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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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**Abstract**

We focus on the impact of migrants' remittances on consumption patterns in rural China, allowing for endogeneity of remittances and county fixed-effects. We find that the marginal propensity to consume out of remittances is close to unity, which is far greater than that out of non-migrant earnings or farm income. These findings imply that rural households 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 rigid land tenure system in China.

JEL Classification: D12, D13, J61, R23

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

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## 1. Introduction

During the past three decades, China has achieved unprecedented economic growth and 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 the rural sectors. However, growing inequality has become a major concern for the Chinese economy. This is first and foremost reflected by the ever growing income gap between the urban and the rural areas since the mid 1980s (see NATIONAL BUREAU OF STATISTICS, 2006).

It is widely accepted that rural-urban migration has played a vital role in China's dual process of urbanization and industrialization.<sup>1</sup> 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 families) are able to settle down in the host cities on a permanent basis. So a typical migrant worker will send a substantial proportion of his/her earned income as remittances to support the immediate and extended families left at home.

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; and DUFLO, 2000) present overwhelming evidence that members of household do not pool their resources in making spending decisions implying rejection of the unitary model of household

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<sup>1</sup> The 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).

behaviour. Moreover, US and UK evidence (e.g. KNOX, 1996; WALKER and ZHU, 2008) 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 remittances have an effect on consumption patterns over and above income from other sources. While we model the full range of household total living expenses comprising eight categories including housing, we will pay particular attention to food expenditure, which represents by far the most important expenditure category in rural China.

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 17% while rural-urban migration was virtually non-existent, due to the restrictive *hukou* system. This dual system which classified each individual as having either an agricultural or non-agricultural *hukou* at birth 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, housing subsidies, healthcare to education (see e.g. AABERGE and ZHU, 2001; FAN, 2008). The fact that land are non-transferable due to state ownership and that 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 (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’.<sup>2</sup> The trend seems to have accelerated in the following years, until the global economic downturn in 2008. For instance, the net flow of rural labor force into the non-agricultural sector during 2000-2004 was an 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).

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 (see e.g. KNIGHT and SONG, 2005; WU and ZHU, 2004). Moreover, an increase in rural labor surplus caused by a combination of a reduction in

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<sup>2</sup> This was actually the title of a special session on China’s rural migration at the 1999 American Economic Association Conference.

cultivated land or an 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 on the *hukou* and the land tenure 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 and repeat migration, large income differentials between sending and receiving areas, legal obstacles that prevent permanent settlements and surplus labor in agriculture – to the *hukou* system. KNIGHT and YUEH (2004) attribute the high job mobility rate of migrants relative to that of urban residents in China to factors such as prohibition on or impediments to urban settlement, restricted access to skilled jobs, and the system of short-term contracts, all of which are closely related to the *hukou* system.

While NCEM simply assumes that the migrant maximizes individual earnings, 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 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.

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 cannot

afford to migrate. ROZELLE et al. (1999) suggest that migration only has a small negative effect on agricultural productivity, 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 (see WORLD BANK, 2006; Chapter 5). Moreover, some latest empirical studies on international migration present some compelling evidence that remittances have a positive causal effect on savings and investment (see e.g. WOODRUFF and ZENTENO, 2007; YANG, 2008). However, even to the extent that this relationship is robust, it is still not obvious if it can be readily applied to the context of internal migration in China, due to its very distinctive institutional settings. Whether rural-urban migration is more conducive to financial capital accumulation than other forms of employment in China is ultimately an empirical question that can only be resolved with Chinese data.

To the best of our knowledge, there has been virtually no direct evidence in the literature on the impact of rural-urban migration and remittances on consumption patterns in China. However, two recent papers 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) conclude that there is no evidence of a link between migration and productive investment. Their interpretation is that migrants in poor areas use remittances to increase current consumption by and large, while households in non-poor areas are slightly more likely to use remittances for consumptive investment (i.e. in housing and other consumer durables). Using a cross-section of rural households surveyed by the Chinese Academy of Social Sciences in 2006, ZHU et al.



(2008) find that migrant households save less than their non-migrant counterparts, at a given level of total household net income. Moreover, they also fail to find any direct impact of remittances on either capital input or gross output of farm production.

### **3. The Empirical Model**

A migrant is defined as someone whose place of employment is out of the 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, while 22.6% and 53.5% are inter-county (but intra-province) and inter-province migrants respectively. In line with FAN (2008) which finds that inter-provincial migration has grown significantly over time using the 1990 and 2000 census data, we also find migrants travel further away in more recent surveys.

