

# Where Did All the Remittances Go? Understanding the Impact of Remittances on Consumption Patterns in Rural China

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ESRC China Workshop, St Andrews, June 2010

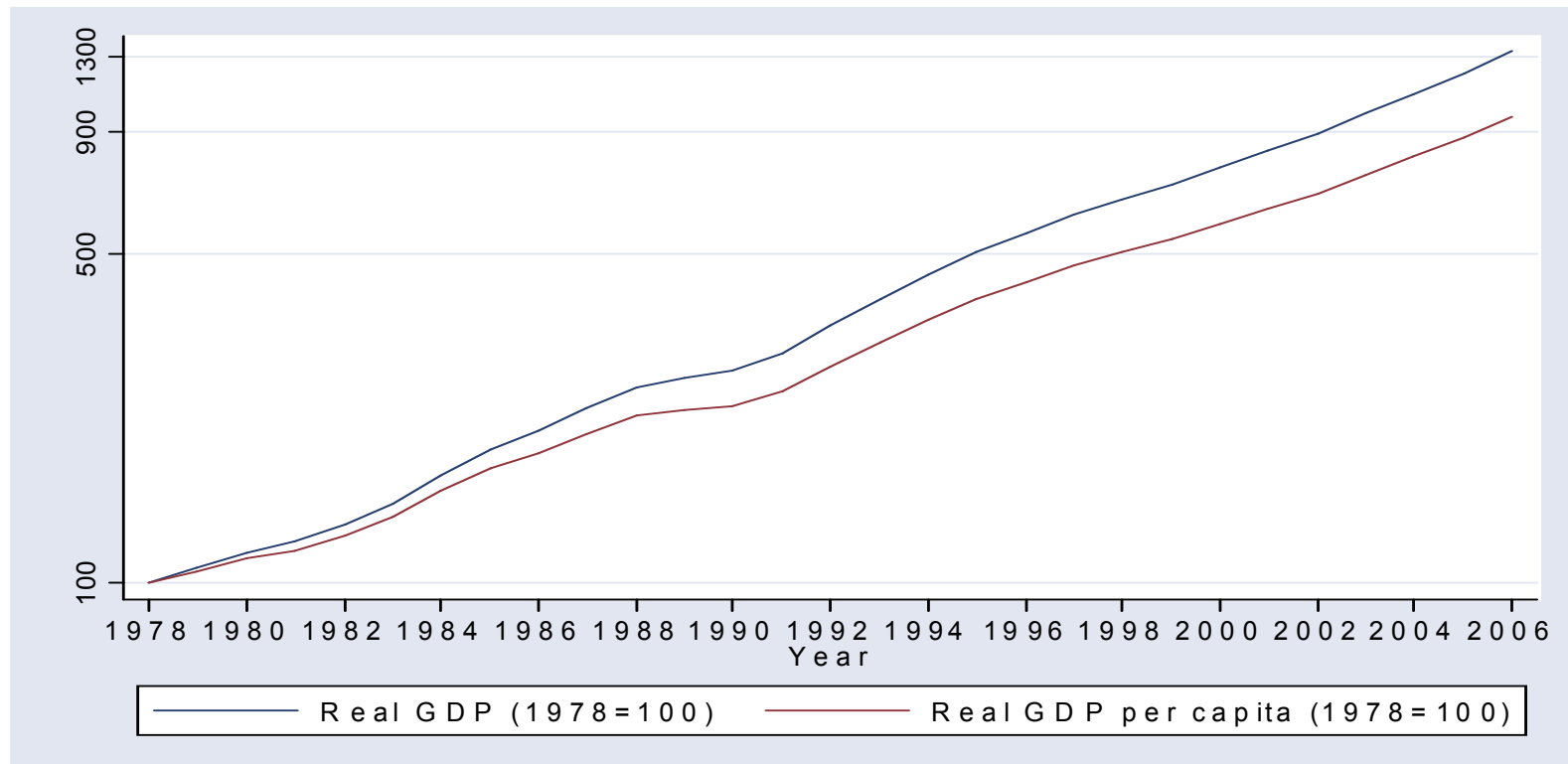
**Acknowledgement:** We are grateful to the British Academy for funding this research. The data was made available through a research collaboration project between Kent and the National Bureau of Statistics of China.

