

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

Yu Zhu* (University of Kent, LSE)
Zhongmin Wu (Nottingham Trent University)
LiQuan Peng (National Bureau of Statistics, China)
Zude Xian (National Bureau of Statistics, China)

Abstract

Rural-urban migration plays a vital role in China's dual process of urbanization and industrialization. It is estimated that there are as many as 150 million rural-urban migrants within China, compared with 200 million cross-border migrants worldwide. However, despite all its importance, rural-urban migration in China has not received the academic attention it deserves, not least due to a lack of access to survey data.

This study is based on a large sample of rural households from three provinces surveyed in 2001 and 2004, representing the Eastern, Central and Western Region of China respectively. We focus on the impact of migrants' remittances on the level of consumption in general, and on food and housing expenditures in particular. In order to address the biases caused by measurement errors in remittances as well the endogeneity of migration we instrument remittances and non-migrant earnings separately using proxies for agricultural land scarcity and social networks. Moreover, we also allow for county fixed-effects by constructing a balanced panel of 105 counties. We find that the marginal propensity to consume (*mpc*) out of remittances is close to unity, which is far greater than *mpc*'s out of non-migrant earnings or farming. Our results also hold in household-level analysis using a highly homogenous sample of couples with dependent children and contradict earlier literature which typically finds very small effects of remittances on consumption for China. These findings imply that rural households take remittances as permanent income and are consistent with the prevalence of circular migration which is largely caused by the combination of the *hukou* (Household Registration) system and the land ownership system in China. The fact that the fixed-effect instrumental-variable estimates could be an order of magnitude higher than the corresponding OLS estimates highlights the importance of allowing for both endogeneity and heterogeneity in studies of remittances and migration.

Keywords: rural-urban migration, remittances, consumption patterns, fixed-effect instrumental-variables estimation

JEL Classification: D12, D13, J61, R23

* Corresponding author. Tel: +44-1227-827438, Fax: +44-1227-827850, Email: Y.Zhu-5@kent.ac.uk

Acknowledgement: We are grateful to the British Academy for funding this research and to the National Bureau of Statistics of China for providing the data.

1. Introduction

It has been 30 years since China adopted the “reform and opening-up” program under Deng Xiaoping in 1978. During this time period, China has achieved unprecedented economic growth, at almost 10% per year in real terms (see e.g. Naughton 2007). This in turn has resulted in substantial reduction in absolute poverty, as evidenced by a more than five-fold increase in per capita real disposable income and a rapid decline in Engel coefficients between 1978 and 2005 in both the urban and rural sector (see Table 1). However, growing inequality has become a major concern for the Chinese economy¹. This is first and foremost reflected by the ever growing income gap between the urban and the rural areas since the mid 1980s (World Bank 2007). After experiencing a narrowing of the income gap during the first phase of the reform, the ratio of per capita nominal disposable income of urban residents to per capita nominal net income of rural residents (i.e. without the need to use sector-specific price deflators) climbed steadily from 1.86 in 1985 to 3.22 in 2005, which was much higher than the ratio of 2.57 in 1978 (see Table 1)².

< Table 1 here >

It is widely accepted that rural-urban migration has played a vital role in China’s dual process of urbanization and industrialization. Recent estimates suggest that as many as 150 million migrant workers, predominantly young or middle-aged, leave impoverished villages for jobs in fast-growing urban areas in any given year. But largely due to China’s restrictive *hukou* (Household Registration) System which excludes rural residents from the urban social security network, few of these migrant workers (and their children) can settle down in the large cities on a permanent basis. So a typical migrant worker will save a substantial proportion of his/her earned income as remittances to support the immediate and extended families left at home and provide for his/her own

¹ The resolution by the new Chinese leadership in 2006 to establish a “Harmonious Socialist Society” by 2020 explicitly emphasizes the need to address the serious imbalance in the social and economic development between the urban and rural areas, and across regions (Woo 2007).

² This implies that the cost of living as represented by the sector-specific consumer price indices is rising at a slower pace in rural areas. Therefore, whether the urban-rural income gap is growing or remain constant throughout the reform era will depend on whether the sector-specific consumer price indices are used as deflators. Nevertheless, there can be little doubt that rural residents are lagging behind their urban counterparts since the mid 1980s.

retirement. Unfortunately, empirical research on this important topic has been rather scarce, not least because of lack of access to household survey data.

In standard economic theory, the source of income does not matter. However, recent studies exploiting exogenous policy reforms of Child Benefit or pensions (e.g. Lundberg et al. 1997, Kooreman 2000, Edmonds (2002), Duflo 2000 and Blow et al. 2006) present strong evidence that members of household fail to pool their resources in making spending decisions and suggest a rejection of the unitary model of household behaviour. Moreover, US and UK evidence (e.g. Knox JHR 1996 and Walker & Zhu 2006) suggest that child support, the transfer from the non-custodial parent to the parent-with-care to support the children, has a *causal* effect on children's educational outcomes well over and above income from other sources.

This paper will focus on the role of remittances in rural China. In particular, we want to examine the extent to which remittance can have an effect on consumption patterns over and above income from other sources. The outcomes we will focus on are food and housing expenditure, which represent by far the most important expenditure categories in rural China.

We follow the earlier work that conducts parametric Engel curve estimation, and tests for differential marginal propensities to consume out of three different sources of income: 1) remittances, i.e. migrant earnings less expenses (or the actual amount the household receives from migrants; 2) non-migrant earnings, i.e. other wages and salaries from employment in local enterprises and organizations; 3) any other net income, predominantly net profits from household operations (self-employment in farming) but also includes net incomes from properties and transfers. We model the full range of household total living expenses comprising 8 categories including housing. We choose not to exploit the variation across by different household types as the results might not be robust to the specification of the demographic variables in the model. Thus, our household-level analysis will be based on samples of couples with dependent children.

The paper is organized as follows: section 2 describes the stylized facts on rural-urban migration in China in recent years and briefly reviews the literature; section 3 presents the empirical model and discusses the key economic and econometric issues;

section 4 summarizes the data; section 5 presents empirical findings; and section 6 concludes.

2. Rural-urban migration in China – “History’s Largest Labor Flow”

Prior to 1978, the level of urbanization of China as measured by the share of urban population was only around 18% while rural-urban migration was virtually non-existent, due to the restrictive *hukou* system (Zhang and Song 2003). This dual system which classified each household as having either an agricultural or non-agricultural *hukou* was designed to set up and maintain social control, and in particular to block 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, healthcare to education (see e.g. Aaberge and Zhu 2001, Fan 2008). Closely linked to the *hukou* system is the collective ownership of land which rules out the sale of land and makes even subcontracting of land costly (NBS 2005a).

