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Migration and Incomes in Source Communities:
A New Economics of Migration Perspective from China

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Abstract

The objective of this paper is to understand the effects of China's migration on source communities and to discuss their policy implications. We draw from New Economics of Labor Migration (NELM) theory to understand how migration and migrant remittances can relax or tighten market constraints in China's rural economy. Using simultaneous-equation econometric techniques and household survey data from China, we estimate net, sector-specific effects of migration on rural household income, focusing on farm production and self-employment. Our econometric findings indicate that the loss of labor to migration has a *negative* effect on household cropping income in source areas. However, we provide evidence that remittances sent home by migrants *positively* compensate for this lost-labor effect, contributing to household incomes directly and indirectly by stimulating crop and possibly self-employment production. This finding offers evidence in support of the NELM hypothesis that remittances loosen constraints on production in the imperfect-market environments characterizing rural areas in less developed countries. Taking into account both the multiple effects of migration and the change in household size, participating in migration *increases* household per-capita income between 14 and 30 percent.

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China is experiencing the largest peacetime flow of labor out of agriculture ever witnessed in world history (Solinger, 1999; Rozelle et al., 1999). Despite the rapid expansion of labor migration, China's work force is still disproportionately employed in agriculture compared to other countries at similar levels of per-capita GDP (Taylor and Martin, 2001). Hence, as China's economy continues to expand, the flow of labor to urban areas will continue and even accelerate (Johnson, 1999).

The massive flow of labor away from farms has intensified research interest in China's migration in recent years. However, as in the broader literature on migration in less developed countries, most recent studies on China's migration have focused on determining the size and composition of the labor flow, macroeconomic implications of increased migration, and the effects of migration on urban areas (Zhao, 1999; Yang, 1999; 1997). Less emphasis has been placed on researching the effects of migration on the rural communities that migrants leave, even though evidence shows that the rural household in the village of origin is typically the central concern of all those involved in migration– both those who leave and those who stay behind (exceptions include Wang and Zuo, 1999; Bai, 2001).

Moreover, the recent increase in migration has left policy makers particularly concerned regarding the way source communities will be affected (MOA, 1999). They are concerned that as labor flows away from farms, food production and crop income will decline, potentially threatening China's food security. Furthermore, policy makers are concerned about the increasing gap between urban and rural household incomes. If migration exacerbates this gap, some fear that as it grows rural residents eventually will flood cities ill-equipped to absorb them. Others fear that discontent over a rising urban-rural income gap could even spill over into political unrest (Yang, 1999).

Because China's markets and other modern economic institutions are still relatively undeveloped, migration may play a pivotal role in creating or overcoming constraints caused by the lack of well-functioning markets and/or institutions (Knight and Song, 1999; Benjamin and Brandt, 2000). The "new economics of labor migration" (NELM) literature analyzes migration as a household decision rather than as an individual decision (Stark, 1991). The NELM hypothesizes that rural households facing imperfect market environments decide

whether or not to participate in migration as part of a set of interwoven economic choices (Taylor et al., 1996). When a household decides to send out a migrant, it makes simultaneous decisions about both its *short* and *long* term production. Specifically, it decides its present labor and other input allocations, which affect its short term production, and on its investment in household resources and savings management strategy, which affect long term production.

By applying insights from NELM to China's migration, we can consider the following questions: When a migrant leaves a household, does the reduction in available labor lead to decreased crop yields and production, or cropping income in the near term? What effects do remittances have, if any, on incomes generated by household on- and off-farm enterprises? And finally, do household members remaining in the village enjoy an immediate, increased standard of living as a result of migration, or is migration by selected family members potentially part of a long-run investment strategy, the returns from which may be small or even negative in the short run for those left behind?

To begin the process of examining these questions, this paper has two primary objectives. First, we set out to use NELM to explore the effects of China's migration on the households and communities that migrants leave. Second, we measure the multiple, competing effects that migration has on the households that send migrants out, and discuss the policy implications of our findings.

To meet our objectives, we first draw from NELM theory to understand how out-migration and migrant remittances can relax or tighten market constraints on households in China's rural economy. Next, we develop a two step, simultaneous equation estimator that is consistent with NELM. The estimator is used to measure the effects of migration and remittances on household income sources, and models the mgiration decision as a Poisson process. We conclude with a discussion of the policy implications of our econometric results. The overall analysis represents a test of the NELM hypothesis, providing insight into the conflicting effects that migration is having on the rural economy and laying a foundation for future research.

1 Migration and the Rural Community

1.1 Development and Migration in China

China's rapid economic growth since 1979 has fueled the transition of labor out of agriculture. As part of broad-based market reform policies, leaders have relaxed the *hukou* registration system and other regulations, helping to spur growth in the migrant labor force (Solinger, 1999). The economy's expansion has led to the creation of more off-farm enterprises, particularly in rural areas, allowing increasing numbers of rural workers to find jobs outside of agriculture. Rozelle et al. (1999) estimate that the size of the off-farm labor force increased from 80 million in 1988 to 154 million in 1995. Migrant labor is the fastest growing component of off-farm labor, the number of migrants increasing from an estimated 20 million in 1988 to 54 million in 1995.

Hebei and Liaoning Provinces, where the household level data for this study were collected, mirror national trends. In part due to their proximity to Beijing, the provinces have historically been manufacturing centers, providing more opportunities for off-farm work relative to other parts of China. In 1988, on average, 20 percent of the labor forces in the 31 surveyed villages were working off-farm. By 1995, this figure had increased to 35 percent. Migration grew even faster, although from a lower initial base. Whereas an average of 2.7 percent of the village workforce out-migrated in 1988, by 1995 this percentage was 5.8 percent.[1] However, in some villages it was much higher; in one village, 62 percent of the workforce outmigrated. The household level data provide evidence that migration from these areas is also growing quickly; almost half of the migrants from the households surveyed have been away for three years or fewer.[2]

Despite the rise in migration at the village level, rural residents in China are still tied closely to their home villages. Anecdotal evidence in the literature (Solinger, 1999) and a sample survey in Shanghai (Wang and Zuo, 1999) suggest that rural migration in China is circular; migrants plan to spend a specific amount of time away from home before returning to the village. Other studies have found that migrants in China tend to have little attachment to places where they find work, and may even leave and return home several times per year

[1] All of these figures were calculated from a survey of village leaders described in Rozelle et al. (1999).

[2] Data are available on the number of months that migrants had been away if they left within the two years prior to the survey, so all individuals migrating for one month or more are included in this statistic.

(Hare, 1999). As a result of their "homeward" focus, migrants have economic incentives to promote and enhance the welfare of those left behind, either through remittances or by bringing back savings if and when they return.

1.2 Migration and Household Development Strategy

Though the main productive activity undertaken by most households in rural China is agriculture, many households augment their agricultural income with a wide array of other productive activities. Households frequently choose to allocate labor to various self-employment activities, wage labor within or near the village, or to migration. Decisions regarding participation in off-farm activities are primarily made at the household level (Davin, 1999). As returns to off-farm activities typically exceed those from agriculture, households find allocating labor to off-farm activities quite attractive (Knight and Song, 1999; Lohmar, 1999).