# Outline

- Introduction
- Stylized facts on rural-urban migration
- Literature Review
- Empirical Model and key economic/  
econometric issues
- Data
- Empirical Results
- Conclusions

# 1) Introduction

- China has had 30 years of “reform and opening-up”
- Unprecedented economic growth: real GDP increases by 9.7% per annum (per capita GDP by 8.5% p.a) during 1978-2006 (Source: China Statistical Yearbook 2007)



## 2) Stylized Facts on Rural-urban Migration

Year	Urban Engel coeff	Rural Engel coeff	Urban-rural income ratio
1978	57.5	67.7	2.57
1980	56.9	61.8	2.34
1985	53.3	57.8	1.86
1990	54.2	58.8	2.20
1995	50.1	58.6	2.71
2000	39.4	49.1	2.79
2005	36.7	45.5	3.23

- Ever growing income gap between the urban and the rural areas since the 1980s
- Causing serious concerns
- Some sign of a policy shift by the new leadership (“Harmonious Socialist Society” by 2020)
- Source: SYC 2006

# History's Largest Labor Flow

- Rural-urban migration non-existent before 1978, despite low urbanization (17.4%)
  - The *Hukou* (Household Registration) system
  - The collective land tenure system
  - A “cradle to grave” welfare system for urbanites
  - Farmers left on their own
- Massive rural-urban migration since early 1980s
  - A net flow of 9.84 million p.a. during 2000-2004
  - Current stock measure: ca. 150 million (200 million cross-border migrants worldwide)
  - Plays a vital role in urbanization and industrialization
    - Urbanization rate increased to 41.8% in 2005
    - Share of primary sector of industry reduced from 27.9% in 1978 to 12.6% in 2005

# 3) Literature

- Relatively few studies on rural-urban migration in China in main-stream economics literature
  - Difficulties in measuring stocks and flows
  - Lack of access to Chinese household data
- Neo-classical economics of migration (NCEM)
  - assumes migrant maximizes his/her earnings (and seeks permanent settlement) as an individual
  - emphasize the “push and pull” factors
  - general consensus that migration is driven by:
    - increased demand in urban (mainly coastal) areas and widening income differentials across regions and between rural and urban areas (Zhang & Song 2003, Wu & Zhu 2004, Knight & Song 2005)
    - Rising rural labor surplus (Zhao 1999)

## New Economics of Labor Migration (NELM)

- New Economics of Labor Migration (NELM) takes the **household** perspective and emphasizes the role of **social networks**
  - Taylor et al. (2003) models migration as a household decision
  - Fan (2008) highlights the importance of social networks in both migration and job search
- Impact of migration and remittances even less understood
  - Positive effect on poverty reduction, although the poorest benefit less (Ravallion and Chen 2004, Du et al. 2005, Zhu & Luo 2008)
  - Only a small negative effect on agricultural production (offsetting effect of remittances through loosening credit constraints), Rozelle et al. 1999

# This Paper

- Focus on the impact of remittances on consumption patterns in rural China
- Model the whole HH living expenses (8 categories including housing)
- Motivated by NELM and empirical literature on intra-household allocation
  - Standard theory suggest that source of income does not matter
  - However, overwhelming rejection of the **unitary model** of household behavior (Lundberg et al. 1997, Kooreman 2000, Edmonds 2002, Duflo 2000, Knox 1996, Argys et al. 1998)
  - Findings have important policy implications (e.g. possibility of return migrants starting up new business with newly acquired financial and human capital)

# Labor Market Options in Rural China

A rural household in China today faces three options in the labor market (Knight and Song 2005) :