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 labor surplus. By the mid 1990s, this surge in migration has already been described as **“History’s Largest Labor Flow”³**. All the evidence suggests that the trend has accelerated in recent years, for instance, the net flow of rural labor force into the non-agricultural sector during the 2000-2004 period was a all-time high, at 9.84 million per annum, comprising a 4.33 million net growth of the rural labor force and a 5.50 million net outflow from the agricultural sector (NBS 2005a, p6).

Given its apparent importance, there seems to be surprisingly few studies on rural-urban migration in China, especially in the economics literature published in the English media. In our opinion, there are at least three main reasons for this apparent gap. First, there is the difficulty in measuring the stocks and flows of migration (Goodkind and West 2002, Fan 2008). For instance, Zhang and Song (2003) noted that “the data

³ This was the title of a special session on China’s rural migration at the 1999 American Economic Association Conference.

from different sources or the same sources in different time may not be consistent due to problems of frequently changing definitions of urban and rural population". However, the situation seems to have improved significantly since 2000 (Zhang and Song (2003)). Secondly, there appears to be a lack of interaction between Chinese researchers who are preoccupied with policy making and the more academic-oriented researchers in the West. Last but not least, there is a general lack of access to Chinese household data.

According to Knight and Song (2005), China still does not even possess a fully functioning labor market by 2005, as the urban labor market is segmented between migrants and urban residents to a large extent with insufficient competition between them. However, the old administered labor system had become history and China is firmly moving towards the creation of a labor market. For latest overviews of migration trends, see Liang and Ma (2004) and Fan (2008).

In line with the neo-classical economics of migration (NCEM) which stresses the "Push and Pull" factors (see Todaro 1969, Harris and Todaro 1970), there appears to be a general consensus that the increased demand for labor in urban areas and the widening income differential are the driving forces behind the recent massive internal migration in China (Zhang and Song 2003, Wu and Zhu 2004, Knight and Song 2005). The migration pattern is also consistent with an overall picture of the rising rural-urban income differential due to increased urban subsidies, investments and credits during the reform period (Yang 1999). Moreover, an increase in rural labor surplus caused by a combination of a reduction in cultivated land or a increase in the labor force or rising agricultural productivity is also found to have a positive impact on migration (see e.g. Zhao 1999).

One distinctive feature of the literature on Chinese migration is its emphasis on the institutional settings which centre around the *hukou* and the land ownership system. For instance, Roberts (1997) attributes the striking similarities between Chinese internal migration and undocumented Mexican migration to the US - in such key respects as the dominance of circular migration, large income differentials between sending and receiving areas, legal obstacles that prevent permanent settlements and surplus labor in

agriculture – to the *hukou* system. Whalley and Zhang (2007) highlight a key role for *hukou* restrictions in supporting inequality in China.

While NCEM assumes that the migrant simply maximizes his or her earnings (and possibly the duration of the stay to achieve permanent settlement) as an individual, the New Economics of Labor Migration (NELM) takes the household perspective and emphasizes the role of social networks (see Mincer 1978, Katz and Stark 1986). Few studies adopt this approach to study Chinese migration. Notable exceptions include Taylor et al. (2003) who models migration as a household decision and Fan (2008, Chap 4, 6) who documented the importance of social networks in both the migration process and the job search experiences.

Comparing to the empirical literature on the determinants of migration in China, the impact of migration and remittances on rural China is even less understood. Both Ravallion and Chen (2004) and Du et al. (2005) report a positive effect of migration on poverty reduction. However this effect is limited as the poorest can't afford to migrate. Rozelle et al. (1999) suggests that migration has a small negative effect on agricultural productivity, although remittance has the offsetting effect through loosened credit constraint. Secondi (1997) presents evidence that grandparents exchange remittances with their migrant adult children for childcare.

3. The Empirical Model

This paper will focus on the impact of remittances on consumption in rural China. In particular, we want to examine the extent to which remittance can have an effect on consumption patterns over and above income from other sources. While we will model the whole of household total living expenses comprising 8 categories, the main focus will be food and housing expenditure, which represent by far the most important expenditure categories in rural China.

We follow the earlier work by Kooreman (2000) and Edmonds (2002) that conducts parametric Engel curve estimation, and tests for differential marginal propensities to consume (*mpc*) out of three different sources of income: 1) remittances,

i.e. net earnings from migration after deducting travel and living costs; 2) non-migrant earnings, i.e. other wages and salaries from employment in local enterprises and organizations; 3) any other net income, predominantly net profits from household operations (self-employment in the traditional agrarian sector) but also includes net incomes from properties and transfers. In the following, these three terms will simply be referred to as remittances, non-migrant earnings and farming.

We model the whole of household total living expenses comprising 8 categories including housing. We choose not to exploit the variation that has occurred by different household types as the results might not be robust to the specification of the demographic variables in the model. Thus, our household-level analysis will be based on samples of couples with dependent children.

A rural household in China today faces three options in the labor market (Knight and Song 2005, Chap 8):

- 1) Farming. This is the most traditional way of life for farmers. However, due to the very low per capita plot of cultivated land (around 1.05 *Mu* or 0.07 hectare in our data), the marginal productivity of labor is very low. The fact that land are non-transferable due to state ownership and periodic readjustments are carried out to ensure absolute per capita equality of landholding in the village also provides peasant with poor incentives to make long-term investments to further improve and diversify production.
- 2) Local non-farm employment. This is primarily employment in the local Township and Village Enterprises (TVEs), but also include all other employment in the local government or non-government organizations.
- 3) Migration for work away from home, normally in the towns and cities. A migrant is defined as someone whose place of employment is out of the *xiang* (township) of the *hukou* registration. Out of the 14320 migrants in our pooled sample from 2001 and 2004, only 23.7% report a **main region of employment** as intra-county (that actually includes migrants who have been working outside the county but only for a relatively short period of time during the year), while 22.6% and 53.5% are inter-county (but intra-province) and inter-province migrants respectively.

Migrants in the 2004 survey are found to travel further away, with only 19.2% as intra-county and 57.1% as inter-province respectively⁴.

Accordingly, in our empirical specification we decompose total household net income into 3 components, namely remittances, non-migrant earnings and a residual category predominated by income from farming. More specifically, we assume that expenditure on good i by household h is given by

$$e_i^h = f_i(x^h, y^h, z^h) + W^h \beta + \varepsilon_i^h \quad (1)$$

where x^h and y^h are household h 's remittances and non-migrant earnings respectively and z^h is all other net income (defined as total net income less remittances and non-migrant earnings), W^h is a vector of exogenous characteristics and ε_i^h captures the unobservable determinants of spending patterns. In our parametric analysis below, we further assume that $f_i(x^h, y^h, z^h)$ is linear and additively separable. This follows earlier research by Kooremen (2000) and Edmonds (2002) who estimate simple specifications where expenditure on each good is assumed to be a linear function of Child Benefit (CB) and of total expenditure less CB. To ensure that our results are as robust as possible we select relatively homogenous samples to minimise the importance of Z in our pooled cross-sectional analysis. Our objective is to test whether $f_i(x^h, y^h, z^h)$ is simply additive. That is, we test if remittance has the same effects on expenditures as other sources of net income.