In our empirical specification we decompose total household net income into 3 components: (i) remittances, i.e. net migrant income after deducting travel and living costs; (ii) non-migrant earnings, i.e. other wages and salaries arising from employment in local enterprises and organizations, and; (iii) 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 denoted as remittances, non-migrant earnings and net farm income.<sup>3</sup>

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<sup>3</sup> 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).

In this paper we model the full range of household total living expenses comprising eight categories including housing. 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 (i.e. total net income less remittances and non-migrant earnings),  $W^h$  is a vector of exogenous characteristics and  $\varepsilon_i^h$  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. Following earlier research by KOOREMAN (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, we test for differential marginal propensities to consume (*mpc*) out of the three different sources of income. 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. 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 a highly homogenous subsample of couples with dependent children.

In this paper we will pursue two different identification strategies. First, we will collapse household data from 2001 and 2004 to construct a balanced panel of 105 counties. We then 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. Second, we run instrumental-variables (IV) estimation at the household level using a subsample of highly homogenous households. We focus on this particular household type, not only because of its growing dominance, but most importantly, to minimize the risk of misspecifying the demographic variables in the model.

#### **4. Data**

This paper 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 Rural Household Survey (RHS) of China. Total migration from these three provinces account for 16% of the 136 million people who lived in places other than their place of registration in 2000 (see NBS ONLINE STATISTICS).

The RHS is a nationally representative socio-economic survey covering production, consumption and labor 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,<sup>4</sup> migrants' remittances are identified as a distinctive component of total net household income in the household records.<sup>5</sup>

Around 36% of the rural labor force in our 2004 sample has participated in migration during the survey year.<sup>6</sup> Of these, two-thirds of all migrants are male and 90%

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<sup>4</sup> This implies that households who have migrated as a whole are not included in the survey. NBS (2005a, p75) documents that out of the 118.23 million rural-urban migrants, only 24.70 million, or 21%, migrated with all their family members according to the 2004 Rural Household Survey.

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

<sup>6</sup> 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.

have previous migration experience. Only 27% of migrants have employment contracts with their employers, of which half are also covered by formal labor insurance. Migrants spend on average 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 a staggering 53%, is remitted. The prevalence of circular and repeat 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 personal contacts such as friends and relatives, 18.8% through job agencies, with 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 individual questionnaires of our sample. It is clear that there has been a dramatic increase in the incidence of migration across all regions over our three-year sample period while the growth in non-migrant (off-farm) employment has been more modest. Whereas Jiangsu province has the lowest fraction of rural labor force engaging in migrant labor, it also has by far the highest share of off-farm non-migrant employment and by 2004 the overall share of on-farm employment has dropped below the 50% mark. This pattern is consistent with Jiangsu being the richest province in the sample (and second richest province in the

country), 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).<sup>7</sup>

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

< Table 1 here >

Table 1 shows the summary statistics of the panel of counties. It is clear that remittances are making a significant contribution to total net income, amounting to 17.6% on average, while non-migrant earnings account for 22.2%. However, net income from farming remains the dominant source of income, responsible for 60% of the annual total net income of 11,845 yuan in 2004 constant prices. The mean total living expenditure is just over 8,000 yuan a year, comprising 1,200 yuan (15%) on housing and 6,800 (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 rural labor force having a qualification at the now compulsory lower-secondary level or below. Around 30% of the labor force has experienced some migration in the survey year, with another 8% in non-migrant

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<sup>7</sup> Per capita rural net income was 2936 yuan for China as a whole in 2004.

employment. Per capita cultivated land is only about 1.05 *mu*, which is equivalent to 0.07 hectare, implying a high level of surplus labor.

An alternative identification strategy exploits 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 could be inadequate in capturing 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 in this paper we will focus on the highly homogenous group of couples with children, of which at least one is below 16.<sup>8</sup> We exclude households with fewer than two able-bodied workers or whose heads are over 60 or have missing educational qualifications. After dropping 15 household with negative net income, we end up with 6,911 households pooled over two years.

< Table 2 here >

Table 2 compares key characteristics of households with and without remittances (used interchangeably with migrant and non-migrant families from now on) in the survey year.<sup>9</sup> Just over half of couples with dependent children report positive remittances. Households not receiving 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

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<sup>8</sup> Comparing to other household types, 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) documents the increased popularity 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.

<sup>9</sup> While 3496 household report positive remittances, 3181 households contain at least one migrant in the survey year. 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.

migrant couples receive almost 4,000 yuan a year from remittances, which accounts for 36.7% of their total net income, they receive less from either non-migrant earnings or 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 in favour of non-migrant households, 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 for the very reason that all travel costs and living expenses away from home have already been deducted before calculating remittances and total net income.