- Migration for work away from home (mostly inter-county)
- Local non-farm employment (TVEs and local gov./non-gov. organizations)
- Farming (traditional)

In empirical analysis, we will decompose total HH net income into 3 components accordingly:

- remittances (i.e. migrant earnings less expenses)
- non-migrant (off-farm) earnings
- other income (predominantly from farming)

## 4) Empirical Model & Key Issues

Assume expenditure on good  $i$  by household  $h$  is given by

$$e_i^h = \beta_0 + \beta_1 x^h + \beta_2 y^h + \beta_3 z^h + W^h \Gamma + \varepsilon_i^h$$

where  $x^h$  and  $y^h$  are household  $h$ 's remittances and non-migrant earnings respectively and  $z^h$  is all other net income,  $W^h$  is a vector of exogenous characteristics and  $\varepsilon_i^h$  is the error term.

This specification implies that household expenditures are linear and additively separable in the various components of net household income (see Kooreman (2000) and Edmonds (2002)).

We will test the following two hypotheses of income pooling in our empirical analysis:

- Hypothesis I:  $\beta_1 = \beta_2$
- Hypothesis II:  $\beta_1 = \beta_2 = \beta_3$

# Identification strategies

Main econometric challenges:

- Measurement error in remittances
- Endogeneity in remittances and other sources of income
- Heterogeneity

Two identification strategies

- Fixed-effects Instrumental-Variables (FEIV) estimation using aggregate measures of balanced panel of 105 counties
- TSLS at the household level using a homogenous subsample of couples with dependent children
  - “Split household” strategy (Fan 2008)
- Instrumenting using proxies for land scarcity and social networks