Household participation in non-agricultural activities, however, is constrained by several factors. As rental markets for land and agricultural labor markets frequently are incomplete in rural China, most households cannot leave agriculture entirely (Nyberg and Rozelle, 1999). As a result, household labor availability for off-farm activities is restricted. Decisions regarding off-farm labor market participation can be further constrained in some areas by thin local job markets and/or the lack of funds or credit availability for starting new self-employment activities (Nyberg and Rozelle, 1999). Where local off-farm markets are available, people have to migrate if they want to find wage labor. If a household lacks liquidity, it may not be able to start self-employment activities; only 10 percent of households in our sample with self-employment activities had obtained loans to start them.

In an economy characterized by incomplete markets, the decision to send out migrants may have significant impacts on other household economic activities. While migrants are away, households have less labor to allocate to production activities in the village. Households can send out more than one migrant, but face a tightening household labor constraint when they do. Households with enough available labor tend to send out more than one migrant; nearly 25 percent of the households in our sample that send out migrants send out more than one. If the migrant household's marginal product on the farm is positive, reducing in the number of laborers causes crop production to fall when the household sends out migrants. The adverse effect of lost labor may be magnified by the fact that most migrants are male

and tend to be younger and better educated than the average rural laborer (Table 1).

Although agricultural production in migrant households may fall due to a decrease in the family labor force, migration, through remittances, can also have positive, indirect effects on household production. In the absence of credit markets, remittances can be used by households to expand their purchases of production factors that could lead to higher farm productivity or higher off-farm production. For example, households might be able to purchase a more fertilizer, more effective pesticides, or custom services for their crops, increasing on-farm production. By purchasing additional inputs, production may increase, but cash income may not increase as much, as these factors must be purchased in the market, unlike household labor. Off-farm production might also be affected; for example, remittances might allow a household to purchase more inventory for its business.

Since the potentially negative effect of migration may be offset by increased use of capital financed from the migrant's remittances, differences in partial productivity measures or incomes between migrant and non-migrant households may not be apparent in descriptive statistics. For example, there is little difference in average maize yields between migrant and non-migrant households (Table 2, row 1). Without considering the offsetting effects, one might be tempted to jump to the conclusion that migration does not affect yields. However, it could be that as found in an earlier study lost labor has a significant negative effect on yields, but remittances make up for some of the loss (Rozelle, Taylor, and de Brauw, 1999).

The aggregate effect of migration on household production will play a role in determining the way migration affects different sources of household income. Incomes from specific sources are typically lower in migrant households than in non-migrant households (Table 2). The average migrant household has around 900 yuan (21 percent) less crop income than the average non-migrant household (row 2). Self-employment participation, incomes, and capital endowments are also lower, on average, in migrant households than in non-migrant households (rows 4 to 8). These differences may indicate that migration has a negative effect on self-employment participation and household income sources. They may also indicate that migrant households are simply poorer and more capital constrained than non-migrant households, and are using migration to help expand production possibilities. Several other factors also may confound descriptive analyses that do not account for factors that vary across households, such as family size, land endowments, wealth levels, or the size of self-

employment endeavors, nor the variation in economic conditions across villages. To control for these factors, we must investigate these questions using a theoretical and empirical strategy described below.

2 The New Economics of Labor Migration

Migration's inherent importance and ubiquity has induced development economists to study migration from several perspectives. The literature has a rich tradition of describing patterns of population movement and studying the determinants of migration (e.g., Harris and Todaro, 1970; Carrington et al., 1996). Research on migration tends to study migrants themselves, or migration's contribution to the urban economy. The literature, however, has neglected other important aspects of migration, such as the effects of migration on source communities (Williamson, 1988; de Haan, 1999).

In the past decade, as the emphasis of development economics has shifted towards the study of market imperfections, new perspectives have emerged stressing the complexity of migration as an economic institution, interrelationships between migration's determinants and impacts, and the household's role in migration decision making (Stark, 1991). Stark hypothesizes that migrants play the role of financial intermediaries, enabling rural households to overcome credit and risk constraints on their ability to achieve the transition from familial to commercial production. We illustrate this hypothesis in Figure 1. Consider a household with two possible production activities. A household may invest its fixed resources ($\overline{T}$), such as land or a building structure for producing a manufactured good for a family-run business, in either a low-return or high-return activity; let Q_i, for $i = 0, 1$, denote output from these two activities, respectively. An array of household characteristics, Z_Y, shapes the returns from investing household resources in each activity. PP represents the production possibility frontier (PPF). At relative prices p_1/p_0, the household will specialize in the high-return activity, Q_1, its output will be $Q^* = f_1(\overline{T}, Z_Y)$, and its income will be $Y^* = g(Q^*)$.

However, the household may face other market constraints on investing in the high-return activity, $c(\cdot) = T_1$, where $c(\cdot)$ denotes one or more barriers that limit the household to invest only T_1 of the fixed resource in the high-return activity, implying that T_1 is less than $\overline{T}$. For example, in the case of a credit or liquidity constraint, $c(\cdot)$ might denote a barrier,

such as the lack of a formal credit market, that prevents the household from producing more Q_1, a relatively profitable good that can be produced in the family's factory. In this example, T_1 represents the part of the household's factory facilities that are actually being used for the high return activity. Although the household would like to produce more Q_1, the lack of available credit (which is $c(\cdot)$) keeps them from doing so.

The role of migration in overcoming the constraints can be illustrated as follows. Without a credit market, family migrants, M, could be sent out to work in a wage earning job. Migrants could help relax the household's credit or liquidity constraint by sending back remittances, R.[3] The effect of migration on production constraints, however, is not always positive. If rural households face a missing or imperfect labor market, migration may further constrain the household from investing in the high-return activity by competing for scarce human capital.

The NELM theory hypothesizes that the constraint binding the amount of the fixed resource allocated to higher-return production, T_1, is a function of migration and remittances, or $c(R, M) = T_1$. We further hypothesize that $c_R > 0$ and $c_M < 0$, since migration, M, leads to a reduction in family labor and a rise in available capital for production in the source household. Constrained output in the high-return activity is $Q_1^c = f_1(T_1, Z_Y)$, and in the low-return activity it is $Q_0^c = f(\overline{T} - T_1, Z_Y)$. Constrained household income, Y^c, is given by

$$Y^c = g(Q_1^c, Q_0^c) \tag{1}$$

where $Y^c < Y^*$, the unconstrained income.

