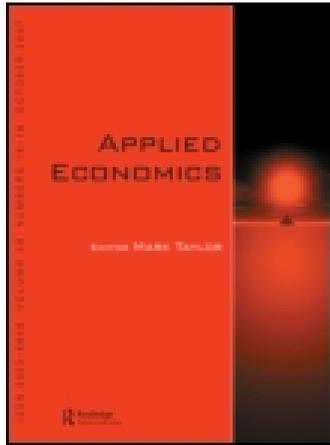


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Where did all the remittances go? Understanding the impact of remittances on consumption patterns in rural China

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Where did all the remittances go? Understanding the impact of remittances on consumption patterns in rural China

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We focus on the impact of migrants' remittances on consumption patterns in China. Using a large homogenous sample of rural households surveyed in 2001 and 2004, we find that remittances are spent on nonhousing consumption expenditures at the margin, virtually dollar-for-dollar, when we instrument remittances and local employed earnings using proxies of social networks. Our findings are robust to intra-household division of labour and to fixed-effect for the county in which the respondents are registered. These results imply that rural households largely take remittances as permanent income and are consistent with the prevalence of circular and repeat migration in China.

Keywords: rural–urban migration; remittances; consumption patterns; fixed-effect instrumental-variables estimation; China

JEL Classification: D12; D13; J61; R23

I. Introduction

During the past three decades, China has achieved unprecedented economic growth and substantial reduction in absolute poverty, as demonstrated by a more than fivefold increase in per capita real disposable income. However, the ever growing income gap between the urban and the rural areas since the mid-1980s has become a major concern for policy makers (NBS, 2006).

Rural–urban migration has played a vital role in China's dual process of urbanization and industrialization.¹ The latest Census reveals that over 220 million people had left the locality of their registered address for more than 6 months in 2010 (Reuters, 2011). Because of China's restrictive *hukou* (household registration) system, which excludes rural residents from the urban social security network, most of these are temporary migrant workers who send substantial remittances to support their immediate and extended families left at home (Meng, 2012).

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¹The proportion of urban residents in China increased from 17.4% in 1978 to 41.8% in 2005, while the share of the primary sector of industry dropped from 27.9% to 12.6% over the same period (NBS, 2006).

In standard economic theory, the source of income does not matter. However, recent studies exploiting exogenous variation in income induced by policy reforms of child benefit or pensions (e.g. Kooreman, 2000; Blow *et al.*, 2012) present overwhelming evidence from various countries that the members of a household do not pool their resources in making spending decisions, implying rejection of the unitary model of household behaviour.

This article focuses on the extent to which remittances have an effect on consumption patterns over and above income from nonmigrant off-farm earnings and farm income for total nonhousing expenditure as well as its four components including food and clothing. The contribution of this article is twofold. First, we present one of the first empirical studies on the impact of rural-to-urban migration and remittances on consumption patterns in China using rural household survey data. The focus on the differential impacts by sources of income is particularly novel and allows us to answer the key policy question of whether growing migration is likely to boost capital accumulation required for rural development in the long run. Second, we also contribute to the New Economics of Labour Migration literature by presenting direct evidence of the role of social networks in the context of rural-to-urban migration in China. In particular, we show that the identification of the causal effect of remittances on consumption patterns comes from changes over times in social network proxies and does not rely on either intra-household division of labour or county fixed-effects.

The article is organized as follows: Section II describes the stylized facts on rural–urban migration in China in recent years and briefly reviews the literature; Section III presents the empirical model and discusses the key economic and econometric issues; Section IV summarizes the data; Section V presents empirical findings; and Section VI concludes and discusses the policy implications.

II. ‘History’s Largest Labour Flow’

Before 1978, the share of urban population in China was only around 17%, while rural–urban migration was virtually nonexistent. The *hukou* system classifying individuals as having either agricultural or nonagricultural *hukou* at birth was designed to maintain social control and, in particular, to limit rural–urban migration in the pre-reform era. Despite some relaxation over the reform period, urban *hukou* holders still enjoy privileged access to many types of jobs, as well as exclusive entitlements to state-provided benefits, ranging from state pension, housing subsidies, healthcare to education (see, e.g. Aaberge and Zhu (2001) and Fan (2008)).

The massive rural–urban migration in China took off in the early 1980s as a result of the success of the *Household*

Responsibility System, which greatly increased rural labour surplus. By the mid-1990s, this surge in migration has already been described as ‘history’s largest labour flow’. The trend seems to have accelerated in the following years, until the global economic downturn in 2008 (Meng, 2012).

In line with the Neo-Classical Economics of Migration, increased demand for labour in urban areas and the widening income differential are identified as the driving forces behind the recent massive internal migration in China (Knight and Song, 2005). One distinctive feature of the literature on Chinese migration is its emphasis on the institutional settings, which centre on the *hukou* and the land tenure system; see for example Knight and Yueh (2004) and Meng *et al.* (2010).