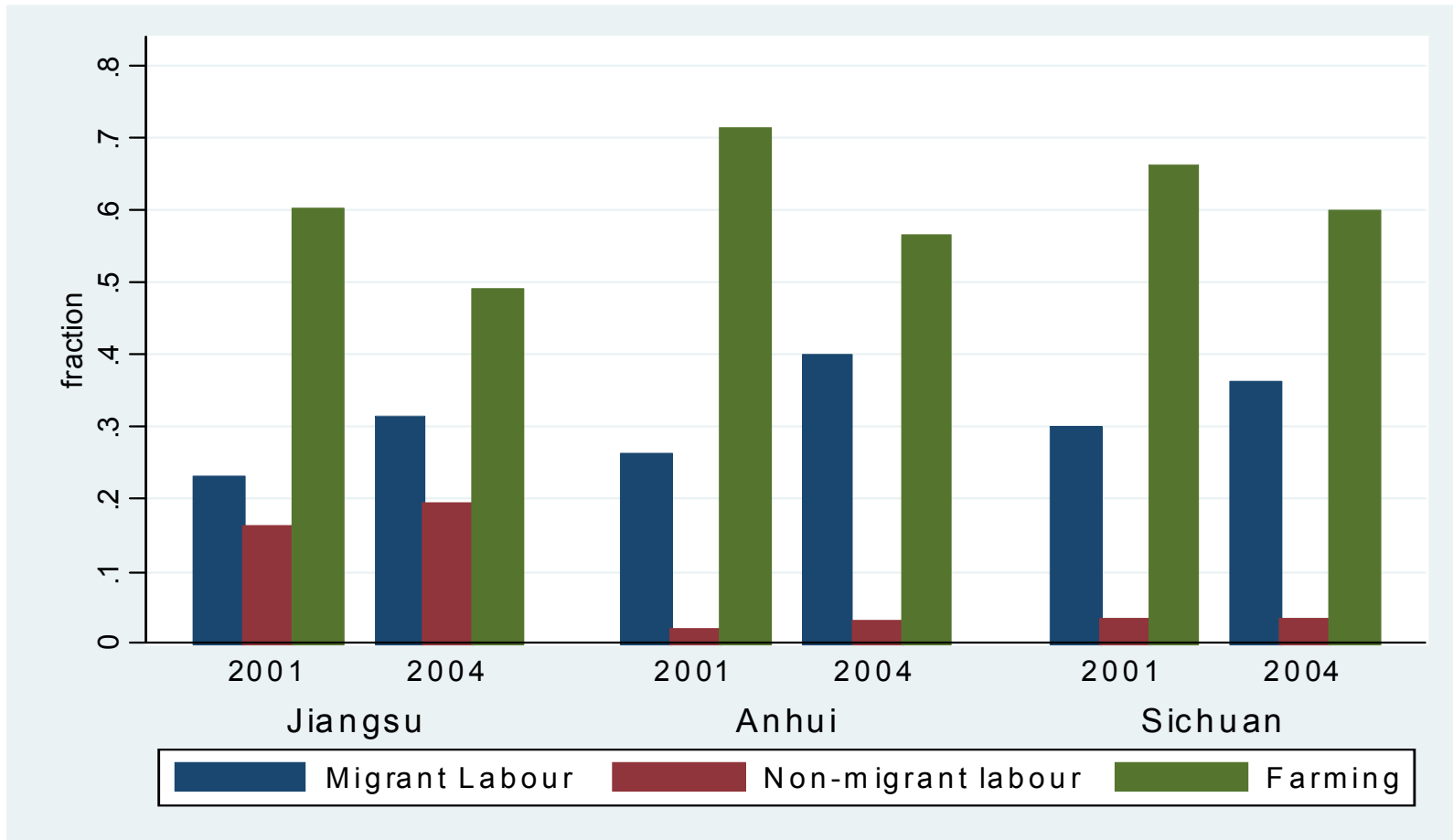
## 5) Data

- A large sample of rural households from the provinces of Jiangsu, Anhui and Sichuan surveyed in 2001 and 2004
- Representing the Eastern (coastal), Central and Western Region of China
- Per capita rural net income in 2004:
  - 4754 yuan in Jiangsu (2<sup>nd</sup> richest province)
  - 2499 yuan in Anhui
  - 2519 yuan in Sichuan
  - 2936 yuan for China as a whole
- 10k+ HHs with 40k+ individuals in each year
- Panel at the county level
- Exclude HHs who have migrated as a whole (21% in 2004)
- Remittance: net of transport costs and living expenses away from home

# Map



# Rural Workforce in Non-Farming Employment by Province and Year



# 6) Empirical Results

## Migration Patterns in 2004:

- 36% of the rural labor force have participated in migration during the survey year
- Of these, 90% have previous migration experience
- Two thirds of all migrants are male
- Only 27% of migrants have formal employment contracts with their employers, of which half are covered by labor insurance.
- Job-search channels
  - 66.4% of migrants get their jobs through friends and relatives
  - 18.8% through job agencies
  - only a tiny 1.4% through government channels
- Temporary and circular migration (migrants spend an average of 8.8 months in migrant work and 2.7 months in agricultural work at home)
- Over half of annual gross earnings are remitted! (4071/7742 yuan)

# Balanced Panel of 105 Counties

	Mean	Share (%)
<b>Total Net Income, of which</b>	11845.0	100.0
Net migrant income (remittances)	2080.8	17.6
Non-migratant earnings	2627.6	22.2
Other net income (farming etc)	7136.6	60.2
<b>Total Living Expenditure, of which</b>	8047.7	100.0
Housing	1223.0	15.2
<b>Total Non-Housing Expenditure, of which</b>	6824.7	84.8
Food	3910.5	57.3
Clothing	414.0	6.1
Household Goods & Services	352.9	5.2
Health	447.5	6.6
Transport and communications	594.6	8.7
Recreation, education & culture	909.9	13.3
Other expenditure	195.3	2.9