Because the relative magnitudes of the derivatives c_R and c_M are unknown, the overall effect of migration on total household income is ambiguous. However, where capital and/or human capital constraints bind, the impacts are not likely to be zero, as in the case of a separable agricultural household model operating in a perfect markets environment (e.g., Singh, Squire and Strauss, 1986). A finding that migrants or remittances significantly affect any *non-migration* source of income in the migrant-sending (and remittance-receiving) household would support the NELM. The sign of activity-specific migration effects, like that of total-income effects, is indeterminate *a priori*. In terms of Figure 1, migration and remittances could increase output of the high-return activity (Q_1) if they complement income

[3]Remittances also contribute directly to household income. Additionally, access to a stream of remittances could affect the nature of uncertainty faced by households.

growth in that sector by relaxing the constraints, $c(\cdot)$. However, this also would imply a negative impact of migration on Q_0. By loosening constraints on technology and the access to fixed inputs (e.g., land or plant), remittances could increase productivity in both sectors by shifting the PPF outward. At given relative prices, the loosening of investment constraints is likely to lead to increased specialization, and a nonparallel shift in the PPF could result in a shift in production between activities.

Few tests of the NELM hypothesis have appeared in the literature; examples include Lucas (1987), Taylor (1992), and Taylor and Wyatt (1996). In the only study on China that indirectly examines the type of linkages described above, Benjamin and Brandt (2000) find evidence that off-farm labor market participation loosens risk constraints on household-farm investments. If migrants play the role of a financial intermediary, as these studies suggest, the *ex-ante* incentive to participate in migration may be large. However, the household's propensity to encourage members to migrate may be mitigated when there are other ways to finance household production investments, or if the loss of labor to migration carries significant costs in terms of foregone yields or self-employment income. The present study will directly test this hypothesis using the econometric model that follows.

3 Econometric Methods and Data

3.1 Econometric Model

If production is constrained and migration, M, and remittances, R, affect production constraints, then the constrained vector of income sources $\mathbf{Y^c}$ depends on M and R in addition to a vector of individual, household, and community characteristics, Z_k.[4] Through production, migration and remittances may have different effects on different income sources. We define household income sources, other than remittances, as crop income, Y_c, self-employed income, Y_s, and other income, Y_o.[5] The sum of remittances and the three income sources equals total household income.[6] The core equations of our model explain the income earned

[4]The bold $\mathbf{Y^c}$ is the vector of incomes from non-remittance sources $k = 1, \ldots, K$; that is, $\mathbf{Y^c} = [Y_k, k = f, s, o]$. It is distinct from constrained total income, Y^c.

[5]"Other" income is largely wage income, though some households have large amounts of pension or animal husbandry income as well.

[6]In this sample we define self-employed income to include income from all family self-employed activities, orchards, greenhouses, and fishponds. Although income gained and kept by a migrant planning to return

by the household from each source:

$$Y_k^c = \gamma_{0k} + \gamma_{1k}M + \gamma_{2k}R + \gamma_{3k}Z_k + \varepsilon_k; \qquad k = c, s, o \tag{2}$$

The null hypotheses associated with NELM are that neither migration, M, nor remittances, R, affect income sources; i.e., $\gamma_{1k},\ \gamma_{2k} = 0\ \forall\ k$. Though not all households that send out migrants receive remittances, remittances are produced by allocating family members to labor migration, M; given migration, they are also affected by human capital and household characteristics, Z_R, affecting migrants' success and/or motivations to remit:

$$R = \alpha_0 + \alpha_1 M + \alpha_2 Z_R + \varepsilon_R \tag{3}$$

Migration, also a function of individual, household, and village characteristics (Z_M), can be represented generally by:

$$M = g(\beta; Z_M) + \varepsilon_M \tag{4}$$

3.2 Estimation

To estimate the system of equations defined by equations (2) to (4) consistently, we must both choose a functional form for equation (4) and consider a number of econometric issues. The functional form is especially important to consider carefully in equation (4), because the number of migrants from a household will always be a non-negative integer. Further complicating estimation, according to NELM, migration and remittances are endogenously determined along with income sources (as in equation (2)). To control for endogeneity, we need instruments that identify both migration and remittances. Selectivity bias could also be a problem, since not all households that send out migrants receive remittances. Also, not all households have self-employment activities. Finally, remittances and other income sources may be subject to the same types of shocks, which would cause contemporaneous correlation across equations.

to the household at a later date might also contribute to household income, data is not available on wages earned by long-term migrants in the sample.

3.2.1 Specifying the Migration Equation

To determine the level of participation in out-migration by a household or an individual, we must account for several factors. First, the number of migrants from a household is never negative. Furthermore, many households do not send out migrants; in our sample, 83 percent do not participate in migration. Finally, a significant portion (25 percent) of the households that send out migrants send out more than one migrant. To account for these factors, we use a count regression functional form for equation (4) (e.g. $g(\beta; Z_M) = exp(\beta_0 + \beta_1 Z_M) + \varepsilon_M$). The count regression has several advantages over other potential estimators. It takes into account households that do not participate in migration, and does not lead to negative predictions, as a linear specification would (Cameron and Trivedi, 1998).[7] It also accounts for the fact that several households have more than one migrant.

3.2.2 Endogeneity

To statistically control for potential endogeneity bias when estimating the system of equations defined by equations (2) to (4), we postulate that in addition to human capital variables, migration is a function of migration networks, or contacts with villagers who have previously migrated. In both theoretical and empirical work, migration networks have been shown to be among the most important variables driving migration (Carrington et al., 1996; Taylor et al., 1996). Members of a village who have already out-migrated help drive down some of the up-front costs of out-migration, as they share information about jobs in other areas with their relatives and neighbors. Therefore, households in villages with histories of migration (or, in China, in villages where people began to migrate when the economy first opened in the early 1980s) have better opportunities to send out migrants. However, village migration networks should not affect the level of household-specific remittances, which depend upon the household's own migration decisions, nor do networks affect incomes from sources within the village. We test two proxy variables for migration networks: the proportion of households in the *village* that sent out migrants in 1988, and we use a dummy variable that is 1 if a village had out-migration in 1988, and zero otherwise.

[7] With 83 percent of households not participating in migration, in order for the error term to have mean zero in a linear estimator, some households must have negative predicted migration. In fact, when we run the regression we specify as a linear regression, over 20 percent of the households in the sample have negative predicted migration.

Given migration, motivations to remit are complex (Lucas and Stark, 1985). In addition to household human capital and other household-specific variables, migrant remittances may be influenced by the village norms to remit (Taylor and Martin, 2001). We use the average level of remittances among families in the village, dropping the observed household, as a proxy for the village norm and assume that the village norm to remit affects each household's remittance level, but has no independent effect on household income. Our data from measures of village-wide experience in migration and village-wide remittances come from our community survey.