The main econometric challenges to the estimation of equation (1) in the Chinese context are three fold:

- 1) Measurement error in remittances. This might be caused by a combination of misreporting in either the gross migrant earnings or the cost of living away from home (or both) and possible misallocation of remittances to a different budget year. Note that 12.6% of households with migrants report zero remittances while 19.3% of households with no migrant workers report positive remittances in the current year.

⁴ Chapter 2 of Fan (2008) presents compelling evidence that inter-provincial migration has grown significantly in the 1990s using the 1990 and 2000 censuses.

- 2) Endogeneity in remittances and other sources of income. It is clear that both labor supply decisions (and hence migration and remittances) are jointly determined with consumption decisions, often as part of the household strategy to maximize household net income and to diversify risks (see the NELM literature).
- 3) Heterogeneity. There is considerable heterogeneity in consumption patterns across regions and across households.

In this paper we will pursue two different identification strategies. Firstly we will pool data from 2001 and 2004 to construct a balanced panel of 105 counties. We will then be able to apply the fixed-effects instrumental-variables (FE-IV) method to allow for both unobservable county-specific fixed-effects and endogeneity or measurement errors in remittances and other sources of income. Secondly, we run instrumental-variables estimation at the household level using a subsample of highly homogenous households to minimize the risk of misspecifying the demographic variables in the model.

4. Data

The main dataset for this project is based on a large sample of rural households from the provinces of Jiangsu, Anhui and Sichuan surveyed in 2001 and 2004, representing the Eastern, Central and Western Region of China respectively, as part of the Rural Household Survey (RHS) of China. According to the latest statistics, rural-urban migration from these three provinces account for around 20% of the national total.

The RHS is a nationally representative social and economic survey containing production, consumption and social activities of rural residents. Village characteristics are also collected. Our sample contains 10,500 households in each of the two survey years. Although interviews are not carried out at the destination, migrants' remittances are identified as a distinctive component of total net household income in the household records⁵.

⁵ Per capita net income is the most important measure of living standards for rural areas in Chinese government statistics.

36% of the rural labor force⁶ in our 2004 sample 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. Migrants spend an average of 8.8 months in migrant work and 2.7 months in agricultural work at home. The mean annual gross migrant income is 7741.5 yuan, of which 4071.3 yuan, or 53% is remitted. The prevalence of temporary and circular migration is in accordance with earlier research (see e.g. Fan 2008) and helps explain why migration has had minimal impact on agricultural production.

Social networks play a vital role in the migration process. In our 2004 sample 66.4% of migrants get their jobs through friends and relatives, 18.8% through job agencies, while only a tiny 1.4% through government channels. So a rural household's chance of migrating 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.

< Figure 1 here >

Figure 1 shows the proportion of rural labor force in migrant labor, non-migrant labor and farming by provinces and year, calculated from the personal records of our sample. It is clear that there has been a dramatic increase in migration across all regions over our three-year sample period while the growth in non-migrant (non-farm) employment has been more modest. While Jiangsu province has the lowest fraction of rural labor force engaging in migrant labor, it also has by far the highest share of non-migrant employment and by 2004 the overall share of non-farm employment has dropped below the 50% threshold. This pattern is consistent with Jiangsu being the richest province in the sample, with a per capita rural net income of 4754 yuan, comparing to 2499 yuan for Anhui and 2519 yuan for Sichuan in 2004 (NBS 2005b).

We first aggregate our data to construct a balanced panel of 105 counties, each observed in both 2001 and 2004. This would allow us to apply the fixed-effects

⁶ Following the official definition, we base our calculation of rural labor force on the sample of males aged 18-50 and females aged 18-45 inclusive.

instrumental-variables (FE-IV) method to account for both unobservable county-specific fixed-effects and endogeneity or measurement errors in remittances and other sources of income. Hence the causal effect of remittances on consumption is identified through variations over remittances across counties and over time that are uncorrelated with the error terms in the consumption functions.

< Table 2 here >

Table 2 shows the summary statistics of the panel of counties. It is clear that remittances are making a significant contribution to total net income, accounting for 17.6% on average, while non-migrating earnings account for 22.2%. However, net income from farm work is still the dominant source of income, comprising over 60% of the average total of 11845 yuan a year in 2004 constant prices. The mean total living expenditure is just over 8000 yuan a year, comprising 1200 yuan (15%) on housing and 6800 (85%) on all non-housing living expenses, the latter further broken down into 7 categories. Food still accounts for over half of non-housing living expenses, reflecting the fact that China is still a lower-middle income country by and large. Average level of education is comparatively low, with 5 out of 6 in the labor force having a qualification at low-secondary level or below. Around 30% of the labor force has experienced some migration in the survey year, with another 8% in non-migrant employment. Per capita cultivated land is only at 1.05 *mu*, which is equivalent to 0.07 hectare, implying a high level of surplus labor.

An alternative identification strategy is to exploit the (greater) variations in sources of income at the household level. However, one might be concerned that a linear specification of demographic variables as in equation (1) might not fully capture the complexity of possible interactions between household members. For instance, in three-generation households part of remittances could be used to support the elderly who may in turn provide childcare (see Secondi 1997). Therefore we will focus on the highly homogenous group of couples with children, of which at least one is below 16 in this paper⁷. We exclude households whose heads are over 60 or have missing education

⁷ Comparing to the unmarried, this group is much less likely to settle in urban areas due to the lack of access to the state educational system in cities and towns. Fan (2008) documented the increased popularity

qualification. We have also dropped 15 household with negative net income, and ended up with just under seven thousand households pooled over two years.

< Table 3 here >

Table 3 compares key characteristics of households with and without remittances (loosely speaking migrant and non-migrant families) in the survey year⁸. Just over half of couples with dependent children report positive remittances. Households not receiving remittances have a total net income of 11,100 yuan, which is about 3 percent higher than households with remittances. Taking into account the differences in household sizes, the income gap widens to more than 7 percent. While migrant couples receive almost 4000 yuan a year from remittances, which accounts for 36.7% of their total net income, they receive less from both non-migrant earnings and farming than non-migrant couples in both absolute and relative terms. The contrast in contribution from non-migrant earnings is particularly striking, at 10.6% and 28.9% respectively.