Table 2 also reveals that the head of a migrant household is marginally older and slightly less likely to hold a qualification above the lower-secondary level. Moreover, there appears to be a more significant gap (around 20%) 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. Table 2 also shows three proxies of social networks which might be used as instruments for off-farm earnings.

< Figure 2 here >

The migration literature is heavily influenced by the theory of human capital. Figure 2 shows the sources of income by the education level of the head of household in the couples' sample. It appears that both net income from farming and non-migrant earnings increase with the level of education, although the gradient for the latter is much steeper. On the other hand, remittances peak at the level of junior secondary level.

## 5. Empirical Results

### 5.1 county-level analysis

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

< Table 3a+3b here >

Table 3 presents the results of the FE-IV model, with remittances and non-migrant earnings instrumented using proxies for social networks and agricultural land scarcity.<sup>10</sup> The critical assumption that these instruments are not correlated with the second-stage outcome of interest except through the first-stage (instrumented) endogenous variables will be tested statistically. Our regression controls for fraction of rural labor force at education levels of college, polytech, senior high school, primary school and illiterate (junior high school being the reference category), number of permanent residents and dependent children per household, as well as boy share. Failing to reject the exogeneity of the residual net income component (which is labelled as net farm income),<sup>11</sup> we decide to treat it as exogenous in the empirical specification. The

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<sup>10</sup> The FE-IV estimation was implemented by the *Stata* module *xtivreg2* (SCHAFER and STILLMAN, 2007).

<sup>11</sup> This 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 given the small plot size of family farms and



first-stage results in Table 3b demonstrates clearly that remittances and non-migrant earnings are identified on different instruments, with remittances predicted by the fraction of rural labor force in the county migrating while non-migrant earnings are predicted by the fraction of labor force in non-migrant employment and per capita cultivated land in the county. Taken together, these instruments are very successful in predicting the two different components of off-farm income. Moreover, we can not reject the null of exogeneity of the instruments for all non-housing expenditures individually and jointly at the 5% significance level, according to the Sargan-test for over-identification. The corresponding p-value for the housing equation is 0.045.

The *mpc* out of remittances on total non-housing expenditure is found to be 0.628, meaning that for each additional yuan of remittance received almost 63 cents will be consumed on non-housing items while another 11 cents will be spent on housing, leaving very little for saving and investment in agriculture. In contrast, only 51 cents and 22 cents will be spent on non-housing living expenditure for each additional yuan of non-migrant earnings and farming income respectively. In contrast, both non-migrant earnings and farming income contribute more to housing expenditure than remittances, with *mpc*'s between 0.30 and 0.22. It is also worth noting that three-quarters 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 regarded as part of permanent income and are particularly import for the welfare of the poor who spend disproportionately on food accordingly to Engel's Law.

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especially the prevalence of circular or repeat migration which allows the migrant to work in the family farm during busy seasons (see. e.g. NATH, 1974).

Comparing the FE-IV estimates to the OLS estimates in Tables A1, 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 on total non-housing items is only 0.435, meaning less than half of an extra yuan of remittances will be consumed.

## 5.2 household-level analysis

Next, 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 share, and number of people in the age groups 0-6, 7-15 or over 61, and a quadratic in the age and dummies for levels of education of the head of household.

< Table 4a+4b here >

Table 4 presents the IV estimates while Table A2 shows the corresponding OLS results. The first-stage results in Table 4b show that all three instruments which proxy social networks are individually significant at the 1% level in predicting remittances and non-migrant earnings. Specifically, higher levels of ownership of telecommunication equipments in the county 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. It is also worth noting that the Cragg-Donald 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 can not reject the null of exogeneity of the instruments in all consumption categories at the 5% significance level except for other expenditures (where  $p=0.010$ ), according to the Sargan statistics.

The IV estimate of the *mpc* on total non-housing expenditure out of remittances is 0.91, which is in excess of the corresponding figures of 0.79 and 0.33 for non-migrant earnings and farm income respectively. For each additional yuan of remittance, 30 cents go to food, 23 cents to recreation, education and culture articles (abbreviated as recreation hereafter) and 17 cents to transport and communications. Comparing to the county-level analysis which models a “representative household”, recreation, turns out to be much more important for couples with dependent children, presumably because school fees and other expenses related to children’s education account for a much higher share of expenditure in this subgroup.

A comparison of Table 4a and Table A2 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 recreation are an order of magnitude higher.