3.2.3 Econometric Efficiency

Finally, we make assumptions regarding the stochastic error terms ε_i, $i = c, s, o, R, M$, that result from the Poisson functional form choice for equation (4).[8] We assume that after correcting for selectivity bias in the self-employment equation, $\varepsilon_i, \forall i \neq M$ are normally and independently distributed with mean zero and variance σ_i^2. Cross-equation error correlation is likely, inasmuch as all rural income generation activities may be subject to the same stochastic shocks. To account for contemporaneous correlation across income sources, we estimate the remittance and income equations as a system using iterated three-stage least squares.[9]

3.3 Data and Variables

The household data used in our paper are from a sample of 787 farm households from 31 villages in Hebei and Liaoning Provinces, surveyed by one of the authors (Rozelle) in the summer of 1995. The survey gathered detailed information on household characteristics and wealth, agricultural production, and non-farm activities. Almost all of the households

[8]The remittance and self-employment equations may also be affected by selectivity bias, as not all households sending away migrants receive remittances, nor do all households participate in self-employment. Therefore, we apply a standard Heckman (1974) procedure to correct for selectivity in the remittance and self-employed income equations. No selectivity bias was found in the remittance equation, controlling for migration. However, the self-employment equation was found to have selectivity bias. To correct for it, we included an inverse Mills Ratio for self-employment participation in that equation. We do not use this procedure in the other activity-income equations, as almost all households have farm income (93 percent) and some other income source (90 percent).

[9]After both estimation steps are completed, we correct for bias in the standard errors caused by the two-step estimation procedure (Murphy and Topel, 1985).

farmed; 404 of the households also generated income through self-employed activities. Almost all of the households had some form of off-farm wages, pensions, or other sources of income; this income is classified as "other" for purposes of this study.

Migrants were identified from the household survey as either children of the household head or household members who left the household to work outside of the village, and returned less frequently than weekly, for at least three months during the year prior to the survey. Of the 787 households in the survey, 134 sent at least one household member into the migrant labor force. Of the 134 migrant households, 97 received remittances from their migrants. Village-level variables were constructed using data from our community-level survey of the same 31 villages. We believe the variables capture many of the intrinsic economic and demographic differences between villages, including the propensity for villagers to migrate and remit.[10]

The variables Z_i, $i = Y_f, Y_s, Y_o, R, M$, in equations (2) to (4) control for different demographic, human capital, and physical capital characteristics across households and for differences in economic conditions across villages (Table 3). Demographic variables hypothesized to affect the model include the total number of family members, including migrants and the number of dependents. If labor markets are imperfect, household size should increase the potential for migration, as well as income, since larger households have more labor to allocate across activities. Young dependents are defined as household members that are 15 years old or younger. Since the number of dependents in rural China would not be expected to affect household income, it is not included in any of the income or remittance equations.

To proxy for wages, we include measure of education and experience in all equations. An extensive literature finds evidence of returns from schooling and other human capital in crop production (Jamison and Lau, 1982) and in migration (Taylor and Martin, 2001). To measure the education level of the household, we use the household head's years of schooling. Alternative measures for the household education level, such as average education of the labor force and the educational attainment of the household member with the most education, lead

[10]When the migration equation of our model, equation (4), is estimated with village-level fixed effects in lieu of the village-level variables, parameter estimates of the household-level variables do not vary significantly, and the predicted valus of migration are comparable to our specification, indicating that the village-level variables we use capture a large portion of the intra-village variation in the sample that we do not use for identification.

to similar results. We also include household head's experience and experience squared, as in Mincer (1974).

To control for differences in physical capital across households, two capital-related variables are included in all five equations. Five other variables are included in specific equations,as they should only affect the level of income in specific activities. Land holdings per capita and the logarithm of the value of all non-productive assets owned by the household, a wealth measure, are included as controls for income generation ability and willingness to bear risk.[11] The area irrigated in the village, the household's agricultural assets (lagged one year) and grain inventory at the beginning of the year are proposed as explanatory variables in the cropping income equation. Analogously, the amount of capital invested in the family enterprise (lagged one year) and the firm's year-beginning inventory are included in the self-employment equation. Wealthier households are less likely to be liquidity constrained, so they should be expected to show a lower propensity to migrate and to have higher self-employment incomes, *ceteris paribus*.

Several variables are included in all five equations to control for different economic conditions and demographics across villages.[12] These variables include the village population, the proportion of village workforce working in wage earning jobs, and the percentage of gross village product (GVP) accounted for by industry. When land size and quality is held constant, households in villages with higher populations are likely to have lower cropping incomes, since land would be relatively more scarce. Other effects of the population size variable and the effects of the other community level variables have an ambiguous effect on most income sources.[13]

[11]Non-productive assets include consumer durable goods such as television sets, radios, cameras, transportation, and furniture.

[12]All equations also include provincial dummy variables.

[13]The industrial percentage of GVP and employment variables control for overall village wealth and communities with opportunities for working off-farm; wealthier villages generally have more industry, more employment, and therefore higher percentages of income coming from industry. The variable should positively affect all income sources but may have a negative effect on migration, since higher industrial GVP percentages imply more job opportunities within the village.

4 Results

4.1 Estimating the Migration equation

We estimate equation (4) using a Poisson functional form, using both possible instruments to identify migration (the percentage of out-migrants from the village in 1988, and the network dummy; Table 4).[14] The predictions from the Poisson functional form that enter the income source equations can be interpreted as the expected or predicted number of migrants from a household. Both specifications lead to expected effects of exogenous variables on migration. Larger households are more likely to participate in migration (row 1); while households with more children are less likely to send away migrants (row 2). Wealthier households are less likely to send out migrants (row 6), as are households situated in more industrialized villages (row 10). Only one of the two potential migration network variables is statistically significant, though they both have a positive effect on the expected number of migrants from a household. Both estimators lead to relatively high correlations between the actual number of migrants and the expected number of migrants (0.57).

4.2 Three Stage Least Squares Results

We estimate the core equations of our model using the dummy variable migration instrument (Table 5). The estimator performs reasonably well; the R-squared statistics for all four equations are significantly different than zero, and the coefficients on do not vary significantly across specifications of the exogenous variables.[15] The instruments also pass the Hausman-Wu test for exogeneity.[16]

[14] A Poisson specification is restrictive, in the sense that it limits the mean and the variance of the estimated variable to being equivalent. To alleviate this restriction and account for overdispersion in the data, another parameter could be estimated, making the distribution of the dependent variable negative binomial rather than Poisson (Cameron and Trivedi, 1998). Using our Poisson results, we test the null hypothesis that the parameter is zero, and cannot statistically reject the hypothesis that the mean and variance are equivalent.

[15] The results are relatively robust to definitions of the income source variables as well. We originally define crop income as income from grain crops, and self-employment income as including income from orchards, fishponds, and other high-value agricultural activites, because these activities require significant investment on the land before anything can be produced. We tried alternatively defining crop or farm income as including income from orchards, fishponds, and forests, and self-employment income as income from all other activities. The results of this regression were similar to those we report.

[16] To test if the instrumental variables that identify the migration equation are exogenous to remittances and income, and the instruments that identify remittances are exogenous to farm and self-employed income, a Lagrange multiplier test can be used. To compute the test statistic, we use an artificial regression of the

The exogenous variables described in the previous section affect migration and income sources in manners consistent with previous findings by other researchers (e.g. Liang and White, 1997). For example, household size is found to have statistically significant, positive effects on all income sources other than remittances (Table 5, row 3).[17] Households with more labor are typically more able to generate household income. Although the coefficients on our measures of human capital are generally insignificant, the education level of the household head positively affects "other" income.