While the Neo-Classical Economics of Migration simply assumes that the migrant maximizes individual earnings, the New Economics of Labour Migration takes the household perspective and emphasizes the role of social networks (see Mincer, 1978; Katz and Stark, 1986). However, few studies on Chinese migration adopt this approach. Notable exceptions include Taylor *et al.* (2003) who model migration as a household decision and Fan (2008) who highlights the role of social networks in both the migration process and the job search experiences.

Compared to the limited empirical literature on the determinants of migration in China, the impact of migration and remittances on rural China is even less understood. Both Du *et al.* (2005) and Murphy (2006) report a positive effect of migration on poverty reduction. Rozelle *et al.* (1999) suggest that migration has only a small negative effect on agricultural productivity, a result consistent with large labour surplus, while remittance has the offsetting effect by relaxing credit constraints.

A recent World Bank review points to remittances by international migrants as both smoothing consumption and providing funds for investment (World Bank, 2006, chapter. 5). Moreover, some latest empirical studies on international migration present convincing evidence that remittances have a positive causal effect on savings and investment (see, e.g. Woodruff and Zenteno (2007) and Yang (2008)). However, using household survey data from Fiji and Tonga, Brown and Leevess (2011) suggest that whether remittances are mainly used for consumption or investment purposes might depend on the duration and intensity of migration and the structure of economic activity within a community.

To the best of our knowledge, there has been virtually no direct evidence on the impact of rural–urban migration and remittances on consumption patterns in China. However, two recent articles have investigated the effect of migration and remittances on savings and investment. Using household data collected in rural China in 2000, de Brauw and Rozelle (2008) find no evidence of a link

between migration and productive investment, as migrants in poor areas use remittances to increase current consumption by and large, while households in nonpoor areas are only slightly more likely to use remittances for housing and other consumer durables. Using a cross-section of rural households surveyed in 2006, Zhu *et al.* (2012) indicate that migrant households save less than their non-migrant counterparts, conditional on total household net income. Moreover, they find no evidence of any direct impact of remittances on either capital input or gross output of farm production.

III. The Empirical Model

In Chinese statistics, a migrant is defined as someone whose main place of employment is out of the township of the *hukou* registration. Out of the 14 320 migrants in our pooled sample from 2001 to 2004, only 23.7% report a *main place of employment* as intra-county (but inter-township), while 22.6% and 53.5% are inter-county (but intra-province) and inter-province migrants, respectively.

Remittances in the Chinese rural household survey (RHS) are defined as migrant earnings net of migrant expenses (travel and living expenses away from home). They include both cash and in-kind transfers and take into account both remittances sent home by the migrant and remittances hand carried by the migrant on his/her return visit.

In our empirical specification, we decompose total household net income into three components: (i) remittances, or net migrant income; (ii) local employed earnings, that is wages and salaries arising from employment in local enterprises and organizations and (iii) any other net income, predominantly net income from household operations (self-employment in the traditional agrarian sector) but also includes net income from properties and transfers. In the following, these three terms will simply be denoted as remittances, local employed earnings and net farm income.²

Since the data does not allow us to impute housing consumption with reasonable precision, we exclude housing from our analysis. In this article, we model total non-housing living expenses and its four components, namely food, clothing, household goods and services, and the residual category of other nonhousing expenditure comprising health, transport and communications, recreation, education and culture. This level of aggregation greatly mitigates the problem of censoring of the dependent

variables (zero-expenditures)³ and ensures the implied linear Engel curves assumption is not too restrictive for our broadly defined composites of goods.

We assume that household expenditures are linear and additively separable in the various components of net household income (see, e.g. Kooreman (2000)). The coefficients of incomes in this linear Engel curve specification can be interpreted as marginal propensities to consume (mpc). More specifically, we assume that expenditure on good i by household h , e_i^h , is given by

$$e_i^h = \beta_0 + \beta_1 x^h + \beta_2 y^h + \beta_3 z^h + W^h \Gamma + u_i^h + v_i^C \quad (1)$$

where x^h and y^h are household h 's remittances and local employed earnings, respectively, and z^h is all other net income (i.e. total net income less the first two components), W^h is a vector of exogenous characteristics, while u_i^h is the idiosyncratic error term and v_i^C captures the unobservable county-fixed effect.

We test for differential mpc's out of the three different sources of income. More specifically, we test the following two hypotheses of income pooling in our empirical analysis:

$$\text{Hypothesis I: } \beta_1 = \beta_2$$

$$\text{Hypothesis II: } \beta_1 = \beta_2 = \beta_3$$

That is, we first test whether remittance has the same effect on expenditures as local employed earnings. More importantly, we also test if these two forms of off-farm earnings have the same effect as net farm income jointly (i.e. the equality of all three sources of net income). To avoid the misspecification of the demographic effects, our household-level analysis will be based on a highly homogenous subsample of nuclear families with at least one dependent child aged 16 or below.