Despite a 10% gap in total expenditure, the budget shares are remarkably similar across the two family types. Note that the budget share of transport and communications for migrant families is no higher than that for non-migrant families because all travel costs and living expenses away from home have already been deducted before calculating total net income.

Table 3 also shows that the head of a migrant household is marginally older and slightly less likely to hold a qualification above the lower-secondary level. On the other hand, there appears to be more a significant gap in favour of non-migrants in the value of the house, which is a good proxy of wealth, and ownership of personal communication equipments. Perhaps surprisingly, the average land size is only slightly in favour of non-migrants.

< Figure 2 here >

< Figure 3 here >

of the “split households” that entails one spouse engaging in migrant labor while the other spouse stays in the village to farm and take care of children and house chores.

⁸ 12.6% of households with migrants report zero remittances while 19.3% of households with no migrant workers in the survey year report positive remittances.

The migration literature is heavily influenced by the theory of human capital. Figures 2 and 3 show the sources of income and consumption expenditure on key items by the education level of the head of household in the couples sample. It appears that there is little variation in net income from farming across the educational distribution. On the other hand, remittances peak at the level of junior secondary level. Most interestingly, there seems to be a very strong negative correlation between qualifications and non-migrant earnings.

In general, expenditures on all items increase with the education of the head of household. This is hardly surprising given the homogeneity of our sample and the monotonically increasing education-income profile.

5. Empirical Results

In the interest of brevity, we will only present the FE-IV estimates for our balanced panel of counties in the text while leaving results of OLS, FE and IV estimates to the Appendix. We will show estimates for all seven non-housing categories individually and as a whole. Housing is presented alongside total non-housing expenditure in the last column, as one might be concerned with its highly skewed distribution caused by the construction of new houses and refurbishment of old houses in the survey year. However, this is unlikely to be a major problem in our aggregate data, which is the mean of on average 100 households in the county in any year.

< Table 4a+4b here >

Table 4a presents the results of the FE-IV model, with remittances and non-migrant earnings instrumented using proxies for social network and agricultural land scarcity. Failing to reject the exogeneity of the residual net income component (which is labelled as net farming income), we decide to treat it as exogenous in the empirical specification. The first-stage results in Table 4b demonstrates clearly that remittances and non-migrant earnings are identified on different instruments, with remittances predicted by the fraction of labor force in the county migrating and non-migrant earnings predicted by the fraction of labor force in non-migrant employment and per capita cultivated land

in the county. Taken together, these instruments did a very good job at predicting the two different components of non-farming income. Moreover, we fail to reject the null of exogeneity of the instruments in all but the housing equation, according to the Sargan-test for over-identification.

The *mpc* out of remittances on total non-housing expenditure is found to be 0.759, meaning that for each additional yuan of remittance more than 75 cents will be consumed while another 9 cents will be spent on housing, leaving very little for saving and investment in agriculture. In contrast, only 61 cents and 24 cents will be used on non-housing living expenditure for each additional yuan of non-migrant earnings and farm income respectively. In contrast, both non-migrant earnings and farm income contribute more to housing expenditure than remittances, with *mpc*'s between 0.23 and 0.26. It is also worth noting that two-thirds of the high *mpc* of remittances can be explained by food, which only accounts for little over half of the non-housing budget. This implies that remittances are treated as part of permanent income and are particularly important for the welfare of the poor who spend disproportionately on food accordingly to Engel's Law.

Comparing the FE-IV estimates to the OLS, FE and IV estimates in Tables A1 through A3 in the Appendix, we can see that failure to allow for either endogeneity or heterogeneity will lead to biased estimates. As an example, the OLS estimate of *mpc* out of remittances is only 0.435, meaning less than half of an extra yuan of remittances will be consumed. Allowing for county-fixed effects alone increases it to 0.591 while accounting for endogeneity and measurement error in income (but ignoring county-fixed effects) raises *mpc* to 0.675.

< Table 5a+5b here >

Finally, we turn to household-level analysis. We remove much of the heterogeneity in consumption patterns across households by looking at a highly homogenous group of couples with dependent children. Our regression also controls for provinces, year and the interactions between provinces and years, as well as number of permanent residents, number of dependent children, boy ratio, and number of children in the age groups 0-16, 7-15, number of people over 61, a quadratic in the age and level of education of the head of household.

Table 5 presents the IV estimates while Table A4 in the Appendix shows the corresponding OLS results. The first-stage results in Table 5b show that all three instruments which proxy social networks are individually significant at the 5% level in predicting remittances and non-migrant earnings. Specifically, higher levels of ownership of telecommunication equipments predict higher earnings from both migrant and non-migrant labor, while higher under-40 workforce sex ratio have the opposite effect on both types of earnings. The fraction of workforce in the county migrating has a positive impact on remittances but a negative impact on non-migrant earnings. Put together, these instruments had a high predicative power on the two endogenous variables. Moreover, we can not reject the null of exogeneity of the instruments in all consumption categories except for other expenditures, according to the Sargan statistics.

The IV estimate of the *mpc* on non-housing total expenditure out of remittances is 0.90, which is in excess of the corresponding figures of 0.78 and 0.32 for non-migrant earnings and farm income respectively. For each additional yuan of remittance, 30 cents go to food, 23 cents to leisure and 17 cents to transport and communications. Comparing to the county-level analysis which models a “representative household”, leisure turns out to be much more important for couples with dependent children, presumably because it comprises school fees and other expenses related to children’s education.

A comparison of Table 5a and Table A4 shows that the IV estimates for food as well as total non-housing expenditure are about 5 times as large as the corresponding OLS estimates while those for health and leisure are an order of magnitude higher.

Comparing to the results in Table 4, we can see the pattern is broadly similar, despite the differences in level of aggregation, sample coverage and estimation methods. Unlike previous studies which typically find a very small effect of remittances on consumption in China (see e.g. Zhao 1999), our results suggest that remittances are by and large regarded as permanent income and are consistent with the prevalence of circular migration which is largely caused by the combination of the *hukou* system and the land ownership system in China.