Physical capital owned by the household also is found to have the expected effects on different income sources. Wealthier households (as measured by the value of their non-productive assets) are more able to generate self-employment and "other" income (row 7, columns 3-4). Households with more land per capita generate higher crop incomes (row 8, column 2). Lagged capital stocks and inventory have positive effects on cropping (rows 9-10, column 2) and self-employment (rows 11-12, column 3), but are only strongly significant for self-employment.[18]

4.3 Migration, Remittances, and Income Sources

The estimated effects of the migration and remittance variables in the income source equations provide strong evidence in support of the hypotheses raised by NELM theory, as do the instruments that identify the migration and remittance equations. As expected, remittances are a positive function of migration (Tables 5; column 2, row 1); each additional migrant is associated with a 386 yuan increase in remittance income. Therefore, households that send

residual from each remittance or income source equation on variables that are exogenous to the system, and the derivatives of the Poisson estimator (Davidson and MacKinnon, 1990). The χ^2 distributed test statistic is $N * R^2$, where N is the number of observations and R^2 is the goodness of fit of that regression. After the second stage in estimation, the statistic is calculated, and is distributed χ^2 with 12 degrees of freedom for the remittance equation residual and χ^2 with 13 degrees of freedom for the farm and self-employed income equations. The statistic is 15.30 for the remittance equation and 17.87 and 15.61, respectively, for the farm and self-employed income equations, indicating that we cannot reject the null hypotheses at the 90 percent confidence level that no correlation exists between the exogenous instruments and the residuals from respective remittance and income source equations.

[17]The regression results do not change very much when the number of laborers available in the household are used in lieu of household size.

[18]To ensure that the coefficients on our variables of interest are not affected by including activity-specific capital variables in the farm income and self-employment equations, we also re-estimated the system without these variables. When these variables are excluded from the model, other parameter estimates do not change, but the goodness of fit decreased. Therefore, we include the variables in the model. Results of this regression are reported in Appendix A, Table A1.

out migrants can expect that migrants will still contribute to the household. The full set of parameter estimates imply that crop income is a negative function of migration (Table 5, row 1, column 2), whereas self-employment income seems to have no statistically significant relationship with migration (row 1, column 3). The results suggest that when migrants leave the household along with their human capital, the ability of the household to produce cropping income is reduced; sending out each migrant from a household leads to a decrease of 1519 yuan in crop income. It is not surprising that crop income decreases significantly when a laborer leaves the household; without active on-farm labor markets, losing a family member reduces the household labor force, on average, by 30 to 50 percent. A labor reduction of this size should have a large negative effect on income, *ceteris paribus*, and as the mean crop income in the sample is around 3600 yuan (Table 3), this result implies that households lose around 40 percent of their crop income when a migrant leaves. However, households with self-employment income do not seem to suffer when migrants leave, as the coefficient on the migration variable in the self-employment equation is small and statistically insignificant. One plausible explanation for these findings is that as households decide to send out migrants, they shift their labor endowment into home activities with higher returns, which would suggest a shift away from cropping, generally the lowest return activity in which households participate in rural China.

Whereas migration itself has a negative effect on crop income, the indirect effect of migration on household income, the effect through remittances, has a largely positive effect on household income sources. Each yuan remitted by a migrant is associated with 1.68 yuan of additional crop income, and 1.14 yuan of self-employment income, though the latter effect is not statistically significant. These results are somewhat larger than estimated multiplier effects of migration found elsewhere in the literature (Taylor, 1992). They do suggest, though, that migration has complex effects on household income in rural China, or at least on some income sources within the household.

To more fully consider the *statistical significance* of our findings, and to investigate the effects of migration on *total* household income, we perform both series of estimates described above using bootstrap methods. We estimate each model 1000 times, each time choosing a new sample from the data set with resampling, and summarize the results for the effects of migration and remittances on income sources in Table 6. Using the bootstrap, we do not

find that our original coefficient estimates were biased, but we do find that standard errors for the coefficient estimates increase.

Still, many of the confidence intervals for our estimates, as measured by percentiles of the bootstrapped distribution, lend statistical credence to our earlier findings. The entire 90 percent confidence interval for the effect of migration on crop income is negative (row 2), while they are both positive for the effect of migration on remittances (row 1) and of remittances on crop income (row 3). Although the confidence interval for the effect of remittances on self-employment income includes some negative values (row 4), the interval is skewed positive, which might suggest that some households engaging in self-employment activities gain from migrant remittances. On the other hand, the confidence interval for effect of migration on self-employment is almost around zero (row 5), indicating that our earlier conclusion that migration does not directly affect self-employment income appears to be correct. These findings also provide more evidence that the loss of labor to migration negatively affects one sector of household production, cropping, while remittances directly contribute to income and indirectly contribute to income by stimulating crop and potentially self-employment production.

Taken as a whole, our results should caution researchers and policy analysts from drawing implications from work that does not account for the complexities of migration and remittance effects on rural economies. Our results support the NELM hypothesis that migrant remittances loosen constraints on different types of household production, in this case stimulating agricultural productivity. The results reported here are consistent with our previous findings, which found that a positive impact of remittances on maize yields nearly offset a negative lost-labor effect (Rozelle et al., 1999).

4.4 Total Effects of Migration on Income

Since migration has multiple effects on household income sources, the net effect of migration on household total income is a sum of direct and indirect effects of migration on income sources, where indirect effects occur through remittances. For example, the total derivative of migration on crop income is:

$$\frac{\mathrm{d}Y_c}{\mathrm{d}M} = \frac{\partial Y_c}{\partial M} + \frac{\partial Y_c}{\partial R}\frac{\partial R}{\partial M}. \tag{5}$$

The net effect of migration on *total* household income is the sum of the effect of migration on remittances and the total effect of migration on each income source, which can be written:

$$\frac{\mathrm{d}Y}{\mathrm{d}M} = \frac{\partial R}{\partial M} + \sum_k \left(\frac{\partial Y_k}{\partial M} + \frac{\partial Y_k}{\partial R}\frac{\partial R}{\partial M} \right); \qquad k = c, s, o. \tag{6}$$

To examine the net effects of migration on income sources, we turn to our bootstrap estimates to understand whether the overall effect of migration on income sources is positive or negative (Table 6). We find that as calculated by equation (5), the total effect of migration on crop income is negative (−873 yuan; row 6), and the entire 90% confidence interval is also negative, indicating that the net effect of migration on crop income is negative. This result is not surprising; cropping tends to have the lowest marginal product of labor for the household, and therefore when the household's labor moves out of the village, the likely response is to use less labor where returns are lowest. However, the confidence interval for net effect of migration on self-employment income is skewed positive (row 7), again providing mild evidence that through remittances, migration may have a positive effect on self-employment income.