As most studies on international migration and remittances in the developing world (see Adams (2011)), we also employ the instrumental variables (IV) method to allow remittances and local employed earnings to be endogenously determined. The identification of the causal effect of remittances and local employed earnings come from county-level social network indicators that are not expected to have a direct effect on consumption conditional on income. We also show that our results are robust with respect to who in the family migrates.

As a sensitivity check, we collapse household data from 2001 to 2004 to construct system-level aggregate measures of a balanced panel of 105 counties in order to estimate fixed-effect instrumental variables (FE-IV)

² These correspond to the three labour market options: migration for work away from home, local off-farm employment and family farming, faced by rural households in China today (see Knight and Song (2005), chap. 8).

³ The share of households with zero expenditure is highest for clothing, at 1.3%, of the sample of nuclear families with dependent children.

model. It is shown that our household-level results are robust to fixed-effect for the county in which the respondents are registered as a resident (place of *hukou* registration). This implies that the identification comes from changes over time in county-level social network proxies and does not rely on cross-sectional variation across counties, such as geographical factors.

IV. Data

This article is based on a large survey of rural households in 2001 and 2004 undertaken by the National Bureau of Statistics (NBS) of China in the provinces of Jiangsu, Anhui and Sichuan, representing the eastern (coastal), central and western regions, respectively, as part of the RHS of China. Total migration from these three provinces accounts for 16% of the 136 million people who lived in places other than their place of registration according to the 2000 Census (see NBS Online Statistics, (2009)).

The RHS is a nationally representative socio-economic survey covering production, consumption and labour activities of rural residents. Our sample contains 10 500 households in each of the two survey years. Although interviews are not carried out at the destination,⁴ migrants' remittances are identified as a distinctive component of total net household income in the household records.

Around 36% of the rural workforce in our 2004 sample has participated in migration during the survey year.⁵ Of these, two-thirds of all migrants are male and 90% have previous migration experience. Only 27% of migrants have employment contracts, of which half are also covered by formal labour insurance. Migrants spend on average 8.8 months in migrant work and 2.7 months in agricultural work at home. The prevalence of circular and repeat migration engaging in informal employment is in accordance with earlier research (see, e.g. Fan (2008)) and helps explain why migration has had minimal impact on agricultural production. The mean annual gross migrant income is 7742 Yuan, of which 4071 Yuan, or a staggering 53%, is remitted.

Our choice of instruments is inspired by the New Economics of Labour Migration literature, which emphasizes the role of social networks in the migration process (Fan, 2008).⁶ In the 2004 sample, 66.4% of migrants get their jobs through personal contacts such

as friends and relatives, 18.8% through job agencies, with only 1.4% through government channels. Hence, a rural household's probability to engage in migration is expected to be positively correlated with both the proportion of households in the reference group who migrate and the better market information arising from increased access to modern telecommunication technology. In addition, the gender imbalance of migrants suggests that the sex ratio of prime age working population might also be a factor in determining migration and generating remittances. Therefore, the instruments for remittances, and local employed earnings, which is the alternative form of off-farm labour income, will be based on these proxy variables for social networks.

Figure 1 shows the proportion of rural workforce in migrant labour, nonmigrant labour and farming by provinces and year, calculated from the individual questionnaires of our sample. It is clear that there has been a dramatic increase in the incidence of migration across all regions over the 3-year sample period, while the growth in nonmigrant (off-farm) employment has been more modest.

We focus only on the highly homogenous group of couples with children, of which at least one is below 16.⁷ We exclude households with fewer than two able-bodied workers or whose heads are over 60 or have missing educational qualifications. After dropping another eight households reporting negative total net income, we end up with 6911 nuclear families pooled over 2 survey years.

Table 1 compares key characteristics of households with and without remittances (or simply recipient and

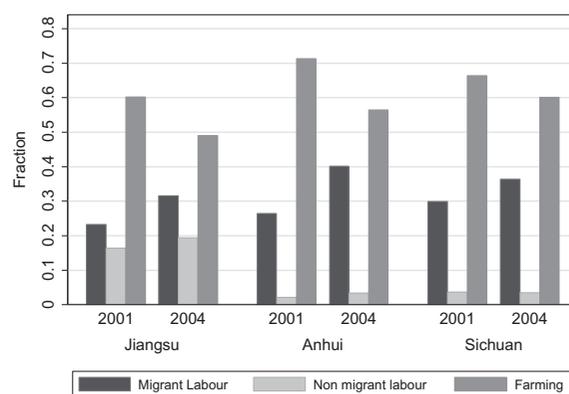


Fig. 1. Type of employment of rural workforce by province and year

⁴ This implies that households who have migrated as a whole are not included in the survey. NBS (2005, p. 75) documents that out of the 118.23 million rural-urban migrants, only 21% migrated with all their family members according to the 2004 Rural Household Survey.