Comparing to the county-level panel results in Table 3, we can see the pattern is broadly similar, despite the differences in level of aggregation, sample coverage and estimation methods. Our results suggest that remittances are by and large regarded 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* system and the rigid land tenure system in China. Our findings are also in line with recent studies which find

no link between migration and productive investment in China (see e.g. DE BRAUW and ROZELLE 2008).

### **5.3 new vs. repeat migrants**

Only one in every six migrant households in our couples with dependent children sample contains at least a new migrant. To the extent that liquidity constraints are important determinants of migration, we would expect the *mpc* out of remittances to be higher for new migrants than for repeat migrants. While removing all new migrants makes virtually no difference to the findings (not shown), we can see from Table 5 that restricting the treatment group to new migrants only<sup>12</sup> increases the *mpc* out of remittances on total non-housing expenditure from 0.91 to 2.06, although we can not reject the null hypothesis that the true *mpc* is equal to unity at the 5% level of significance due to the large standard error. Moreover, the disproportionate increase in *mpc* on health and recreation out of remittances is consistent with the notion that credit constrained farmers who face high medical or education expenses are using migration as a last resort.

< Table 5 here >

### **5.4 split-households**

Out of the 3181 migrant 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

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<sup>12</sup> We have dropped a small number of households containing a mixture of new and repeat migrants. For brevity we do not report the first stage results. However all the instruments easily pass the conventional IV relevance tests in all equations.

the farm (see FAN 2008).<sup>13</sup> While the determination of gender division of labor is beyond the scope of this paper, we carry out a comparison of split-households with non-migrant households, as a sensitivity check.

< Table 6 here >

We repeat IV estimation using the pooled sample of non-migrant households and split-households only, and present the second-stage estimates in Table 6. Comparing to the headline results in Table 4, we can see that the patterns are broadly similar. However, the point estimate of the *mpc* out of remittances on total non-housing expenditure is now virtually unitary, implying that, for the dominant migrant type of split-households, total non-housing expenditures virtually increase dollar-for-dollar with remittances.

## 6. Conclusions

We focus on the impact of migrants' remittances on the level of consumption, using a large sample of rural households surveyed in 2001 and 2004 by the National Bureau of Statistics of China in three provinces, representing the eastern (coastal), central and western regions of China respectively. In order to address the biases caused by measurement errors in remittances as well as 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 contrary to what the OLS estimates would have suggested, the FE-IV estimates of marginal propensity to consume

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<sup>13</sup> The remainder can be classified as only wife migrating (235 households, or 7.4%), both husband and wife migrating (376, or 11.8%) and any migration pattern involving adult children (570, or 17.9%).

(*mpc*) out of remittances is indeed greater than those out of non-migrant earnings, and especially traditional 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. Moreover, we find that for the dominant migrant type of split-households, in which husbands engage in migrant labor and wives stay behind, total non-housing expenditures virtually increase dollar-for-dollar with remittances.

Our findings are in line with recent studies which find no link between migration and productive investment in China. These findings imply that migrant households take remittances as permanent income by and large 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. On the other hand, there is evidence that the *mpc* out of remittances for new migrants is significantly higher than that for repeat migrants, supporting the idea that credit constraint are more likely to be binding for this small minority group.

An important qualification of the results is that, 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 labour force, our findings may not be generalized to the whole population of rural residents.

Our findings have a number of policy implications. First, 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 many 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 their low endowment of financial, human and social capital, despite their large potential welfare gain. Therefore 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 programs and microfinance schemes. Second, notwithstanding the significant impact on health and especially education expenses which are expected to have a positive effect on growth and development in the long-run, 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 labor market.

A lot more research is 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 also of great interest to policy makers and researchers alike.