6. Conclusions

This study is based on a large sample of rural households from three provinces surveyed in 2001 and 2004, representing the Eastern (Coastal), Central and Western Region of China respectively. We focus on the impact of migrants' remittances on the level of consumption in general, and on food and housing expenditures in particular. In order to address the biases caused by measurement errors in remittances as well the endogeneity of migration we instrument remittances and non-migrant earnings separately using proxies for agricultural land scarcity and social networks. Moreover, we also allow for county fixed-effects by constructing a balanced panel of 105 counties. We find that the marginal propensity to consume (*mpc*) out of remittances is close to unity, which is far greater than those out of non-migrant earnings or farming. Our results also hold in instrumental-variable estimation at the household-level using a highly homogenous sample of couples with dependent children, despite the differences in level of aggregation, sample coverage and estimation methods. Our findings strongly contradict earlier literature which typically find very small effects of remittances on consumption for China. These findings imply that rural households take remittances as permanent income by and large and are consistent with the prevalence of circular migration which is largely caused by the combination of the *hukou* (Household Registration) system and the land ownership system in China. The fact that the fixed-effect instrumental-variable estimates could be an order of magnitude higher than the corresponding OLS estimates highlights the importance of allowing for both endogeneity and heterogeneity in studies of remittances and migration.

Our findings have a number of implications. Firstly, given the high level of *mpc* out of remittances, increasing migration and hence remittances will have a very strong positive impact on poverty reduction in rural China than other policy instruments. However, the poorest part of the rural population is conceivably least likely to benefit from the new economic opportunity arising from migration, given the disadvantaged positions in financial, human and social capital. Therefore there is a strong case for more government intervention to facilitate migration in general, and especially for those caught in poverty traps, through government job intermediaries, training and education programs and microfinance schemes. Secondly, the fact that remittances are predominantly used for

consumption purposes implies that growing migration is unlikely to boost capital accumulation which will in turn increase productivity in farming.

A lot more research are needed before we get a better understanding of history's largest labor flow. Of particular interest is how families strategically use migration to maximize household income and to diversify risk given the constraints imposed by the institutions. Moreover, the impact of migration on other outcomes such as education, fertility and gender equality are of great interest to policy makers and researchers alike.

References

- Aaberge, R. and Zhu, Y. "The Pattern of Household Savings during a Hyperinflation: The Case of Urban China in the 1980s", **Review of Income and Wealth**, 2001, 47(2) pp. 181-202.
- Blow, L. Walker, I. and Y. Zhu (2006), "Who Benefits from Child Benefit", The **Warwick Economics Research Paper Series**, No. 749.
- Du, Y., Park, A. and S. Wang (2005), "Migration and Rural Poverty in China", **Journal of Comparative Economics**, 33(4), pp. 688-709.
- Duflo E. (2000), "Child health and household resources in South Africa: Evidence from the Old Age Pension Program", **American Economic Review: Papers and Proceedings**; 90; 393-98.
- Edmonds, E.V. (2002), "Reconsidering the Labelling Effects of Child Benefits: Evidence from a Transitional Economy", **Economics Letters**, 76, 303-309.
- Fan, C. C. (2008) **China on the Move – Migration, the state, and the household**, Routledge.
- Goodkind, D and L. A. West (2002), "China's Floating Population: Definitions, Data and Recent Findings", **Urban Studies**, 39 (12), pp. 2237-2250.
- Harris, J. R. and M. P. Todaro (1970) "Migration, Unemployment and Development: A theoretical Analysis," **American Economic Review**, 60, pp. 126-142.
- Liang, Z. and Z. Ma (2004) "China's Floating Population: New Evidence from the 2000 census," **Population and Development Review**, 33 (3), pp. 467-488.
- Katz, E. and O. Stark (1986) "Labor Migration and Risk Aversion in Less Developed Countries," **Journal of Labor Economics**, 4(1), pp. 134-149.
- Knight, J. and L. Song (2005) **Towards a Labor Market in China**, Oxford University Press.
- Knox, V.W. (1996). "The Effects of Child Support Payments on Developmental Outcomes for Children in Single-Mother Families", **Journal of Human Resources**, 31(4), pp. 816-840.

- Kooreman P. (2000) "The Labelling Effect of a Child Benefit system", **American Economic Review**; 90; 571-83.
- Liu, Zhijun (2005) "An Economic Analysis of the Rural-Urban Migration in China", **Lincoln Institute of Land Policy Working Paper**.
- Lundberg S., Pollak R.A., Wales T.J. (1997) "Do Husbands and Wives Pool Their Resources?", **Journal of Human Resources**; 1997; 32; 463-480.
- Mincer, J. (1978) "Family Migration Decisions," **Journal of Political Economy**, 86 (5), pp. 749-773.
- Naughton, B. (2007), "Reframing China Policy: The Carnegie Debates", **Journal of Chinese Economic and Business Studies**, Vol. 5, No. 3, 193-202.
- NBS (National Bureau of Statistics) (2005a), **Research on Rural Labor of China 2005**, China Statistics Press (in Chinese).
- NBS (2005b) **China Statistical Yearbook 2005**. China Statistics Press.
- NBS (2006) **China Statistical Yearbook 2006**. China Statistics Press.
- Ravallion, M. and S. Chen (2004), "Learning from Success", **Finance and Development**, 41 (4), pp. 16-19.
- Roberts, K. D. (1997) "China's 'tidal wave' of Migrant Labor: What Can We Learn from Mexican Undocumented Migration to the United States?" **International Migration Review**, 31 (2), pp. 249-293.
- Rozelle, S., Taylor, J. E. and A. de Brauw (1999), "Migration, Remittances and Agricultural Productivity in China", **American Economic Review: Papers and Proceedings**, 89 (2), pp. 287-291.
- Secondi, G. (1997), "Private Monetary Transfers in Rural China: Are Families Altruistic?", **Journal of Development Studies**, 33 (4), pp. 487-511.
- Taylor, J. E., Rozelle, S. and A. de Brauw (2003), "Migration and Income in Source Communities: A New Economics of Migration Perspective from China", **Economics Development and Cultural Change**, 52 (1), pp. 75-101.
- Todaro, M. P. (1969) "A Model of Labor Migration and Urban Unemployment in Less Developed Countries," **American Economic Review**, 59, pp 138-148.
- Walker, I. and Y. Zhu (2006) "Child Support and Educational Outcomes", presented at the **2006 European Society for Population Economics (ESPE) conference**.
- Whalley, J. and S. Zhang (2007), "A Numerical Simulation Analysis of (Hukou) Labor Mobility Restrictions in China", **Journal of Development Economics**, 82(2), pp. 392-410.
- Woo, W. T. (2007), "Reframing China Policy: The Carnegie Debates", **Journal of Chinese Economic and Business Studies**, Vol. 5, No. 3, 179-191.
- World Bank (2007), **World Development Report 2008**.

