive Days on Fruits (0/1)	0.240	0.427	7,302	0.198	0.398	6,711	0.000
Days on Fruits (per worker, not including zeros)	24.628	36.154	1,603	34.993	53.292	1,217	0.000
Days on Fruits (per worker)	5.449	16.926	6,268	5.748	18.239	5,192	0.363
Income from Fruits (per worker)	111.260	458.213	6,255	131.245	534.908	5,177	0.031
Positive Days on Animal Husbandry (0/1)	0.772	0.420	7,303	0.643	0.479	6,711	0.000
Days on Animal Husbandry (per worker, not including zeros)	55.586	44.222	5,235	56.343	46.230	3,814	0.430
Days on Animal Husbandry (per worker)	44.570	40.003	6,253	39.117	41.132	5,215	0.000
Income from Animal Husbandry (per worker)	741.102	982.232	6,245	649.056	953.328	5,188	0.000
High Education (middle school degree or higher)	0.467	0.499	7,301	0.484	0.500	6,711	0.041

Notes: 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 p-values in the final column indicate whether the mean values are statistically different from each other.

1 Origin-Destination Flows

1.1 Origin-Destination SDY Links and Migration

We analyze whether SDY linkages between provinces from s to p predict subsequent migration from p to s using two separate data sets that have information about the origin and destination provinces of migrants. One is the 2002 China Household Income Project (CHIP). The advantage of this wave of the CHIP data is that it deliberately targets rural-to-urban migrants. Of the 5327 households surveyed, 1674 have individuals who have moved across provinces. The survey was conducted in 12 provinces, and interprovincial migrants are from 29 different origin provinces. The second data set we use is the NFP over the waves 2010 to 2012.[1] Unlike the main NFP data set used in this analysis that spans 1995 to 2002, the three years from 2010 to 2012 include information on the destination province of the migrant.[2]

We estimate the following equation:

$$Y_{p\to s} = \beta_0 + \beta_1 X_{s\to p} + \delta_s + \gamma_p + \epsilon_{sp} \tag{1}$$

where each observation is a province s-province p pair such that $s \neq p$.[3] The dependent variable, $Y_{p\to s}$, is a measure of the migration flows from province p to province s; this is aggregated to the province-pair level from the household data sets as the logarithm of one plus the total number of migrants from p to s. The key regressor is $X_{s\to p}$, a measure of the historical aggregate flows of sent-down youth from province s to province p based on data published by the Sent-down Youth Office of the State Council of China (1983). $X_{s\to p}$ is the logarithm of the total number of youths sent from s to p (plus one). The regressions also include fixed effects for origin and destination provinces, which control for the general attractiveness of a destination or the general migration propensity of individuals from an origin. The standard errors are clustered two-ways at both the origin province and at the destination province to allow for arbitrary correlations of the error term within both origin and destination provinces.

[1] We were able to use a representative sub-sample of 45,960 person-year observations to calculate aggregate migration flows. We see 4192 cross-province migrants (and their corresponding origins and destinations) and 4993 intra-province migrants.

[2] The NFP survey is quite different in the 2010-2012 waves as compared to 1995-2002. The later waves do not include all of the variables used in the main analysis and for topics that do overlap, the phrasing of the question can be quite different. Moreover, the full microdata are not readily available to outside researchers at this time. For these reasons, we do not use these waves in our main analysis.

[3] We focus on *inter-provincial* SDY flows for two reasons. One is data: to our knowledge, systematic records of intra-provincial SDY flows were not centrally maintained. The second is that, in order to interact intra-provincial SDY flows with time-varying shocks, we would have to maintain the assumption of exogeneity of the timing of own-province *hukou* reforms and labor demand shocks. As shown in Table 3 and discussed below, the exclusion restriction holds for reforms and shocks in provinces linked by inter-provincial SDY flows but not for own-province reforms and shocks.