⁵ Following the official definition, we base our calculation of rural workforce on the sample of males aged 18–50 and females aged 18–45 inclusive.

⁶ Ioannides and Loury (2004) offer an excellent survey of the literature on job search networks.

⁷ Compared to other household types, this group is much less likely to settle in urban areas because of the lack of access to the state educational system in cities and towns.

Table 1. Summary statistics of couples with dependent children, by remittance status

	Households without remittances	Households with remittances	Difference (SE)
Total net income, of which:	11 099.2	10 731.8	367.5 (167.7)
Remittances	–	3937.5 [36.7%]	–
Local employed earnings	3204.3 [28.9%]	1135.8 [10.6%]	2068.5 (106.5)
Net farm income (residual income)	7894.91 [71.1%]	5658.5 [52.7%]	2236.5 (132.9)
Total net income per capita	3094.2	2868.0	226.1 (50.0)
Total nonhousing expenditure, of which:	6647.1	6074.4	572.7 (90.9)
Food	3664.4	3407.9	256.6 (38.0)
Clothing	477.1	410.2	66.8 (10.8)
Household goods and services	359.1	289.1	70.0 (15.5)
Other expenditure	2146.5	1967.2	179.3 (57.6)
Share of total nonhousing expenditure:			
Food	0.605	0.601	0.005 (0.004)
Clothing	0.071	0.068	0.003 (0.001)
Household goods and services	0.050	0.045	0.004 (0.001)
Other expenditure	0.274	0.286	–0.012 (0.004)
Jiangsu province (reference category)	0.305	0.274	0.031 (0.011)
Anhui province	0.365	0.369	–0.004 (0.012)
Sichuan province	0.329	0.357	–0.028 (0.011)
Household characteristics			
Number of residents	3.756	3.891	–0.135 (0.020)
Number of dependent children under 16	1.410	1.383	<i>0.026</i> (0.014)
Boy ratio	0.583	0.576	0.007 (0.010)
Number of children aged 6 or below	0.222	0.187	0.035 (0.011)
Characteristics of Head of Household (HoH):			
Low education (below lower secondary)	0.210	0.224	–0.014 (0.010)
Lower secondary (reference category)	0.620	0.643	–0.023 (0.012)
High education (above lower secondary)	0.170	0.133	0.037 (0.009)
Age	37.417	38.145	–0.728 (0.143)
Female	0.025	0.018	0.008 (0.003)
Value of house	23 592.7	19 369.9	4222.8 (569.1)
Land per capita in the village ($\mu = 0.0667$ <i>hec.</i>)	1.157	1.117	0.039 (0.013)
Instrumental variables:			
County ownership of telephone, mobile, pager/PC	0.487	0.454	0.033 (0.006)
County workforce migrating	0.267	0.342	–0.075 (0.003)
County under 40 workforce sex ratio (male/female)	1.027	1.029	–0.002 (0.003)
Observations	3415 [49.4%]	3496 [50.6%]	

Notes: Income and expenditures are annual amounts of RMB Yuan in 2004 constant prices. Figures in parentheses are SEs. Percentages in square brackets are shares of total. Differences in bold and italic cases indicate statistical significance at the 5% and 10% levels, respectively.

nonrecipient households) in the pooled household sample.⁸ Just over half of couples with dependent children report positive remittances. Households without remittances have a mean total net income of 11 100 Yuan, which is about 3%

higher than households with remittances. Taking into account the differences in household sizes, the per capita income gap widens to more than 7%. While recipient couples receive almost 4000 Yuan a year from remittances,

⁸ Twelve point six per cent of households with migrants report zero remittances, while 19.3% of households with no migrant workers in the survey year report positive remittances.

which accounts for 36.7% of their total net income, they receive less from either local employed earnings or farming than nonrecipient couples in both absolute and relative terms. The contrast in contribution from local employed earnings to total net income is particularly striking, at 10.6% and 28.9%, respectively. This pattern is consistent with remittances being more fungible with local employed earnings than with farm income.

Despite a 10% gap in total nonhousing expenditure in favour of nonrecipient households, the budget shares are remarkably similar across the two family types. For food, which accounts for about 60% of total nonhousing expenditure, the difference is statistically insignificant. Note that all travel costs and living expenses away from home have already been deducted before calculating both remittances and total net income.