# FE-IV, 1st-stage Estimates

	Remittances	Non-migrant earnings
County Workforce Migrating	<b>3313.7</b> (951.3)	-1066.3 (921.0)
County Workforce in Non-migrant Employment	-1508.3 (1522.6)	<b>5507.9</b> (1474.2)
Cultivated land per capita in the village ( <i>Mu</i> =0.0667 hectare)	107.1 (553.5)	<b>-1579.2</b> (535.9)
Test of excluded instruments: $F_{3, 93}$ (p-value)	<b>4.42</b> (0.006)	<b>7.49</b> (0.000)
Anderson canon. Corr LM statistic: $\chi^2_2$ (p-value)	<b>10.136</b> (0.006)	

- Treating farming income as exogenous ( $H_0$  not rejected in formal test)
- Remittances identified through share of country workforce migrating
- Non-migrant earnings identified through share of country workforce in non-migrant employment and per capita cultivated land
- Control for proportion of labour force at various levels of education, household size, number of dependent children and boy ratio.

## FE-IV, 2nd-stage estimates

	Food	Transport- commun.	Recreation, education & culture	Total Non- housing	Housing
Remittances	<b>0.457</b> (0.230)	<b>0.258</b> (0.111)	0.019 (0.092)	0.628 (0.366)	0.111 (0.419)
Non Migrant earnings	0.128 (0.179)	<b>0.233</b> (0.086)	0.109 (0.071)	0.514 (0.384)	0.296 (0.325)
Net farm income	<b>0.125</b> (0.052)	<b>0.077</b> (0.025)	0.029 (0.021)	<b>0.222</b> (0.082)	<b>0.221</b> (0.094)
P(remit = earn)	0.123	0.805	0.290	0.735	0.635
P(remit=earn=farminc)	0.231	0.094	0.426	0.398	0.893
Sargan Statistics: $\chi^2_1$ (p-value)	1.899 (0.168)	0.021 (0.885)	0.074 (0.786)	1.267 (0.260)	<b>4.012</b> (0.045)
Root Mean Squared Error	425.7	204.8	169.1	676.5	774.2

- Can't reject exogeneity of instruments in all but housing equations
- *mpc* out of remittances on non-housing expenditure very high (also high on food and transport/communication)
- Remittances part of permanent income and important for poor
- Failure to account for endogeneity/heterogeneity lead to biased estimates: OLS (0.435)

# OLS, County Panel

	Food	Transport- commun.	Recreation, education & culture	Total Non- housing	Housing
Remittances	0.189***	0.085***	0.055***	0.435***	0.073
Non Migrant earnings	0.170***	0.068***	0.054***	0.445***	0.197***
Net farm income	0.098***	0.059***	0.036***	0.254***	0.099***
P(remit = earn)	0.661	0.325	0.945	0.870	<b>0.033</b>
P(remit=earn=farminc)	<i>0.093</i>	0.431	0.333	<b>0.002</b>	<b>0.026</b>