The results are displayed in Online Appendix Table A4. Column 1 suggests that each additional 10,000 people that the government sent down from s to p in the 1960s and 1970s increases migration flows in the reverse direction by 11 percent in 2002 as measured in the CHIP data.[4] The corresponding estimate in the NFP 2010-2012 data shown in column 2 is a 5.7 percent increase. Both estimates are significant at the 5 percent level or higher. These results are supportive of the idea that the program of sent-down youth created lasting inter-province linkages.

1.2 Origin-Destination Variation and Pull Factors

In addition to testing whether SDY flows from s to p predict subsequent migration from p to s in the previous section, we can use the 2010-2012 NFP data, which contains information on migrants' origin and destination, to test whether the interaction of SDY with the two pull factors in province s led to more migration from p to s.

Over a sample where each observation is a origin-destination-year, we estimate:

$$flows_{p \to s,t} = \beta_0 + \beta_1 M^j_{st} + \beta_2 M^j_{st} \times SDY_{s \to p} + \delta_{sp} + \delta_t + \epsilon_{spt} \tag{2}$$

where $j = \{reform, demand\}$, $flows_{p \to s,t}$ is the logarithm of the total number of migrants arriving in province s from p in year t. M^{reform}_{st} equals $\sum_{u \leq t} d_{su}$ and is the accumulated number of reforms that occurred between the years 2010 to 2012 in province s by year t. M^{demand}_{st} is the level of output in manufacturing and construction in province s in year t.[5] We also include an interaction between M^j_{st} and $SDY_{s \to p}$, the historical SDY flows from s to p. The regression also includes origin-destination fixed effects and year fixed effects. We cluster the standard errors at the origin-destination province pair level.

The results are presented in Online Appendix Table A6 where the dependent variable is the logarithm of the number of migrants arriving from province p to province s in year t. Columns 1 and 2 show that, while *hukou* reforms increase in-migration from provinces without historical SDY ties, each additional 10,000 SDY who were sent from s to p increase the response by a further extent, statistically significant at the 1 percent level. That is, the response to *hukou* reforms is significantly greater for migrants coming from provinces with historical ties to the reforming province. Columns 3 and 4 replicate this analysis for the labor demand shocks, however the effects are not precisely estimated, perhaps reflecting the financial crisis of 2008, which increased local unemployment and hence dampened

[4] The SDY flows are re-scaled by their conditional-on-positive mean where the mean is roughly 10,000 people.

[5] We summarize the reforms occurring between 2010 and 2012 in Online Appendix Table A5.

the extent to which demand in manufacturing and construction translated into demand for migrant workers.

Table A2: Effect of Hukou Reforms and Labor Demand Shocks on Procurement/Market Prices

	(1)	(2)
Reform Tally × SDY Flows	-0.002	
	(0.003)	
Demand Shock × SDY Flows		-0.003
		(0.002)
p-value	0.471	0.207
Observations	787	787

Notes: Each observation is a province-crop-year. The crops are: grain, oil seed, cotton, sugar, meat, silk, fruit, dry fruit, dry vegetables and condiments. The dependent variable is the ratio of procurement price to market price. The data cover the years 1995 to 2000. The regressions include year indicators, crop 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.

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.

Table A4: Historical Sent-Down Flows and Subsequent Inter-Province Migration

	CHIP	NFP
	2002	2010-12
	(1)	(2)
Sent Down Flows	0.795	0.422
	(0.336)	(0.122)
N	233	300
LHS Variable Mean	22.179	18.084

Notes: The dependent variable is inter-province migration flows. Regressions also include destination province fixed effects and origin province fixed effects. The dependent variable is inter-province migration flows. Robust standard errors clustered two ways by origin province and by destination province in parentheses.