Though our results show a negative effect of migration on crop *income*, we do not show that the *yields* is negatively affected by migration. Households may also be using remittances to purchase or rent substitutes for labor in farming, which would decrease income from crops, but would not affect production. To investigate whether yields decreased as a result of migration, we use plot level data from 612 of the 787 households in the sample to regress our predicted migration variable and remittances against yields (Table 7). We find that though migration has a small, negative effect on yields (row 1), remittances have a positive effect on yields (row 2). At the mean level of remittances amongst households in the sample with migrants (1560 yuan; Table 3), the overall effect of migration on yields is positive (−70+0.13*1580=130 jin/mu). In summary, migration most likely affects the input mix purchased by households rather than their crop output.

We also use the bootstrapping results to calculate the net effect of migration and remittances on total household income, as in equation (6) (Table 6, row 8). Although we tried a number of methods for calculating the this derivative, we report the total effect using coefficients that were significant in the original regression from Table 5.[19] Though the point

[19]We also calculated the total income effect using all coefficents estimated in each iteration of the bootstrap, and using only significant coefficients. This methods led to a similar point estimate of the net of effect of

estimate for the net effect of migration on total income is negative, the standard error is nearly as large. The confidence interval includes some positive values, indicating that the total effect of migration on household income may be positive for some households.

While the negative (or insignificant) effect on total household income may be surprising, it is important to remember that a departing migrant also changes the number of mouths to feed and people to clothe within the household. Therefore, the net effect of migration on *total* income may not be as important as the net effect on *per-capita* income. To investigate the effects of migration on per-capita, we perform an exercise similar to that of Barham and Boucher (1999). We consider nine hypothetical households, which have three to five members and have per-capita incomes at the 25th, the 50th, and the 75th percentile of the per-capita income distribution (Table 8). We take the per-capita income for each household (column 1) and multiply by the number of members to get the total income (column 2), then subtract off our point estimate for the effect of migration on total household income (columns 3 and 4). Finally, we calculate the new per-capita income, taking into account the fact that one member has left (column 5) and calculate a percentage gain in per-capita income (column 6).

When we consider changes in per-capita income rather than total income, we find that migration has an unambiguously positive effect on households. All nine hypothetical households experience an increase in per-capita income of between 14 and 30 percent. Poorer households do not fare as well as richer households, because they are not as able to absorb any decrease in total household income. Smaller households do better than larger households, because they lose a larger proportion of the household when one member leaves. Of course, as our regression results show (Table 4), larger households would be more likely to support multiple migrants than smaller households. So households with five or more members could potentially send two migrants out and further increase the gains– in per-capita terms– to migration.

migraiton on total income, but exhibited bias (according to the bootstrap) and a much larger standard error, as one would expect. By reporting the estimate above, we implicitly assume that the coefficients on other partial effects are zero.

5 Conclusions

In this paper we have explored the links among migration, remittances, and crop and self-employed incomes in rural China. Our econometric findings using household-farm survey data indicate that the loss of labor to migration has a negative effect on household cropping income in source areas, although it does not negatively affect crop yields. However, we provide evidence that the remittances sent home by migrants partially compensate for this lost-labor effect, contributing to household incomes directly and also indirectly by stimulating crop and possibly self-employment production. This finding offers evidence in support of the NELM hypothesis that remittances loosen constraints on production in the imperfect-market environments characterizing rural areas in less developed countries. Taking into account the multiple effects of migration and the change in household size, we find that participating in migration at the household level increases household per-capita income, for those left behind, by between 14 and 30 percent.

Although we have identified multiple ways that migration and remittances affect rural incomes in China, migration may have even more complex effects on household outcomes than we can cover in the scope of this paper. In our study and in our data set, there is mild evidence that households invest remittances in self-employed activities that may not immediately return profits, in order to realize higher incomes in the not-so-distant future, once the migrant returns home. For example, over the course of the year the change in self-employment capital and inventory, on average, is positive for migrant households with self-employed income. However, the same statistic is close to zero, or negative, for non-migrant households. As imperfections in capital and insurance markets certainly exist in rural China, they could provide households with a motivation to migrate as part of a dynamic strategy to invest in new non-agricultural ventures. Additional longitudinal data are necessary to explicitly test this hypothesis.

Finally, a policy issue facing national leaders is whether migration will narrow or exacerbate the gap between urban and rural incomes. Our results indicate that migration positively affects incomes for rural households and could further catalyze income growth in self-employed activities in the longer run. Households face a labor constraint when their members migrate from the village, and they face capital constraints that create incentives

to participate in migration in order to expand home businesses. If the government wishes to slow the flow of migrants out of rural areas, it may need to intervene in credit markets by reforming the formal rural credit system or encouraging development of informal credit institutions. Such measures would increase households' self-employed production efficiency and lessen the imperative to send migrants out into the labor force primarily to finance these activities. However, more thorough reforms to institutions that limit permanent migration, such as the household registration system, would likely have an even more complex and potentially larger effect on life in rural China and act as a more potent stimulant to the nation's structural transformation.

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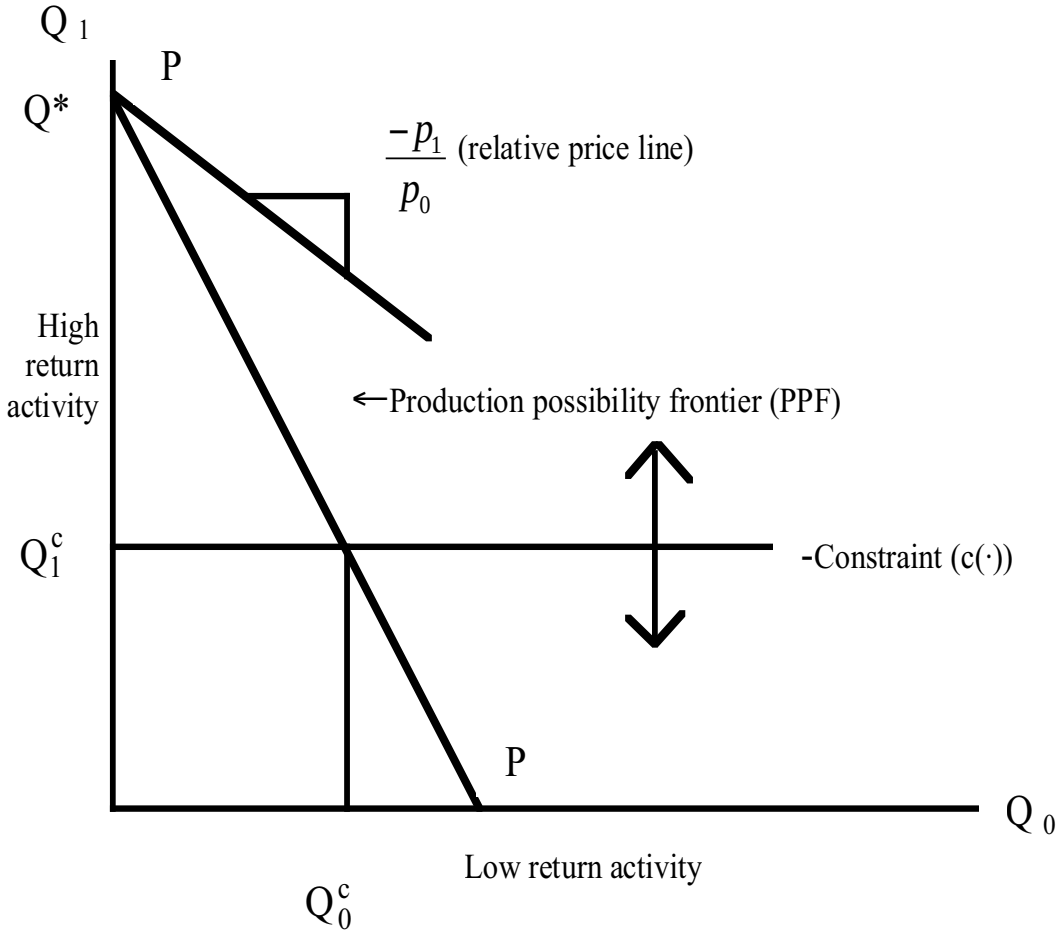