Table 1 shows that a recipient household is slightly larger but with roughly the same number of dependent children. Boys are equally over-represented in both household types. However, recipient households tend to have fewer pre-school children. Table 1 also reveals that the head of a recipient household is marginally older and slightly less likely to hold a qualification above the Lower Secondary level. Moreover, there appears to be a 20% gap in favour of nonrecipients in the value of the house, which is a good proxy of family wealth. Perhaps surprisingly, the average land size is only slightly in favour of nonrecipients.

Table 1 also shows three proxies of social networks, which will be used as instruments for off-farm earnings. It

turns out that the gap in ownership of personal communication equipments is actually in favour of nonrecipients, while the converse is true for the proportion of county workforce migrating and the male–female ratio for workforce under the age of 40.

V. Empirical Results

Household-level analysis

To ensure our results are as robust as possible, we focus on a highly homogenous group of couples with dependent children in our household-level analysis. Our regression controls for province dummies, number of permanent residents, number of dependent children under 16; boy share and number of children aged six or below; age, age squared and dummies for gender and education level of the head of household. SEs reported have all been adjusted for cluster sampling at the county level.

Table 2 presents OLS results including the full set of controls. The hypothesis that remittances have the same effect as local employed earnings on consumption is rejected at the 1% significance level for all nonhousing expenditures categories individually as well as jointly. Moreover, the null hypothesis of pooling of all three sources of income is also rejected at the 1% level in all specifications.

Tables 3 and 4 present the corresponding two-stage least squares (2SLS) estimates. In this article, we treat

Table 2. OLS estimates of the pooled sample

	Food	Clothing	Household goods and services	Other expenditure	Total nonhousing expenditure
Remittances	0.072 (0.014)	0.020 (0.004)	0.014 (0.004)	0.107 (0.011)	0.213 (0.025)
Local employed earnings	0.117 (0.008)	0.038 (0.003)	0.045 (0.014)	0.178 (0.019)	0.377 (0.029)
Net farm income	0.078 (0.008)	0.014 (0.002)	0.017 (0.003)	0.080 (0.010)	0.189 (0.018)
Anhui province	-138.9 (140.4)	-17.7 (30.3)	6.0 (50.2)	-155.9 (130.7)	-306.5 (259.4)
Sichuan province	408.4 (135.9)	-31.6 (33.2)	12.3 (50.6)	-31.5 (143.1)	357.8 (267.9)
No. of residents	107.9 (47.0)	-19.4 (10.3)	-5.0 (14.3)	60.6 (56.0)	144.1 (91.1)
No. of dependent kids	-154.2 (35.8)	-26.8 (10.5)	-19.6 (13.2)	-127.1 (65.2)	-327.7 (78.1)
Boy ratio	-7.2 (53.1)	-25.3 (11.9)	-38.0 (20.2)	-199.9 (56.2)	-270.4 (95.9)
No. of kids aged 0–6	124.5 (49.9)	-33.4 (11.9)	3.6 (19.5)	-153.4 (75.3)	-58.6 (114.9)
HoH low education	-49.7 (58.9)	-26.6 (12.6)	-26.0 (14.2)	-140.0 (65.6)	-242.4 (111.4)
HoH high education	<i>107.6</i> (63.5)	56.6 (19.2)	4.7 (27.0)	252.8 (87.9)	421.6 (139.6)
Age of HoH	126.3 (36.8)	28.4 (7.6)	-5.6 (12.7)	265.7 (61.2)	414.9 (94.8)
Age ² of HoH	-1.21 (0.47)	-0.42 (0.10)	0.06 (0.17)	-3.13 (0.78)	-4.70 (1.21)
Female HoH	65.8 (107.7)	108.3 (44.2)	-40.8 (44.4)	156.1 (174.0)	289.4 (238.1)
Constant	-704.0 (724.7)	-81.4 (139.0)	-267.3 (281.2)	-4396.8 (1183.9)	-4914.9 (1811.3)
$P(H_0: \beta_1 = \beta_2)$	0.001	0.000	0.005	0.000	0.000
$P(H_0: \beta_1 = \beta_2 = \beta_3)$	0.000	0.000	0.009	0.000	0.000
RMSE	1407.9	402.5	610.0	2178.4	3176.7

Notes: $N = 6911$. SEs in parentheses adjusted for clustering at county level. $P(H_0: \beta_1 = \beta_2)$ is the p -value for test that the coefficients on remittances and local employed earnings are equal. $P(H_0: \beta_1 = \beta_2 = \beta_3)$ is the p -value for the test that the coefficients on all three income sources are equal. Bold and italic cases indicate statistical significance at the 5% and 10% levels, respectively.