- Wu, Z and Y. Zhu (2004), "Income Differential on Out-migration: the Impact of Between-Gap and Within-Gap", **Journal of Chinese Economic and Business Studies**, Vol. 2 no. 1, pp. 27-38.
- Yang, D. T. (1999), "Urban-Biased Policies and Rising Income Inequality in China", **American Economic Review: Papers and Proceedings**, 89 (2), pp. 306-310.
- Zhang, K. H. and S. Song (2003), "Rural-Urban Migration and Urbanization in China: Evidence from Time-Series and Cross-Section Analyses", **China Economic Review**, 14(4), pp. 386-400.
- Zhang, Mei (2003) **China's Poor Regions. Rural-Urban Migration, Poverty, Economic Reform and Urbanization**, Routledge.
- Zhao, Y. (1999), "Leaving the Countryside: Rural-to-Urban Migration Decisions in China", **American Economic Review: Papers and Proceedings**, 89 (2), pp. 281-286.

Figures

Figure 1: Type of Employment of Rural Workforce by Province and Year

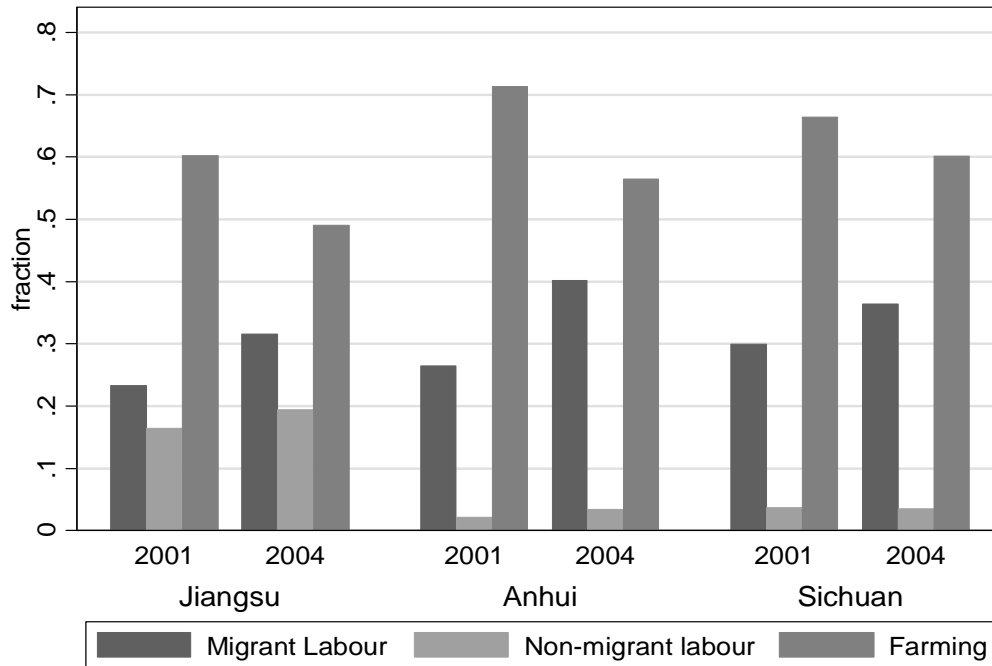


Figure 2: Sources of Net Income by Highest Qualifications of Head of Household

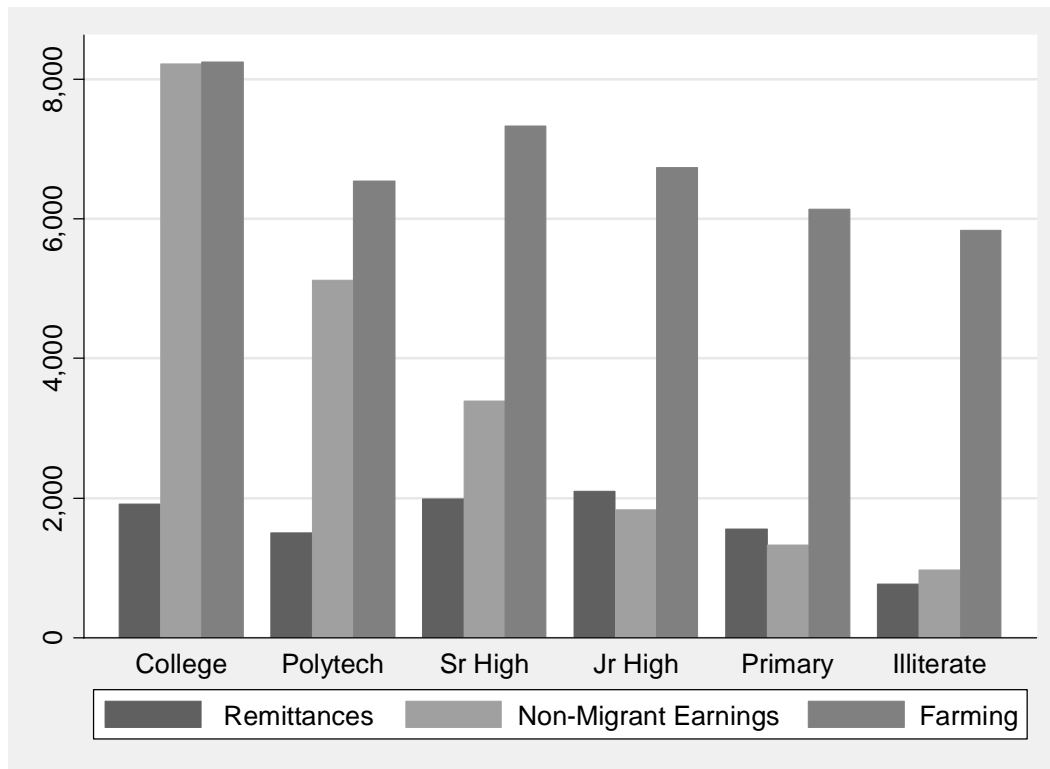
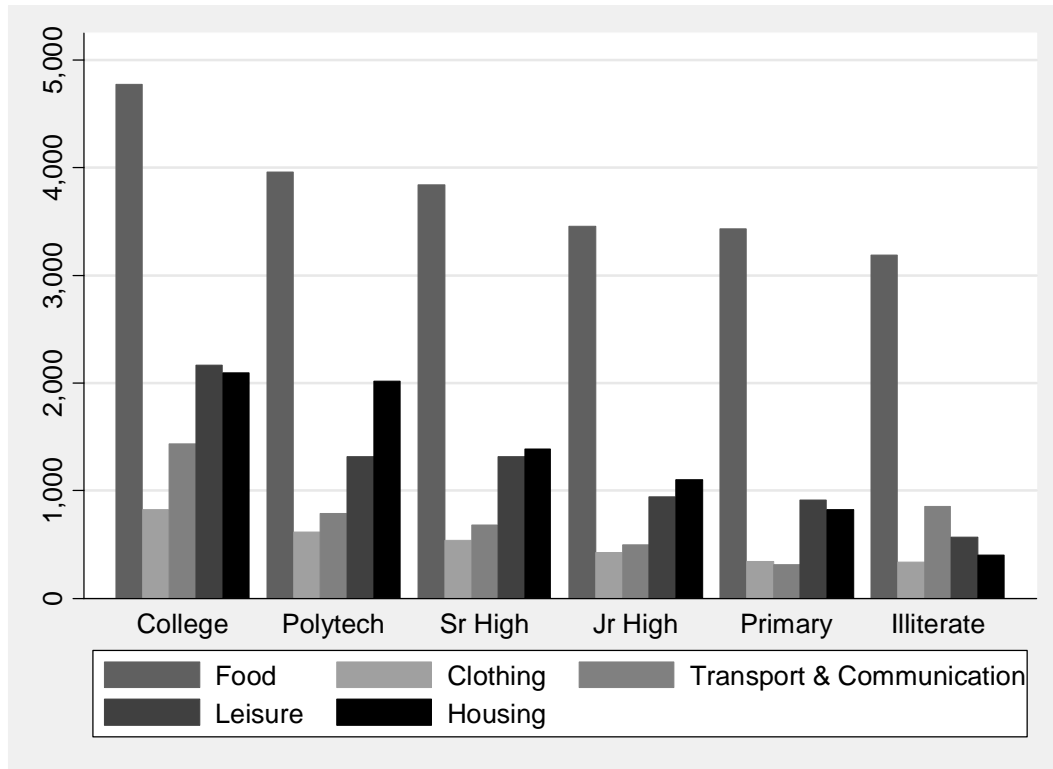


