Linking Proximity to Secondary Cities vs Mega Cities, Agricultural Performance, & Nonfarm Employment of Rural Households in China

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1. Introduction

a) Definition and Importance of Nonfarm income of rural households

a.1) Nonfarm income

= local nonfarm income + migration income

a.2) Importance of nonfarm income for China rural households:

- 34% (2000) to 52% (2010)

Income shares in <u>our sample</u> for 2005 & 2006

	2005	2006
Agricultural Income	50	45
Local nonfarm income	**21**	**22**
Migration income	**18**	**20**
Other income	11	13
Total	100	100

b) Literature gaps

Gap 1): did not differ distance to urban center/cities of different sizes, which may affect rural household employment choices differently:

1) Different attractions for migrants (amenities, wages, living costs)

1) Different product market interactions with rural areas (agroindustry)

1) Different consumption demand of city on rural areas (income, diet diversity)

Gap 2): distance to nearest city only may ignore the impacts from <u>other potential cities</u>

- International evidence:

  Fafchamps et al. (2006): school participation in Nepal

  de Janvry and Sadoulet (2001): off-farm participation in Mexico

- Chinese case, in particular:

  E.g. Rural-urban migrants are attached by several cities in Guangdong province

c) Research question:

How does distance to cities by different sizes impact rural household nonfarm income (values and shares)?

… conditioned by agricultural performance of zone

… conditioned by different categories of distance measures

2. Sample of households & cities

2.1. Household sample

a) China's Research Center for the Rural Economy (RCRE)

b) Two-year panel datasets (**2005 & 2006**);

c) Sample size:

3,050 households; 55 villages;

5 heterogeneous provinces

2.2. City sample

a) China's city classification

a.1) Prefectural level city

- China divided into 344 "prefectural cities"
- each has urban center (can be mega, large, or small), plus surrounding area divided into several counties.

a.2) County level city (below prefecture), 1300

- Each county includes a county center and the surrounding rural areas

b) What we use and not use

b.1) Using: Prefectural level cities (aggregate urban areas in Prefecture)

- To include impacts from all urban areas (**urban agglomeration**)
- rural respondents tend to answer by "mega city" or "prefecture"

b.2) Not using: County-level cities

- Difficult to get data
- Au & Henderson/2006: county-city effects on labor productivity not distinguishable from rural areas' effects.

Prefecture-cities distribution

City Type	Population (million)	City		Share in urban pop.
		Number	Share	
Small	0-1	152	**44**	**15**
Large	1-5	183	53	68
Mega	>5	9	3	16
Total		344	100	100

2.3. Definitions of Urban Proximity

Five sets of distance variables we compare

Nearest

a) Unweighted distance to nearest city of any size

b) Unweighted distance to nearest city in each of three size categories (small, large, mega)

All cities

c) Weighted distance by city population/total urban population in city category

d) Weighted by manufacturing GDP

e) Weighted by services GDP

3. Model and estimation

a) Estimation Equation (linear)

$$Y_{ijt} = \alpha + \beta_1 \text{Small}_j + \beta_2 \text{Large}_j + \beta_3 \text{Mega}_j + \beta_4 \text{AP}_{jt} + \delta Z_{ijt} + \gamma_{year} + \varphi_{province} + v_j + c_{ij} + \varepsilon_{ijt}$$

- Y are incomes (local nonfarm, agriculture, and migration) of household, village, year;
- Small_j, Large_j, and Mega_j are three distances
- AP is agricultural performance of village
- Z: individual and household level controls
- γ_{year} and $\varphi_{province}$ time and province fixed effects
- v_j and c_{ij} village- and household-specific unobserved characteristics;
- ε_{ijt} is random error, clustered by village.

b) Estimation methods

b.1) address unobserved household and village effects with **Correlated random effect** (CRE) estimation

b.2) **address potential endogeneity of AP use IV method** (temperature, humidity, rain, organic carbon, and pH) (similar to Deichmann, Shilpi, Vilkis 2009)

4. Key findings and conclusions

4.1 Findings by distance measure

(just controlling for agricultural performance, not interacting with distances)

4.2 Findings w/ interaction agricultural performance & distances

4.1 Findings by distance measure (just controlling for ag perf. not interacting with distance)

Distance (ln) HH #=3,050	Nearest city	Nearest city by size	Popul. Wgt.	GDP weighted	
				From Manuf.	From Service
Local nonfarm income					
Dis_nearest	**-1.374**	/	/	/	/
Dis_smaller	/	**0.114**	**-72.314*** **	**-112.274*** **	**-23.776**
Dis_large	/	**-0.215**	**-96.580***	**-62.054***	**9.427**
Dis_mega	/	**-0.766**	**142.234*** **	**146.400** **	**6.601**

1.Nearest "any city" & "city size" unweighted measure: no significances.

2. Popul. and Manuf.-GDP Weighted distances:
close to **secondary** cities --> higher local nonfarm income.

4.1 Findings by distance measure (just controlling for ag perf. not interacting with distance) (count.)

Distance (ln) HH #=3,050	Nearest city	Nearest city by size	Popul. Wgt.	GDP weighted	
				From Manuf.	From Service
Migration income					
Dis_nearest	**-0.343**	/	/	/	/
Dis_smaller	/	**-0.88**	**20.62**	**42.507**	**-16.418**
Dis_large	/	**-0.479**	**97.713***	**55.353***	**-6.709**
Dis_mega	/	**0.686**	**-121.592****	**-101.543****	**4.086**

1.Nearest "any city" & "city size" unweighted measure: no significances.

2. Popul. and Manuf.-GDP Weighted distances:
close to **mega** cities --> higher migration nonfarm income**.**

Conclusions from 4.1. (just controlling for ag performance)

1. Stronger linkage between secondary cities and employment generation in rural areas

2. Stronger pull effects from mega city on migration

3. Above effects may through the effects of aggregation (population) and manufacturing center in the prefecture cities.

4.2 Findings w/ interaction distance & ag perf.

	Local nonfarm income		Migration nonfarm income	
Weights	Popul.	GDP_Manuf.	Popul.	GDP_Manuf.
Dis_small	**-107.023*** **	**-131.300*** **	**49.839** **	**84.555* **
Dis_large	**-105.527**	**-60.573**	**130.872** **	**87.133** **
Dis_mega	**171.615** **	**159.583* **	**-172.686*** **	**-167.442** **
AP*D_s	**2.553**	**2.895**	**-2.083** **	**-5.148**
AP*D_l	**4.269**	**1.659**	**-4.663** **	**-4.215**
AP*D_m	**-5.256**	**-3.617**	**5.564** **	**7.796**
AP	**-12.039**	**-7.284**	**9.186** **	**12.215**

AP has a positive effect on migration income;
and the effects are multiplied by being away from mega cities.

Implications from 4.2 (with Ag performance interaction with distances)

1. Importance of urban proximity on nonfarm income, in particularly in rural areas with poorer agriculture performances.

2. Importance of local agriculture on migration income, in particularly if rural households are far from mega cities.