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## Figures

Figure 1: Type of employment of rural workforce by province and year

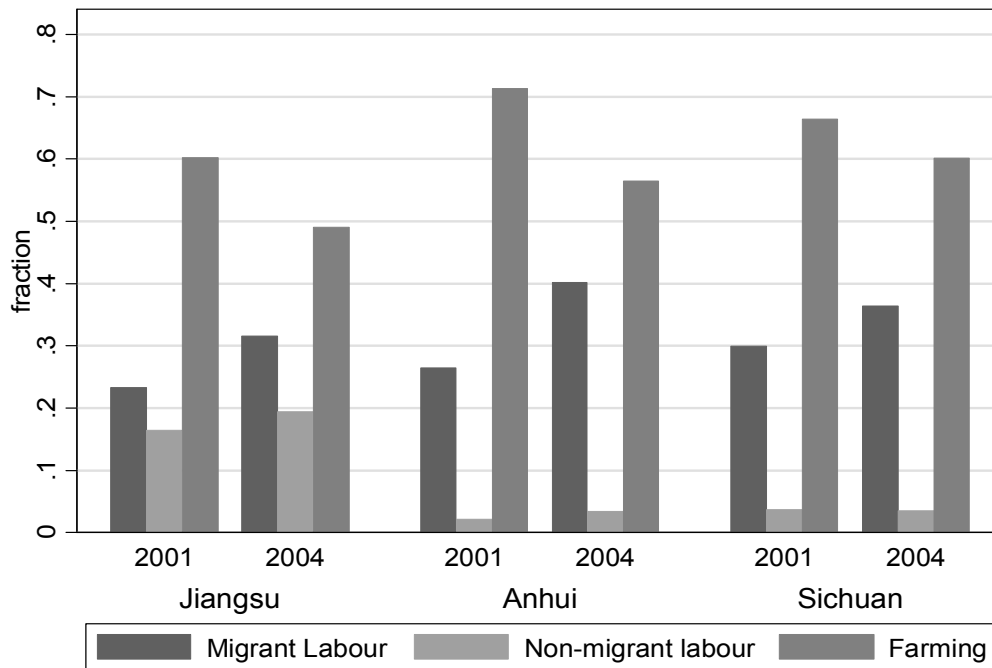
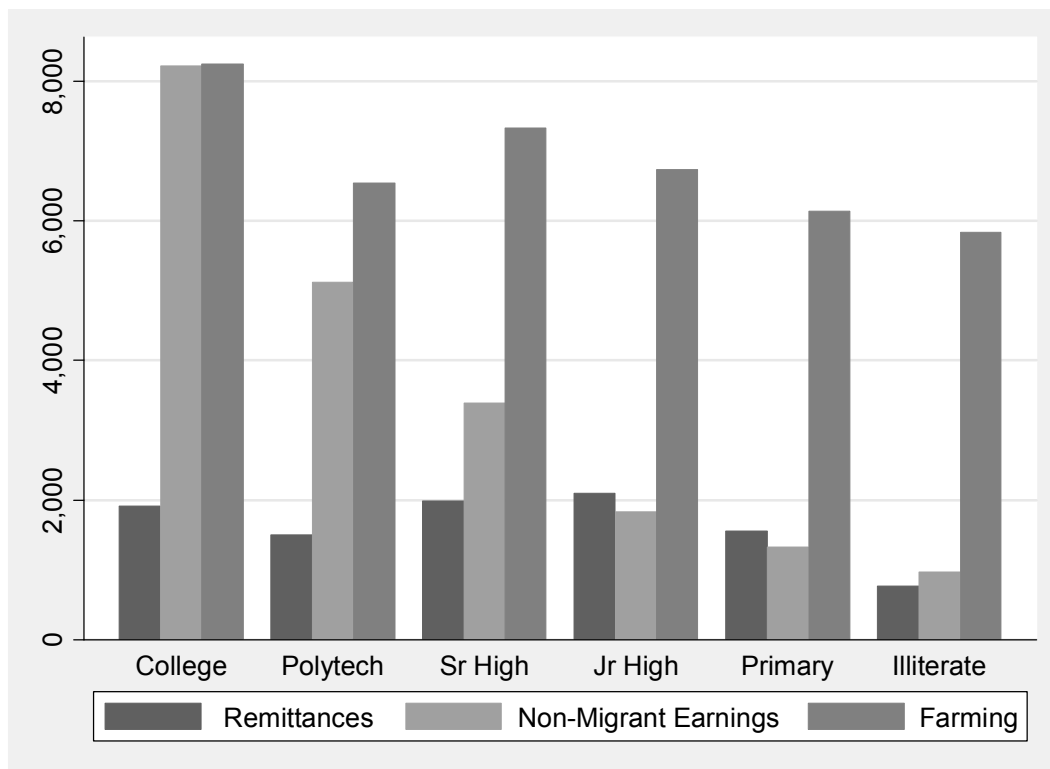