Figure 3: Expenditures by Highest Qualifications of Head of Household



Tables

Table 1: Per capita Real Disposable Income and Engel Coefficients for Urban and Rural Households and the Urban-rural Income Ratio, Selected Years.

Year	Urban per capita real disposable income, Index (1978=100)	Rural per capita real net income, Index (1978=100)	Urban Engel coefficient	Rural Engel coefficient	Urban-rural income ratio
1978	100.0	100.0	57.5	67.7	2.57
1980	127.0	139.0	56.9	61.8	2.34
1985	160.4	268.9	53.3	57.8	1.86
1990	198.1	311.2	54.2	58.8	2.20
1995	290.3	383.6	50.1	58.6	2.71
2000	383.7	483.4	39.4	49.1	2.79
2005	607.4	624.5	36.7	45.5	3.23

Sources: NBS (2006) China Statistical Yearbook 2006 and authors' own calculations.

Table 2: Summary characteristics:

	Mean	Standard Deviation	Share (%)
Total Net Income, of which	11845.0	4612.7	100.0
Net migrant income (remittances)	2080.8	1216.7	17.6
Non-migrant earnings	2627.6	3724.6	22.2
Other net income (farming etc)	7136.6	1841.3	60.2
Total Living Expenditure, of which	8047.7	3137.3	100.0
Housing	1223.0	1165.1	15.2
Total Non-Housing Expenditure, of which	6824.7	2293.2	84.8
Food	3910.5	1025.6	57.3
Clothing	414.0	214.7	6.1
Household Goods & Services	352.9	204.0	5.2
Health	447.5	247.8	6.6
Transport and communications	594.6	466.3	8.7
Leisure	909.9	402.1	13.3
Other expenditure	195.3	156.8	2.9
Number of residents	3.92	0.47	
Total Net Income per capita	3111.6	1386.7	
Workforce with College Education	0.019	0.020	
Workforce with Polytech Education	0.025	0.018	
Workforce with Sr. High Education	0.118	0.053	
Workforce with Jr. High Education	0.567	0.109	
Workforce with Primary Education	0.228	0.107	
Workforce who are Illiterate	0.042	0.063	
Number of Dependent children	0.787	0.266	
Boy Ratio	0.562	0.068	
County Workforce Migrating	0.303	0.141	
County Workforce in Non-migrant Employment	0.083	0.136	
Cultivated land per capita in the village ($\mu=0.0667$ hectare)	1.048	0.338	
Observations	210		

Notes: Income and expenditures are annual amounts of RMB yuan in 2004 constant prices.

Table 3: Summary characteristics of households without and with remittances:

	Households without remittances	Households with remittances
Total Net Income, of which	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%)
Total Living Expenditure	7955.3	7063.9
Housing	1308.3 (16.4%)	989.5 (14.0%)
Total Non-Housing Expenditure, of which	6647.1 (83.6%)	6074.4 (86.0%)
Food	3664.4 (55.1%)	3407.9 (56.1%)
Clothing	477.1 (7.2%)	410.2 (6.8%)
Household Goods & Services	359.1 (5.4%)	289.1 (4.8%)
Health	372.4 (5.6%)	328.9 (5.4%)
Transport and communications	560.6 (8.4%)	484.2 (8.0%)
Leisure	1043.8 (15.7%)	989.0 (16.3%)
Other expenditure	169.7 (2.6%)	165.1 (2.7%)
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 College	0.008	0.002
Highest Education of HoH Polytech	0.023	0.013
Highest Education of HoH Sr. High	0.140	0.118
Highest Education of HoH Jr. High	0.620	0.643
Highest Education of HoH Primary	0.191	0.207
Highest Education of HoH Illiterate	0.019	0.017
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

Notes: Income and expenditures are annual amounts of RMB yuan in 2004 constant prices. Figures in parentheses are shares of total.

Table 4a, Fixed-effect Instrumental-Variables Model, 2nd-stage estimates

	Food	Clothing	HH Goods & Serv	Health	Transport-commun.	Leisure	Other Expenditure	Total Non-housing	Housing
Remittances	0.526 (0.218)	-0.030 (0.037)	0.014 (0.047)	-0.025 (0.066)	0.258 (0.105)	0.041 (0.086)	-0.026 (0.039)	0.759 (0.350)	0.086 (0.387)
Non Migrant earnings	0.170 (0.189)	0.052 (0.032)	0.018 (0.041)	0.008 (0.057)	0.244 (0.091)	0.118 (0.075)	-0.000 (0.034)	0.611 (0.304)	0.262 (0.336)
Net farm income	0.132 (0.053)	-0.003 (0.009)	0.023 (0.011)	-0.003 (0.016)	0.080 (0.026)	0.032 (0.021)	-0.023 (0.010)	0.236 (0.086)	0.225 (0.094)
Sargan Statistics: χ^2_1 (p-value)	2.034 (0.154)	1.811 (0.178)	0.607 (0.436)	0.426 (0.514)	0.440 (0.507)	0.347 (0.556)	0.845 (0.348)	0.650 (0.420)	5.134 (0.024)
Root Mean Squared Err.	434.7	72.8	93.8	131.7	208.8	171.1	77.6	698.0	770.1