Table 3. 2SLS estimates of the pooled sample, second-stage estimates

	Food	Clothing	Household goods and services	Other expenditure	Total nonhousing expenditure
Remittances	0.400 (0.058)	0.057 (0.013)	0.050 (0.015)	0.483 (0.056)	0.990 (0.109)
Local employed earnings	0.328 (0.045)	0.083 (0.010)	0.065 (0.009)	0.341 (0.039)	0.818 (0.084)
Net farm income	0.145 (0.013)	0.024 (0.004)	0.024 (0.003)	0.148 (0.015)	0.340 (0.030)
$P(H_0: \beta_1 = \beta_2)$	0.368	0.100	0.321	0.024	0.222
$P(H_0: \beta_1 = \beta_2 = \beta_3)$	0.000	0.000	0.000	0.000	0.000
Hansen J -statistic: χ^2_1 (p -value)	0.865 (0.353)	0.745 (0.388)	0.628 (0.428)	0.010 (0.922)	0.240 (0.625)
RMSE	1877.1	450.3	623.1	2531.9	4251.6

Table 4. 2SLS estimates of the pooled sample, first-stage estimates

	Remittances	Nonmigrant earnings
County ownership of telephone, mobile phone, pager or PC	1251.1 (365.7)	5982.8 (1117.7)
County workforce migrating	4754.7 (621.4)	-9416.3 (2079.1)
County under 40 workforce sex ratio	-1281.5 (646.0)	-2034.4 (1102.9)
Test of excluded instruments: $F_{3, 104}$ (p -value)	47.55 (0.000)	11.30 (0.000)
Kleibergen–Papp rk Wald F -statistic (weak identification test)	50.370 (Stock-Yogo 10% critical value: 13.43)	

Notes: $N = 6911$. SEs in parentheses adjusted for clustering at county level. $P(H_0: \beta_1 = \beta_2)$ is the p -value for test that the coefficients on remittances and local employed earnings are equal. $P(H_0: \beta_1 = \beta_2 = \beta_3)$ is the p -value for the test that the coefficients on all three income sources are equal. Control variables are the same as those in Table 2, which include province dummies, number of permanent residents, number of dependent children under 16; boy share and number of children aged six or below; age, age squared and dummies for gender and education level of the head of household. Bold and italic cases indicate statistical significance at the 5% and 10% levels, respectively.

net farm income as exogenous in the empirical specification. This assumption implies that the marginal product of labour in farming for this type of families is very low and not statistically different from zero, which is quite likely to hold in rural China given the small plot size of family farms and especially the prevalence of circular or repeat migration, which allows the migrant to work in the family farm during busy seasons (see Nath (1974)). Moreover, the hypothesis that net farm income is exogenous is not rejected at even the 10% significance level in formal tests in almost all expenditure categories including total nonhousing expenditure. The only exception is for food, where the p -value equals 0.017. This is perhaps not totally surprising, given that some food might be home produced and not properly accounted for on either side of the equation. Another reason why we should be more cautious in comparing food consumption between recipient and nonrecipient households is that the former excludes days when migrants are away.

The first-stage results in Table 4 show that all three instruments that proxy social networks are individually significant at the 5% or 10% level in predicting remittances and local employed earnings. Holding all other factors constant, higher levels of ownership of telecommunication equipments in the county predict higher earnings from both migrant and nonmigrant labour,

while higher under-40 workforce sex ratio has negative effects on both types of earnings. On the other hand, the fraction of workforce in the county migrating has a positive impact on remittances but a negative impact on local employed earnings. This is plausible if the two forms of off-farm employment are closer substitutes to each other compared to family farming, whereas the fraction of workforce in the county migrating proxies the relative attractiveness of migration over local off-farm employment. Put together, these instruments have a high predictive power on the two endogenous variables. It is also worth noting that the Kleibergen–Papp Wald F -statistic is well above the critical value for the weak instruments test at the 10% significance level (Stock and Yogo, 2005). Moreover, we cannot reject the null of exogeneity of the instruments in all consumption categories, even at the 35% significance level, according to the Hansen J -statistics in Table 3.

The IV estimate of the mpc on total nonhousing expenditure out of remittances is 0.99, well in excess of the corresponding figures of 0.82 and 0.34 for local employed earnings and farm income, respectively. For each additional Yuan of remittance, 0.40 go to food, 0.06 to clothing, 0.05 to household goods and services, and 0.48 to all other nonhousing expenditure, which include health, transport, communications and leisure.