Figure 2: Sources of net income by highest qualifications of head of household



## Tables

TABLE 1

*Summary statistics of the panel of counties*

	<i>Mean</i>	<i>Standard deviation</i>	<i>Share (%)</i>
<b>Total Net Income, of which</b>	11845.0	4612.7	100.0
Remittances (net migrant income)	2080.8	1216.7	17.6
Non-migrant earnings	2627.6	3724.6	22.2
Net farm income (i.e. residual income)	7136.6	1841.3	60.2
<b>Total Living Expenditure, of which</b>	8047.7	3137.3	100.0
Housing	1223.0	1165.1	15.2
<b>Total Non-Housing Expenditure, of which</b>	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
Recreation, education and culture articles	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	0.024	0.017	
Workforce with Sr. high school education	0.115	0.051	
Workforce with Jr. high school education	0.570	0.109	
Workforce with primary school Education	0.230	0.108	
Workforce who are illiterate	0.043	0.067	
Number of dependent children	0.787	0.266	
Boy share	0.562	0.068	
County workforce migrating	0.308	0.142	
County workforce in non-migrant employment	0.085	0.140	
Cultivated land per capita in the village ( <i>Mu=0.0667 hectare</i> )	1.048	0.338	
Observations		210	

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

TABLE 2

*Summary statistics of couples with dependent children, by remittance status*

	<i>Households without remittances</i>	<i>Households with remittances</i>
<b>Total Net Income, of which</b>	11099.2	10731.8
Remittances (net migrant income)	-	3937.5 (36.7%)
Non-migrant earnings	3204.3 (28.9%)	1135.8 (10.6%)
Net farm income (i.e. residual income)	7894.91 (71.1%)	5658.5 (52.7%)
<b>Total Living Expenditure</b>	7955.3	7063.9
Housing	1308.3 (16.4%)	989.5 (14.0%)
<b>Total Non-Housing Expenditure, of which</b>	6647.1 (83.6%)	6074.4 (86.0%)
Food	3664.4 (55.1%)	3407.9 (56.1%)
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%)
Recreation, education and culture articles	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 school	0.140	0.118
Highest Education of HoH Jr. high school	0.620	0.643
Highest Education of HoH primary school	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
Land per capita in the village ( $Mu=0.0667$ hec.)	1.157	1.117
County ownership of telephone, mobile, pager/PC	0.487	0.454
County workforce migrating	0.267	0.342
County under 40 workforce sex ratio	1.027	1.029
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 3a

*Fixed-effect instrumental-variables model, 2<sup>nd</sup>-stage estimates, county panel*

	<i>Food</i>	<i>Clothing</i>	<i>Household goods &amp; services</i>	<i>Health</i>	<i>Transport &amp; communication</i>	<i>Recreation, education and culture</i>	<i>Other expenditure</i>	<i>Total non-housing</i>	<i>Housing</i>
Remittances	<b>0.457</b> (0.230)	-0.043 (0.042)	0.017 (0.051)	-0.054 (0.072)	<b>0.258</b> (0.111)	0.019 (0.092)	-0.026 (0.042)	<i>0.628</i> (0.366)	0.111 (0.419)
Non-migrant earnings	0.128 (0.179)	0.050 (0.033)	0.014 (0.040)	-0.010 (0.056)	<b>0.233</b> (0.086)	0.109 (0.071)	-0.010 (0.032)	<i>0.514</i> (0.384)	0.296 (0.325)
Net farm income	<b>0.125</b> (0.052)	-0.004 (0.010)	<b>0.023</b> (0.011)	-0.005 (0.016)	<b>0.077</b> (0.025)	0.029 (0.021)	<b>-0.023</b> (0.009)	<b>0.222</b> (0.082)	<b>0.221</b> (0.094)
Sargan Statistics: $\chi^2_1$ (p-value)	1.899 (0.168)	2.251 (0.134)	0.347 (0.556)	0.656 (0.418)	0.021 (0.885)	0.074 (0.786)	1.086 (0.297)	1.267 (0.260)	<b>4.012</b> (0.045)
Root Mean Squared Err.	425.7	78.5	94.3	133.2	204.8	169.1	76.9	676.5	774.2

TABLE 3b

*Fixed-effect instrumental-variables model, 1st-stage estimates, county panel*

	<i>Remittances</i>	<i>Non-migrant earnings</i>
County workforce migrating	<b>3313.7</b> (951.3)	-1066.3 (921.0)
County workforce in non-migrant employment	-1508.3 (1522.6)	<b>5507.9</b> (1474.2)
Cultivated land per capita in the village (1 <i>Mu</i> = 0.0667 hectare)	107.1 (553.5)	<b>-1579.2</b> (535.9)
Partial R-sq of excluded instruments: $F_{3, 93}$ (p-value)	<b>4.42</b> (0.006)	<b>7.49</b> (0.000)
Anderson canon. Corr LM statistic: $\chi^2_2$ (p-value)	<b>10.136</b> (0.006)	

*Notes:* Control variables include fraction of labor force at education level of college, polytech, senior high school, primary school and illiterate (junior high school being the reference category), number of permanent residents per household, number of dependent children per household and boy share. Bold and italic cases indicate statistical significance at the 5% and 10% level respectively. Standard errors in parentheses unless indicated otherwise.