Table 4b, Fixed-effect Instrumental-Variables Model, 1st-stage estimates

	Remittances (net migrant income)	Non-migrant earnings
County Workforce Migrating	3526.0 (969.9)	-840.9 (940.0)
County Workforce in Non-migrant Employment	-1584.6 (1636.0)	5057.0 (1585.6)
Cultivated land per capita in the village (<i>Mu</i> =0.0667 hectare)	127.0 (557.8)	-1702.6 (540.6)
Partial R-sq of excluded instruments: $F_{3, 93}$ (p-value)	4.66 (0.004)	6.59 (0.000)
Anderson canon. Corr LM statistic: χ^2_2 (p-value)	11.733 (0.003)	

Notes: Control variables include fraction of labor force at education level of college, polytech, senior high school, primary and illiterate (junior high school being the reference category), number of permanent residents per household, number of dependent children per household and boy ratio. Bold cases indicate statistical significance at the 5% level. Standard errors in parentheses unless indicated otherwise.

Table 5a, Instrumental-Variables Estimates of the Pooled Sample, 2nd-stage estimates

	Food	Clothing	HH Goods & Serv	Health	Transport-commun.	Leisure	Other Expenditure	Total Non-housing	Housing
Remittances	0.301 (0.040)	0.048 (0.011)	0.060 (0.015)	0.055 (0.028)	0.171 (0.028)	0.226 (0.035)	0.039 (0.012)	0.900 (0.097)	0.081 (0.133)
Non Migrant earnings	0.291 (0.015)	0.082 (0.004)	0.069 (0.006)	0.047 (0.011)	0.142 (0.011)	0.136 (0.013)	0.018 (0.004)	0.784 (0.037)	0.278 (0.051)
Net farm income	0.127 (0.007)	0.022 (0.002)	0.026 (0.003)	0.016 (0.005)	0.060 (0.005)	0.062 (0.006)	0.011 (0.002)	0.324 (0.018)	0.133 (0.024)
Sargan Statistics: χ^2_1 (p-value)	0.833 (0.361)	0.267 (0.606)	0.004 (0.950)	0.968 (0.325)	0.348 (0.556)	0.275 (0.600)	13.254 (0.000)	0.871 (0.351)	0.787 (0.375)
Root Mean Squared Err.	1676.3	442.1	630.6	1151.9	1155.4	1442.8	483.9	4055.0	5561.3

Table 5b, Instrumental-Variables Model of the Pooled Sample, 1st-stage estimates

	Remittances (net migrant income)	Non Migrant earnings
County ownership of telephone, mobile phone, pager or pc	747.7 (288.0)	7554.6 (336.9)
County Workforce Migrating	4499.0 (329.6)	-8482.3 (385.6)
County under 40 workforce sex ratio	-1956.6 (366.8)	-840.5 (429.1)
Test of excluded instruments: $F_{3, 6887}$ (p-value)	70.99 (0.000)	357.05 (0.000)
Anderson canon. Corr LM statistic: χ^2_2 (p-value)	165.087 (0.000)	

Notes: Control variables include provinces, year and the interactions between provinces and years number of permanent residents per household, number of dependent children per household and boy ratio and number of children in the age groups 0-6, 7-15, number of people over 61, age and age squared of the head of household and level of education of the head. Bold cases indicate statistical significance at the 5% level. Standard errors in parentheses unless indicated otherwise.

Appendix:

Table A1 OLS

	Food	Clothing	HH Goods & Serv	Health	Transport-commun.	Leisure	Other Expenditure	Total Non-housing	Housing
Remittances	0.191***	0.019**	0.029***	0.028**	0.084***	0.056***	0.027***	0.435***	0.071
Non Migrant earnings	0.166***	0.046***	0.044***	0.031***	0.066***	0.053***	0.032***	0.437***	0.199***
Net farm income	0.095***	0.017***	0.018***	0.020**	0.057***	0.035***	0.007	0.249***	0.096**
Root Mean Squared Err	650.2	116.7	112.8	197.0	263.0	226.3	125.0	995.9	873.9

Table A2, Fixed-Effect

	Food	Clothing	HH Goods & Serv	Health	Transport-commun.	Leisure	Other Expenditure	Total Non-housing	Housing
Remittances	0.316***	0.038***	0.039**	0.003	0.147***	0.029	0.017	0.591***	0.075
Non Migrant earnings	0.006	0.054***	0.061***	-0.003	0.091***	0.012	-0.008	0.213*	-0.112
Net farm income	0.105**	0.005	0.026**	-0.000	0.065**	0.029	-0.019**	0.212***	0.219**
Root Mean Squared Err	435.6	64.6	95.1	137.7	194.7	169.0	77.2	696.3	781.1

Table A3, Instrumental Variable

	Food	Clothing	HH Goods & Serv	Health	Transport-commun.	Leisure	Other Expenditure	Total Non-housing	Housing
Remittances	0.305***	-0.033	0.031*	0.050	0.147***	0.130***	0.045**	0.675***	0.305**
Non Migrant earnings	0.191***	0.046***	0.044***	0.034***	0.087***	0.060***	0.033***	0.496***	0.205***
Net farm income	0.098***	0.013**	0.018***	0.021**	0.057***	0.040***	0.008	0.254***	0.113***
Root Mean Squared Err	642.3	126.3	109.6	192.6	264.7	232.1	122.7	999.0	882.3

Notes: Control variables include fraction of labor force at education level of college, polytech, senior high school, primary and illiterate (junior high school being the reference category), number of permanent residents per household, number of dependent children per household and boy ratio. Bold cases indicate statistical significance at the 5% level. ***, **, * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Table A4, OLS estimates of the Pooled Sample

	Food	Clothing	HH Goods & Serv	Health	Transport-commun.	Leisure	Other Expenditure	Total Non-housing	Housing
Remittances	0.060***	0.019***	0.031***	0.006	0.057***	0.024***	0.010***	0.190***	0.124**
Non Migrant earnings	0.112***	0.037***	0.045***	0.022***	0.090***	0.050***	0.012***	0.369***	0.224***
Net farm income	0.075***	0.014***	0.017***	0.007**	0.039***	0.025***	0.007***	0.183***	0.132***
Root Mean Squared Err	1379.5	401.3	609.9	1141.2	1089.5	1273.2	475.4	3137.4	5562.9

Notes: Control variables include provinces, year and the interactions between provinces and years, number of permanent residents per household, number of dependent children per household and boy ratio and number of children in the age groups 0-6, 7-15, number of people over 61, age and age squared of the head of household and level of education of the head. ***, **, * indicate statistical significance at the 1%, 5% and 10% levels respectively.