Figure 1. Potential Effects of Migration on Production Possibilities

Table 1. Human Capital Statistics for Household Members

Variable Mean	Migrants (n=183)	All Non-Migrant Workers (n=2273)
Percentage that are Male	76.1%	49.7%
Age	29.0	38.5
Education	8.2	5.8
Experience	14.8	26.2

Notes: Means in this table are calculated at the individual level. Education is defined as the number of years of school completed. Experience is defined as age minus years in school minus six. *Source:* Authors' survey.

Table 2. Income and Self-Employment Capital in Migrant and Non-Migrant households

Variable	Migrant Households (n=134)	Non-Migrant Households (n=653)
Farm Income	3590	4500
Total Income	9230	11580
Households with Self-Employed Activities (Percentage)	35%	54%
Self-Employed Income (All HHs)	1440	3790
Value, Self-Employed Capital (All HHs)	3460	7980
Self-Employed Income (HHs with self-emp.)	3220	7240
Value, Self-Employed Capital (HHs with self-emp.)	7780	13530

Notes: All figures above are calculated at the household level.
Source: Authors' survey.

Table 3. Descriptive Statistics for Selected Variables

Variable Mean	Migrant Households (n=134)	Non-migrant Households (n=653)
Migration and Income Variables		
Number of Migrants	1.37	–
	(0.69)	
Remittances	1580	–
	(2910)	
Farm Income	3600	4500
	(2600)	(5700)
Self-Employed Income	1440	4500
	(4000)	(12800)
Non-Farm Income	2620	2580
	(3470)	(5290)
Human Capital and Household Demographics		
Education of Head	5.75	6.46
	(3.24)	(2.51)
Experience of Head	40.3	31.0
	(13.6)	(13.0)
Household Size	4.25	3.78
	(1.25)	(1.12)
Young Dependents	0.66	1.13
	(0.78)	(0.86)
Physical Capital Variables		
Value, Non-Productive Assets	1250	2590
	(1170)	(3960)
Land per Capita	3.05	2.28
	(2.46)	(2.27)
Non-Farm Enterprise Capital, Lagged	2380	4680
	(11000)	(24100)
Non-Farm Inventory, Lagged	1170	1260
	(5600)	(7480)
Agricultural Assets, Lagged	1410	1470
	(1800)	(2600)
Grain Stocks, Lagged	175	125
	(600)	(360)

Notes: Standard Deviations in parenthesis. Data from authors' survey.

Table 4. Effects of Household and Village Characteristics on Migration

Explanatory Variables	Specification	
	(1)	(2)
Household Demographic and Human Capital Characteristics		
Household Size	0.67	0.65
	(10.29)**	(9.95)**
Young Dependents	−0.95	−0.89
(7.45)**	(6.94)**	
Experience of Head	0.031	0.037
	(1.07)	(1.23)
Experience,	−0.0002	−0.0003
Squared	(0.70)	(0.89)
Education of Head	0.051	0.051
	(1.60)	(1.65)*
Household Physical Capital Variables		
Log Value,	−0.24	−0.22
Non-Productive Assets	(4.39)**	(3.82)**
Land per Capita	0.062	0.057
	(2.17)**	(2.09)**
Village Characteristics		
Proportion of Village	0.013	1.37
Workforce, Enterprises	(0.01)	(0.73)
Village Population	−0.0014	−0.00014
	(1.00)	(0.74)
Percentage GVP, Industry	−0.0093	−0.014
	(2.21)**	(3.05)**
Percentage of Workforce,	−0.025	
Out-Migrating, 1988	(0.02)	
Out-Migration ocurring in		0.41
1988 (dummy)		(2.21)**
Regression Statistics		
Log-Likelihood	−376.5	−374.1
Predicted Migrants,	0.014	0.015
Minimum		
Predicted Migrants,	3.93	4.12
Maximum		

Notes: * denotes significance at the 10 percent level; ** denotes significance at the 5 percent level. Provincial fixed effects are not reported.

Table 5. Estimated Effects of Migration and Remittances on Income Sources, using Iterated Three Stage Least Squares, Controlling for Selectivity in Self-Employment Equation

Explanatory Variables	(1) Remittances	(2) Farm Income	(3) Self-Employed Income	(4) Wage and Other Income
Expected Number of Migrants	386 (2.19)**	−1519 (2.09)**	−83 (0.06)	−1063 (1.40)
Remittances		1.68 (2.44)**	1.14 (0.89)	−0.55 (0.80)
Household Demographic and Human Capital Characteristics				
Household Size	7.90 (0.16)	712 (3.83)**	853 (2.42)**	437 (2.19)**
Experience of Head	−16.3 (0.98)	−50.4 (0.79)	−241 (1.96)**	115 (1.65)*
Experience, Squared	0.22 (0.96)	0.16 (0.79)	2.25 (1.37)	−0.41 (0.43)
Education of Head	−23.4 (1.02)	−45.2 (0.51)	−207 (1.21)	328 (3.40)**
Household Physical Capital Variables				
Log Value, Non-Productive Assets	48.9 (1.18)	−105 (0.67)	674 (2.23)**	633 (3.73)**
Land per Capita	8.76 (0.40)	900 (10.66)**	−444 (2.79)**	58.8 (0.65)
Agricultural Assets, Lagged		0.13 (1.82)*		
Grain Stocks, Lagged		0.59 (1.49)		
Non-Farm Enterprise Capital, Lagged			0.20 (11.82)**	
Non-Farm Inventory, Lagged			0.24 (4.64)**	
Village Characteristics				
Mean Village Remittance	0.90 (4.80)**			
Proportion of Village Workforce, Enterprises	143 (0.15)	−14700 (4.25)**	966 (0.14)	3048 (0.80)
Village Population	−0.0011 (0.01)	−0.70 (2.28)**	−0.11 (0.19)	−0.13 (0.41)
Percentage GVP, Industry	0.44 (0.18)	28.4 (3.11)**	40.4 (2.28)**	27.7 (2.78)**
Area Irrigated, Village		39.1 (8.30)**		
Inverse Mills Ratio			3317 (7.39)**	

Notes: t-statistics in parenthesis; standard deviations are adjusted by the method suggested by Murphy and Topel (1985). * denotes significance at the 10 percent level; ** denotes significance at the 5 percent level. Provincial fixed effects are not reported. Expected migration is computed from the results in column (4) of Table 4. The inverse Mills ratio is calculated by taking all exogenous variables that might affect self-employed income and regressing them against a 0-1 no participation-participation variable, by the probit method, for self-employment activities. An inverse Mills ratio is calculated from those results.