Legend: \*:p<0.1; \*\*:p<0.05; \*\*\*:p<0.01

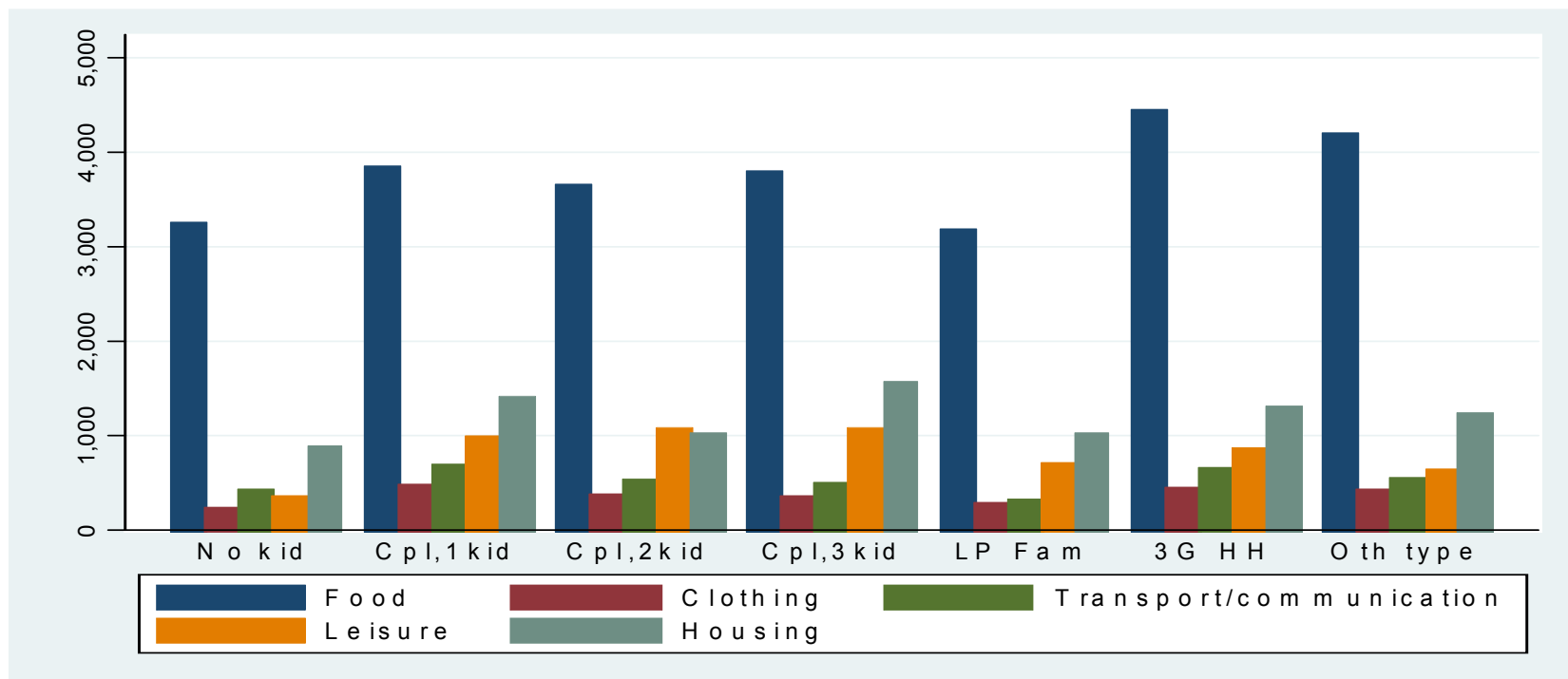
Notes: N=210. P(Remit = earn) is the p-value for test that the coefficients on remittances and non-migrant earnings are equal.

P(remit=earn=farminc) is the p-value for the test that the coefficients on all three income sources are equal.

Control variables include fraction of labor force at education level of college, polytechnic, senior high school, primary school and illiterate (junior high school being the reference category), number of permanent residents per household, number of dependent children per household and boy share.

Bold and italic cases indicate statistical significance at the 5% and 10% levels respectively.

# Household-level Analysis



- Considerable heterogeneity wrt. to consumption patterns (and sources of income) across HH types
- Focus on the highly homogenous subgroup of couples with dependent children and at least 2 able-bodied workers in HH-level analysis to minimize risk of functional form misspecification (two-thirds of all HHs)

# Couples with Dependent Children

	Households without remittances	Households with remittances
<b>Total Net Income, of which</b>	11099.2	10731.8
Net migrant income (remittances)	-	3937.5 (36.7%)
Non-migrant earnings	3204.3 (28.9%)	1135.8 (10.6%)
Other net income (farming etc)	7894.91 (71.1%)	5658.5 (52.7%)
<b>Total Living Expenditure</b>	7955.3	7063.9
Housing	1308.3 (16.4%)	989.5 (14.0%)
<b>Total Non-Housing Expenditure, of which</b>	6647.1 (83.6%)	6074.4 (86.0%)
Food	3664.4 (55.1%)	3407.9 (56.1%)
Transport and communications	560.6 (8.4%)	484.2 (8.0%)
Number of residents	3.76	3.89
Total Net Income per capita	3094.2	2868.0
Age of head of household (HoH)	37.4	38.1
Women HoH	0.025	0.018
Highest Education of HoH Above Jr. High	0.171	0.133
Highest Education of HoH Jr. High	0.620	0.643
Highest Education of HoH Below Jr High	0.210	0.224
Age of youngest child	10.0	10.3
Value of House	23592.7	19369.9
Owning telephone, mobile phone, pager or pc	0.473	0.407
Cultivated land per capita in the village ( $\mu=0.0667$ hectare)	1.157	1.117
Observations	3415	3496