Table A5: *Hukou* Reform in China: 2010-2012

Province	Reform Year	Description of Hukou Reform	Document Name	Issue Date
Hebei	2010	If a migrant has a hukou in Hebei Province, she can get a urban hukou if she lives in that city for more than 6 months.	JiZheng (2010) No.124	December 1, 2010
Shanghai	2010	A migrant can get a Shanghai hukou if she has a special talent, including a PhD degree or expertise in some fields.	HuFuFa (2010) No.28	August 6, 2010
	2011	Relaxation of some restrictions on the hukou of the spouses of migrants and clarifying that the talent requirement includes the special skills and agricultural experts.	Hu RenSheLiFa (2011) No. 2	September 8, 2011
Jiangsu	2010	There were a series of hukou reforms in different cities in Jiangsu Province, including Suzhou City, Taizhou City, and Changzhou City. A migrant can get the city hukou if she buys (in Suzhou and Changzhou) or rents an apartment (in Taizhou).	SuFa (2010) No. 301	November 13, 2010
Shandong	2011	A migrant can get a city hukou in Dezhou if she rents an apartment and has a job.	LuZhengBanfa (2011) No. 40	August 23, 2011
	2012	A migrant can get a city hukou in several cities (Rizhao, Zibo, Liaocheng, Bingzhou) in Shangdong Province if she rents an apartment and has a job.	RiGongTongZi (2012) No. 194	November 20, 2012

Table A6: Migration Pull Factors and Inter-Province Migration Flows

	(1)	(2)	(3)	(4)
Reform Tally	1.983	1.781		
	(0.979)	(0.948)		
Reform Tally × SDY Flows		3.789		
		(0.709)		
Demand Shock			-0.012	0.001
			(0.105)	(0.107)
Demand Shock × SDY Flows				0.623
				(0.732)
N	144	144	291	291

Notes: The dependent variable is inter-province migration flows. Each observation is an origin-destination-year. The data set used is the NFP 2010-2012. Reform Tally is defined using reforms from 2010 to 2012, and the demand shocks refer to shocks from 2010 to 2012. The regressions include year indicators and a constant term. The standard errors are clustered at the origin-destination province pair level.

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

	(1)	(2)
Panel A: Log-consumption Growth		
Reform Tally × Flows	-0.018	
	(0.002)	
Demand Shock × Flows		-0.044
		(0.013)
p-value	0.000	0.002
N	74232	74229
Panel B: Squared Log-consumption Growth		
Reform Tally × Flows	-0.024	
	(0.008)	
Demand Shock × Flows		-0.042
		(0.008)
p-value	0.009	0.000
N	74223	74220
Implied Relative Risk Aversion	0.54	1.12
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 $ReformTally$ for s in t is the accumulated number of reforms in provinces that sent SDY to s by year t; see Section 5 for details. 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.

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

	Log Total Consumption		Log Food Consumption		Log Non-Staple Food	
	IV: Hukou	*Demand*	*Hukou*	*Demand*	*Hukou*	*Demand*
	(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.

Table A9: IV Estimates of Migration on Labor

	Log Agricultural Labor Inputs		Number of Household Laborers	
	IV: Hukou	*Demand*	*Hukou*	*Demand*
	(1)	(2)	(3)	(4)
Migrant	0.127	1.019	-0.298	-0.854
	(0.800)	(1.006)	(0.853)	(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.

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

	Agricultural Income		Non-Agricultural Income	
	IV: Hukou	*Demand*	*Hukou*	*Demand*
	(1)	(2)	(3)	(4)
Panel A: Level of Income				
Migrant	1.128	2.621	1.124	-1.517
	(1.117)	(1.476)	(1.399)	(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	0.104	-2.063	-2.227
	(1.939)	(1.192)	(1.122)	(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	-0.738	-0.515	-0.487
	(0.652)	(0.770)	(0.662)	(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.

Table A11: IV Estimates of Migration on Assets

	Non-Productive Assets		Agricultural Assets		Non-Agricultural Assets	
	IV: Hukou	*Demand*	*Hukou*	*Demand*	*Hukou*	*Demand*
	(1)	(2)	(3)	(4)	(5)	(6)
Migrant	-3.773	-3.284	-3.772	-3.466	-2.544	-1.788
	(1.414)	(1.429)	(1.875)	(2.359)	(0.937)	(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.

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.

References

Bonnin, Michel. 2013. *The lost generation: The rustication of Chinese youth (1968-1980).* Chinese University of Hong Kong.