Table 6. Bootstrapped Marginal Effects of Migration and Remittances, and total effect of migration on Income

Derivative	Estimate	Std. Error	90 % Conf. Interval
Partial effects of migration and remittances on income sources			
$\frac{\partial R}{\partial M}$	387	214	[80,787]
$\frac{\partial Y_c}{\partial M}$	−1512	150	[−3515, −447]
$\frac{\partial Y_s}{\partial M}$	312	1081	[−1459,1888]
$\frac{\partial Y_o}{\partial M}$	−1037	921	[−2430, −62]
$\frac{\partial Y_c}{\partial R}$	1.65	1.47	[0.37,4.85]
$\frac{\partial Y_s}{\partial R}$	0.77	1.86	[−1.89,3.71]
$\frac{\partial Y_o}{\partial R}$	−0.62	1.73	[−2.68,2.46]
Net effects of migration on cropping and self-employment income			
$\frac{\mathrm{d}Y_c}{\mathrm{d}M}$	−873	532	[−1760, −81]
$\frac{\mathrm{d}Y_s}{\mathrm{d}M}$	610	798	[−649, 1900]
Net effect of migration on income			
$\frac{\mathrm{d}Y}{\mathrm{d}M}$	−486	580	[−1263, 446]

Notes: In this table, M stands for migration, R stand for remittances, and Y_c, Y_s, Y_o, and Y stand for cropping income, self-employment income, other non-farm income, and total income, respectively. The partial derivatives in rows 1-7 correspond to coefficients reported in Table 5; for example, the partial effect of migration on remittances corresponds to the coefficient in row 1, column 1 of Table 5. The *total* derivatives in rows 8-9, or the net effects of migration on income sources, are calculated using the formula in equation (5), and the net effect of migration on total income in row 10 is calculated using equation (6).

Table 7. Effects of Migration and Remittances on Yields

Explanatory Variables	Crop Yield
Expected	−70.1
Migrants	(1.63)*
Remittances	0.14
	(1.96)**
Household Characteristics	
Experience	2.65
of Head	(0.49)
Experience,	−0.02
Squared	(0.29)
Education	13.6
of Head	(1.20)
Household	−23.7
Size	(1.04)
Log, Value	12.8
Non-Productive Assets	(0.99)
Plot Characteristics	
Distance	6.62
from House	(0.34)
Plot	−7.06
Size	(2.27)**
Plot	103
Quality	(4.00)**
Village Characteristics	
Proportion of Village	−377
Workforce, Enterprises	(1.33)
Population	−0.033
	(1.20)
Percentage GVP,	0.57
Industry	(0.87)
Area Irrigated, Village	1.31
	(3.52)**

Notes: Sample size is 1076 plots; t-statistics in parenthesis. * denotes significance at the 10 percent level; ** denotes significance at the 5 percent level. Standard errors were corrected for correlation across households. The remittance variable is instrumented with the average remittance level for other households in the village. Provincial fixed effects and specific crop dummies (rice, cotton, beans) are not reported. Expected migration is computed from the results in column (2) of Table 4.

Table 8. Simulated Per-Capita Income Effects of Migration on Households

	(1)	(2)	(3)	(4)	(5)	(6)
	Per Capita Income before migration	Total Income for given household size	Loss in Net Income due to loss of migrant	Total Income for household after migration leaves:	Estimated Per Capita Income after migrant leaves:	Percent Change in per capita Income:
		(1)*N			(4)/(N-1)	((5)-(1))/(5)
Households with three members						
25th percentile	1403	4209	−486	3723	1862	25
50th percentile	2195	6585	−486	6099	3050	28
75th percentile	3471	10413	−486	9927	4964	30
Households with four members						
25th percentile	1403	5612	−486	5126	1708	18
50th percentile	2195	8780	−486	8294	2765	21
75th percentile	3471	13884	−486	13398	4466	22
Households with five members						
25th percentile	1403	7015	−486	6529	1631	14
50th percentile	2195	10975	−486	10489	2622	16
75th percentile	3471	17355	−486	16869	4217	18

Notes: The net income loss due to migration is calculated using the point estimate in Table 7. N in the formulae above denotes the household size before out-migration occurs. 25th, 50th, and 75th percentile denote the point in the pre-capita income distribution at which the household falls.

Appendix Table A. Estimated Effects of Migration and Remittances on Income Sources, using Iterated Three Stage Least Squares, Controlling for Selectivity in Self-Employment Equation

Explanatory Variables	(1) Remittances	(2) Farm Income	(3) Self-Employed Income	(4) Wage and Other Income
Expected Number	393	−1535	−126	−661
of Migrants	(2.36)**	(2.20)**	(0.08)	(0.82)
Remittances		1.39	1.35	−1.69
		(1.96)**	(0.82)	(2.05)**
Household Demographic and Human Capital Characteristics				
Household Size	5.86	778	850	572
	(0.12)	(4.29)**	(2.09)**	(2.95)**
Experience of Head	−15.8	−49.2	−163	89.5
	(0.96)	(0.86)	(0.76)	(1.21)
Experience,	0.21	0.16	1.47	-0.07
Squared	(0.94)	(0.19)	(0.77)	(0.07)
Education of Head	−23.7	−46.6	−60.6	300
	(1.04)	(0.53)	(0.31)	(2.94)**
Household Physical Capital Variables				
Log Value, Non-	51.1	−78.4	1226	662
Productive Assets	(1.26)	(0.51)	(3.56)**	(3.71)**
Land per Capita	8.27	938	−610	72.8
	(0.38)	(11.47)**	(3.31)**	(0.77)
Village Characteristics				
Mean Village Remittance	0.99			
	(5.28)**			
Proportion of Village	29.7	−15264	330	4473
Workforce, Enterprises	(0.03)	(4.41)**	(0.04)	(1.11)
Village Population	−0.0069	-0.72	0.26	-0.07
	(0.08)	(2.35)**	(0.38)	(0.21)
Percentage GVP, Industry	0.76	29.0	32.4	24.8
	(0.31)	(3.19)**	(1.58)	(2.34)**
Area Irrigated, Village		38.6		
		(8.27)**		
Inverse Mills Ratio			3159	
			(6.16)**	

Notes: t-statistics in parenthesis. * denotes significance at the 10 percent level; ** denotes significance at the 5 percent level. Provincial fixed effects are not reported. Expected migration is computed from the results in column (4) of Table 4. The inverse Mills ratio is calculated by taking all exogenous variables that might affect self-employed income and regressing them against a 0-1 no participation-participation variable, by the probit method, for self-employment activities. An inverse Mills ratio is calculated from those results.