- Migrant families have:
  - Lower income
  - Lower wealth (house values)
  - Less educated
  - However, consumption pattern remarkably similar

# TSLS, 1<sup>st</sup> Stage Estimates

	Remittances	Non Migrant earnings
County ownership of telephone, mobile phone, pager or PC	<b>740.3</b> (288.9)	<b>7443.5</b> (337.6)
County Workforce Migrating	<b>4469.5</b> (327.7)	<b>-8551.8</b> (382.8)
County under 40 workforce sex ratio	<b>-1458.7</b> (367.1)	<b>-1635.7</b> (428.9)
Test of excluded instruments: $F_{3, 6887}$ (p-value)	<b>23.20</b> (0.000)	<b>11.96</b> (0.000)
Kleibergen-Papp Wald F statistic (weak id. test)	<b>21.518</b> (Stock-Yogo 10% CV: 13.43)	

- Allowing for clustering at county level
- Instruments proxies for social networks
- All 3 instruments individually significant
- Control for provinces, years and interactions, household size, number of dependent children and boy ratio, number of children in age groups 0-6, 7-15, a quadratic in age of HoH and level of education of HoH.

# TSLS, 2<sup>nd</sup> Stage Estimates

	Food	Transport/ communi- cation.	Recreation education & culture	Total Non- housing	Housing
Remittances	<b>0.295</b> (0.098)	<b>0.168</b> (0.036)	<b>0.232</b> (0.045)	<b>0.905</b> (0.193)	0.071 (0.178)
Non Migrant earnings	<b>0.291</b> (0.037)	<b>0.141</b> (0.017)	<b>0.140</b> (0.022)	<b>0.791</b> (0.071)	<b>0.272</b> (0.071)
Net farm income	<b>0.126</b> (0.016)	<b>0.060</b> (0.009)	<b>0.063</b> (0.009)	<b>0.325</b> (0.037)	<b>0.131</b> (0.032)
P(remit = earn)	0.971	0.379	<b>0.040</b>	0.561	0.290
P(remit=earn=farminc)	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.024</b>
Sargan Statistics: $\chi^2_1$ (p-value)	0.157 (0.692)	0.603 (0.438)	0.024 (0.878)	0.007 (0.787)	2.060 (0.151)
Root Mean Squared Error	1669.0	1452.6	1452.7	4069.9	5561.5

- Can't reject exogeneity of instruments in all equations
- *mpc* out of remittances on non-housing expenditure 0.905 (also high on food, recreation, transport/communication)
- Income pooling across all income sources overwhelmingly rejected

# OLS Bias

	Food	Transport- commun	Recreation education & culture	Total Non- housing	Housing
Remittances	<b>0.060</b>	<b>0.060</b>	<b>0.019</b>	<b>0.190</b>	<b>0.124</b>
Non Migrant earnings	<b>0.112</b>	<b>0.112</b>	<b>0.037</b>	<b>0.369</b>	<b>0.224</b>
Net farm income	<b>0.075</b>	<b>0.075</b>	<b>0.014</b>	<b>0.183</b>	<b>0.132</b>
P(remit = earn)	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.009</b>
P(remit=earn=farminc)	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.007</b>

- TSLS estimates 5 times as large as OLS estimates for food and total non-housing expenditure, and
- 10 times as large for health and recreation