TABLE 4a  
*Instrumental-variables estimates of the pooled sample, 2<sup>nd</sup>-stage estimates*

	<i>Food</i>	<i>Clothing</i>	<i>Household goods &amp; services</i>	<i>Health</i>	<i>Transport &amp; communication</i>	<i>Recreation, education and culture</i>	<i>Other expenditure</i>	<i>Total non-housing</i>	<i>Housing</i>
Remittances	<b>0.295</b> (0.041)	<b>0.046</b> (0.011)	<b>0.063</b> (0.015)	<b>0.055</b> (0.028)	<b>0.168</b> (0.028)	<b>0.232</b> (0.035)	<b>0.046</b> (0.012)	<b>0.905</b> (0.099)	0.071 (0.135)
Non-migrant earnings	<b>0.291</b> (0.015)	<b>0.081</b> (0.004)	<b>0.070</b> (0.006)	<b>0.048</b> (0.011)	<b>0.141</b> (0.011)	<b>0.140</b> (0.013)	<b>0.019</b> (0.004)	<b>0.791</b> (0.037)	<b>0.272</b> (0.051)
Net farm income	<b>0.126</b> (0.007)	<b>0.022</b> (0.002)	<b>0.026</b> (0.003)	<b>0.016</b> (0.005)	<b>0.060</b> (0.005)	<b>0.063</b> (0.006)	<b>0.012</b> (0.002)	<b>0.325</b> (0.018)	<b>0.131</b> (0.025)
Sargan Statistics: $\chi^2_1$ (p-value)	0.996 (0.318)	1.068 (0.302)	0.357 (0.550)	1.737 (0.188)	0.642 (0.423)	0.070 (0.791)	<b>6.640</b> (0.010)	0.247 (0.620)	1.472 (0.225)
Root Mean Squared Err.	1669.0	440.4	632.7	1152.3	1452.6	1452.7	488.6	4069.9	5561.5

TABLE 4b  
*Instrumental-variables estimates of the pooled sample, 1<sup>st</sup>-stage estimates*

	<i>Remittances</i>	<i>Non Migrant earnings</i>
County ownership of telephone, mobile phone, pager or PC	<b>740.3</b> (288.9)	<b>7443.5</b> (337.6)
County workforce migrating	<b>4469.5</b> (327.7)	<b>-8551.8</b> (382.8)
County under 40 workforce sex ratio	<b>-1458.7</b> (367.1)	<b>-1635.7</b> (428.9)
Test of excluded instruments: $F_{3,6887}$ (p-value)	<b>69.83</b> (0.000)	<b>362.88</b> (0.000)
Anderson canon. Corr LM statistic: $\chi^2_2$ (p-value)	<b>160.427</b> (0.000)	
Cragg-Donald Wald F statistic (weak id. test)	<b>54.556</b> (Stock-Yogo 10% c.v: 13.43)	

*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 share 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.



TABLE 5

*Instrumental-variables estimates of the pooled sample of new migrants and non-migrant households, 2<sup>nd</sup>-stage estimates*

	<i>Food</i>	<i>Clothing</i>	<i>Household goods &amp; services</i>	<i>Health</i>	<i>Transport &amp; communication</i>	<i>Recreation, education and culture</i>	<i>Other expenditure</i>	<i>Total non-housing</i>	<i>Housing</i>
Remittances	<b>0.597</b> (0.212)	0.001 (0.046)	0.072 (0.065)	0.179 (0.144)	<b>0.322</b> (0.126)	<b>0.753</b> (0.214)	<b>0.137</b> (0.058)	<b>2.062</b> (0.573)	-0.111 (0.690)
Non-migrant earnings	<b>0.308</b> (0.028)	<b>0.071</b> (0.006)	<b>0.067</b> (0.009)	<b>0.055</b> (0.019)	<b>0.140</b> (0.017)	<b>0.178</b> (0.028)	<b>0.037</b> (0.008)	<b>0.855</b> (0.075)	<b>0.316</b> (0.091)
Net farm income	<b>0.130</b> (0.013)	<b>0.018</b> (0.003)	<b>0.024</b> (0.004)	<b>0.019</b> (0.009)	<b>0.060</b> (0.008)	<b>0.075</b> (0.013)	<b>0.014</b> (0.004)	<b>0.340</b> (0.035)	<b>0.133</b> (0.043)
Sargan Statistics: $\chi^2_1$ (p-value)	0.009 (0.926)	0.140 (0.708)	0.503 (0.478)	1.584 (0.208)	3.667 (0.056)	0.519 (0.471)	0.785 (0.376)	0.025 (0.873)	0.658 (0.417)
Root Mean Squared Err.	2029.3	438.3	623.6	1378.6	1208.1	2050.1	551.7	5493.5	6621.0

Notes: N=4208 (of which 478 are new migrant households). Control variables include provinces, year and their interactions; number of permanent residents, boy share and number of children by age groups, number of people over 61; level of education as well as a quadratic in the age of the head of household. Bold cases indicate statistical significance at the 5% level. Standard errors in parentheses unless indicated otherwise.