Table 5. 2SLS estimates of the pooled sample of split migrant households and nonrecipient households, second-stage estimates

	Food	Clothing	Household goods and services	Other expenditure	Total nonhousing expenditure
Remittances	0.459 (0.077)	0.065 (0.016)	0.064 (0.019)	0.538 (0.069)	1.126 (0.145)
Local employed earnings	0.324 (0.042)	0.082 (0.010)	0.065 (0.009)	0.328 (0.037)	0.799 (0.080)
Net farm income	0.146 (0.015)	0.024 (0.004)	0.024 (0.004)	0.142 (0.016)	0.337 (0.034)
$P(H_0: \beta_1 = \beta_2)$	0.163	0.372	0.960	0.004	0.052
$P(H_0: \beta_1 = \beta_2 = \beta_3)$	0.000	0.000	0.000	0.000	0.000
Hansen J -statistic: χ^2_1 (p -value)	0.551 (0.458)	0.358 (0.550)	0.601 (0.438)	0.017 (0.897)	0.107 (0.744)
RMSE	1892.5	454.2	652.1	2519.0	4261.7

Notes: $N = 5730$ (of which 2000 are split migrant households). SEs in parentheses adjusted for clustering at county level. $P(H_0: \beta_1 = \beta_2)$ is the p -value for test that the coefficients on remittances and local employed earnings are equal. $P(H_0: \beta_1 = \beta_2 = \beta_3)$ is the p -value for the test that the coefficients on all three income sources are equal. Control variables are the same as those in Table 2, which include province dummies, number of permanent residents, number of dependent children under 16; boy share and number of children aged six or below; age, age squared and dummies for gender and education level of the head of household. Bold and italic cases indicate statistical significance at the 5% and 10% levels, respectively.

While we cannot reject the hypothesis that remittances have the same effect as local employed earnings on consumption (except for the residual category of other expenditure), the hypothesis of income pooling with net farm income is overwhelmingly rejected for all consumption categories individually and for total nonhousing expenditure as a whole.

A comparison of Tables 3 and 2 reveals that the 2SLS estimates for food, other expenditure and total nonhousing expenditure are about five times as large as the corresponding OLS estimates. This indicates that the OLS bias resulting from endogeneity and measurement errors is quite substantial. While the OLS results suggest that only 20% of any marginal increase in remittances will be spent on consumption, implying all the remaining will be either spent on housing or saved, our 2SLS results indicate that total nonhousing expenditures increase virtually dollar-for-dollar with remittances.

Split-households

Fan (2008) documents the increased popularity of the 'split households' strategy in rural China. Out of the 3181 recipient households used in our household-level analysis, 2000, or 62.9%, can be identified as following a split-household strategy, which entails the husband migrating and the wife staying in the countryside to look after the children and the farm.⁹ While the study of the determinants of gender division of labour is beyond the scope of this article, we investigate whether the effect of remittances on consumption patterns is driven by gender-specific division of labour within the household, that is who migrates and who stays.

⁹ The remainder can be classified as only wife migrating (7.4%), both husband and wife migrating (11.8%) and any migration pattern involving adult children (17.9%).

We repeat IV estimation using the pooled sample of nonrecipient households and split-households only and present the second-stage estimates in Table 5. Compared to the baseline results in Table 3, we can see that the patterns are broadly similar. The point estimate of the mpc out of remittances on total nonhousing expenditure is now slightly above unity in point estimate, but we cannot reject the null of unity given the size of the SE.

We interpret this as suggestive evidence that the identification of the causal effect of remittances on consumption patterns using the full sample of nuclear families is not driven by gender-specific division of labour within the family.

County-level analysis

We collapse the household data from the period 2001 to 2004 to construct system-level aggregate measures of a balanced panel of 105 counties. This would enable us to apply the FE-IV method to eliminate unobservable time-invariant heterogeneity while still allowing for endogeneity or measurement errors in remittances and local employed earnings.

The first-stage results in Table 6 are similar to those in Table 4, but slightly less precisely determined, because of the smaller variation of variables at the more aggregate county level. Nevertheless, our instruments still pass the IV relevance test, and we still cannot reject the null of exogeneity of the instruments for all nonhousing expenditures individually or jointly at the 5% significance level, according to the Hansen J -statistics for over-identification.

Overall, the county-level FE-IV results in Table 7 are broadly in line with the household-level IV estimates.

Table 6. Fixed-effect instrumental-variables (FE-IV) model, 1st-stage estimates, county panel

	Remittances	Local employed earnings
County ownership of telephone, mobile phone, pager or PC	<i>1181.6</i> (706.1)	2501.9 (1091.3)
County workforce migrating	4410.1 (1302.6)	-4864.7 (1889.3)
County under 40 workforce sex ratio	-2663.9 (1033.2)	-541.1 (1495.1)
Test of excluded instruments: $F_{3, 104}$ (p -value)	11.28 (0.000)	2.42 (0.071)
Under identification test:		
Kleibergen–Papp rk LM statistic: χ^2_2 (p -value)		6.824 (0.033)

Notes: Robust SEs in parentheses. $P(H_0: \beta_1 = \beta_2)$ is the p -value for test that the coefficients on remittances and local employed earnings are equal. $P(H_0: \beta_1 = \beta_2 = \beta_3)$ is the p -value for the test that the coefficients on all three income sources are equal. Control variables are the same as those in Table 2, which include province dummies, number of permanent residents, number of dependent children under 16; boy share and number of children aged six or below; age, age squared and dummies for gender and education level of the head of household. Bold and italic cases indicate statistical significance at the 5% and 10% levels, respectively.