## New Migrants Only, TSLS, 2<sup>nd</sup> Stage

	Food	Transport- commun.	Recreation education & culture	Total Non- housing	Housing
Remittances	0.597 (0.420)	0.322 (0.167)	<b>0.753</b> (0.293)	<b>2.062</b> (0.976)	-0.111 (0.837)
Non Migrant earnings	<b>0.308</b> (0.050)	<b>0.140</b> (0.023)	<b>0.178</b> (0.041)	<b>0.855</b> (0.118)	<b>0.316</b> (0.099)
Net farm income	<b>0.130</b> (0.025)	<b>0.060</b> (0.012)	<b>0.075</b> (0.019)	<b>0.340</b> (0.064)	<b>0.133</b> (0.042)
P(remit = earn)	0.463	0.222	<b>0.031</b>	0.181	0.582
P(remit=earn=farminc)	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.001</b>
Hansen J Statistic: $\chi^2_1$ (p-value)	0.003 (0.960)	2.840 (0.092)	0.270 (0.603)	0.014 (0.906)	1.491 (0.222)
Root Mean Squared Error	2029.3	1208.1	2050.1	5493.5	6621.0

- N=4208, of which 478 are new migrants
- *mpc* out of remittances on non-housing expenditure 2.062 (although not very precisely determined), implying credit constraint

## Split Households Only, TSLS, 2<sup>nd</sup> Stage

	Food	Transport- commun.	Recreation education & culture	Total Non- housing	Housing
Remittances	<b>0.315</b> (0.115)	<b>0.164</b> (0.042)	<b>0.285</b> (0.059)	<b>1.008</b> (0.234)	0.104 (0.226)
Non Migrant earnings	<b>0.285</b> (0.034)	<b>0.132</b> (0.014)	<b>0.135</b> (0.022)	<b>0.773</b> (0.064)	<b>0.303</b> (0.069)
Net farm income	<b>0.124</b> (0.017)	<b>0.055</b> (0.008)	<b>0.063</b> (0.011)	<b>0.319</b> (0.040)	<b>0.138</b> (0.036)
P(remit = earn)	0.795	0.395	<b>0.009</b>	0.316	0.378
P(remit=earn=farminc)	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.003</b>
Hansen J Statistic: $\chi^2_1$ (p-value)	0.009 (0.926)	1.006 (0.316)	0.064 (0.801)	0.000 (0.996)	1.942 (0.163)
Root Mean Squared Error	1652.0	1054	1482	4046	5928

- N=5730, of which 2000 are split households
- *mpc* out of remittances on non-housing expenditure 1.008 implying that remittances are spent on non-housing consumption expenditures dollar-for-dollar

# Other Robustness Checks

- Similar results with three-generation households or all household types containing at least 2 able-bodied workers
- Companion Paper on Savings (Zhu et al. 2009)
  - Based on a smaller but more recent cross-sectional data (1500 HHs)
  - Model savings correcting for endogeneity, measurement error and functional form misspecifications
  - Find that remittances contribute less to HH savings, dollar for dollar
  - Moreover, no evidence of impact of remittances on either capital input or gross output of farm production

## 7) Conclusions

- FEIV estimates using county-level panel data suggest that the *mpc* out of remittances is very high, and is far greater than those out of non-migrant earnings or farming
- Results also hold in instrumental-variable estimation at the household-level using a highly homogenous sample of couples with dependent children
- Imply that rural households take remittances as permanent income by and large
- Consistent with the prevalence of circular migration which is largely caused by the combination of the *hukou* system and the land tenure system in China

# Policy Implications and Further Research

- Policy implications:
  - Migration/remittances will have a very strong positive impact on poverty reduction in rural China
  - A strong case for more government intervention to facilitate migration through government job intermediaries, training and education programs and microfinance schemes.
  - But migration unlikely to boost capital accumulation which will in turn increase productivity in farming
- Future research:
  - how families strategically use migration to maximize household income and to diversify risk given the constraints imposed by the institutions.
  - the impact of migration on other outcomes such as education, fertility and gender equality