TABLE 6

*Instrumental-variables estimates of the pooled sample of split-households and non-migrant households, 2<sup>nd</sup>-stage estimates*

	<i>Food</i>	<i>Clothing</i>	<i>Household goods &amp; services</i>	<i>Health</i>	<i>Transport &amp; communication</i>	<i>Recreation, education and culture</i>	<i>Other expenditure</i>	<i>Total non-housing</i>	<i>Housing</i>
Remittances	<b>0.315</b> (0.051)	<b>0.050</b> (0.014)	<b>0.079</b> (0.021)	0.062 (0.038)	<b>0.164</b> (0.033)	<b>0.285</b> (0.046)	<b>0.053</b> (0.015)	<b>1.008</b> (0.126)	0.104 (0.185)
Non-migrant earnings	<b>0.285</b> (0.015)	<b>0.079</b> (0.004)	<b>0.069</b> (0.006)	<b>0.048</b> (0.011)	<b>0.132</b> (0.010)	<b>0.135</b> (0.014)	<b>0.024</b> (0.004)	<b>0.773</b> (0.037)	<b>0.303</b> (0.055)
Net farm income	<b>0.124</b> (0.008)	<b>0.022</b> (0.002)	<b>0.027</b> (0.003)	<b>0.016</b> (0.006)	<b>0.055</b> (0.005)	<b>0.063</b> (0.007)	<b>0.013</b> (0.002)	<b>0.319</b> (0.020)	<b>0.138</b> (0.029)
Sargan Statistics: $\chi^2_1$ (p-value)	0.051 (0.822)	0.173 (0.677)	0.520 (0.471)	2.325 (0.127)	1.241 (0.265)	0.228 (0.633)	<b>7.219</b> (0.007)	0.000 (0.991)	1.035 (0.309)
Root Mean Squared Err.	1652.0	443.3	661.5	1214.0	1054	1482	470.2	4046	5928

Notes: N=5730. Control variables include provinces, year and their interactions; number of permanent residents, boy share and number of children by age groups, number of people over 61; level of education as well as a quadratic in the age of the head of household. Bold cases indicate statistical significance at the 5% level. Standard errors in parentheses unless indicated otherwise.

**Appendix:**

TABLE A1  
*OLS, county panel*

	<i>Food</i>	<i>Clothing</i>	<i>Household goods &amp; services</i>	<i>Health</i>	<i>Transport &amp; communication</i>	<i>Recreation, education and culture</i>	<i>Other expenditure</i>	<i>Total non-housing</i>	<i>Housing</i>
Remittances	0.189***	0.020**	0.030***	0.028**	0.085***	0.055***	0.027***	0.435***	0.073
Non-migrant earnings	0.170***	0.046***	0.045***	0.031***	0.068***	0.054***	0.031***	0.445***	0.197***
Net farm income	0.098***	0.017***	0.018***	0.020**	0.059***	0.036***	0.006	0.254***	0.099**

*Notes:* N=210. Control variables include fraction of labor force at education level of college, polytech, senior high school, primary school and illiterate (junior high school being the reference category), number of permanent residents per household, number of dependent children per household and boy share. Bold cases indicate statistical significance at the 5% level. \*\*\*, \*\*, \* indicate statistical significance at the 1%, 5% and 10% levels respectively.

TABLE A2  
*OLS estimates of the pooled sample*

	<i>Food</i>	<i>Clothing</i>	<i>Household goods &amp; services</i>	<i>Health</i>	<i>Transport &amp; communication</i>	<i>Recreation, education and culture</i>	<i>Other expenditure</i>	<i>Total non-housing</i>	<i>Housing</i>
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***

*Notes:* N=6911. Control variables include provinces, year and their interactions; number of permanent residents, boy share and number of children by age groups, number of people over 61; level of education as well as a quadratic in the age of the head of household. Bold cases indicate statistical significance at the 5% level. Standard errors in parentheses unless indicated otherwise.