Table 7. Fixed-effect instrumental-variables (FE-IV) model, 2nd-stage estimates, county panel

	Food	Clothing	Household goods and services	Other expenditure	Total nonhousing expenditure
Remittances	0.614 (0.178)	<i>0.063</i> (0.034)	<i>0.093</i> (0.049)	0.627 (0.181)	1.396 (0.401)
Local employed earnings	0.690 (0.229)	0.127 (0.044)	0.143 (0.049)	0.685 (0.206)	1.646 (0.443)
Net farm income	0.262 (0.113)	0.032 (0.016)	<i>0.057</i> (0.032)	0.230 (0.120)	0.581 (0.267)
$P(H_0: \beta_1 = \beta_2)$	0.769	0.208	0.397	0.820	0.645
$P(H_0: \beta_1 = \beta_2 = \beta_3)$	0.001	0.027	<i>0.064</i>	0.001	0.000
Hansen J -statistic: χ^2_1 (p -value)	3.534 (0.060)	0.014 (0.906)	0.000 (0.986)	0.001 (0.970)	1.080 (0.299)
RMSE	852.1	144.2	208.4	785.8	1767.8

Although the point estimate of the mpc on total nonhousing expenditure out of remittances is 1.396, we cannot reject the null of unity. Moreover, despite the much smaller sample variation arising from aggregation, we can still formally reject the income pooling hypotheses at the 5% significance level for all expenditure categories except for household goods and services where it is rejected at the 10% level.

Importantly, the FE-IV model estimates suggest that our household-level results are robust with respect to fixed-effect for the county in which the respondents are registered. This implies that the identification of the causal effect of remittances on consumption patterns does not rely on time-invariant cross-sectional variation across counties, such as geographical factors, and lends further support to the idea that the identification comes from changes over time in county-level social network proxies.

Taken together, the evidence strongly suggests that failure to allow for endogeneity will lead to severe downward bias of mpc out of remittance on all nonhousing expenditure categories, by a factor of up to five. It is also worth noting that the mpc of remittances on food is over 0.40 in all specifications. This suggests that remittances are regarded as part of permanent income and are particularly important for the welfare of the poor who spend disproportionately on food.

VI. Conclusions

We focus on the impact of migrants' remittances on consumption expenditures, using a large sample of rural households surveyed in 2001 and 2004 by the National Bureau of Statistics of China. To address the biases caused by the endogeneity of migration as well as potential measurement errors in remittances, we instrument remittances and local employed earnings separately using proxies for social networks at the county level. Using a highly homogenous sample of couples with dependent children, we find that contrary to what the OLS estimates would suggest, the 2SLS estimates indicate that remittances are disproportionately spent on nonhousing expenditures, virtually dollar for dollar, compared to local employed earnings and in particular to income from farming. Moreover, we find that our results hold when we focus on 'split-households', in which husbands engage in migrant labour and wives stay behind. This suggests that our findings are robust to intra-household division of labour.

Moreover, our results are also robust to the control of county fixed-effects when we collapse our data into a balanced panel of 105 counties. This implies that the identification of the causal effect of remittances on consumption patterns comes from changes over time in county-level

social network proxies and does not rely on cross-sectional variation across counties, such as geographical factors.

Our findings are in line with recent studies, which find no link between migration and productive investment in China. These findings imply that recipient households by and large take remittances as permanent income and are consistent with the prevalence of circular and repeat migration, which is largely caused by the combination of the restrictive *hukou* (household registration) system and the land tenure system in China (see, e.g. de Brauw and Rozelle (2008) and Zhu *et al.* (2012)).

However, since our sample effectively excludes all permanent migrants (who bring their families with them to urban areas), which account for about 20% of the migrant workforce, our findings may not be generalized to the whole population of rural residents. Moreover, because of data limitations, we are also unable to rule out biases arising from time-varying unobservables.

Our findings have a number of policy implications. First, given the high level of mpc out of remittances on nonhousing consumption expenditure, increasing migration and hence remittances could be an effective policy instrument in poverty alleviation. There is a strong case for more government intervention to facilitate migration in general, and especially for those caught by poverty traps, through government job intermediaries, training and education programmes and microfinance schemes.

Second, the fact that remittances are predominantly used for consumption purposes implies that growing migration is unlikely to boost capital accumulation, which is much needed to increase productivity in farming and to foster rural development in general, in the absence of fundamental institutional reforms, which liberalize the labour market.

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