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DO AGRICULTURAL HOUSEHOLDS USE INTERNATIONAL MIGRATION AS AN INCOME DIVERSIFICATION STRATEGY?

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Abstract

Many agricultural households in developing countries depend on international migration and nonfarm work to cope with the economic risks and uncertainty associated with farming. We examine the effects of international migration and remittances on rural households' participation in nonfarm jobs and the earnings generated from these jobs. Using data on agricultural households in Albania, results indicate that remittances received from migrant household members induce reallocation of household labor to nonfarm self-employment jobs, and increase income from at-home farming. Overall, international migration contributes to rural development in Albania through the positive impact of remittances on households' ability to diversify income and reduce income risks associated with farming.
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JEL Codes*: D12; F22; F24; Q12; O15; O52.*

1. Introduction

A central question in analyzing the impact of international migration on development is how migration and related remittances re-shape rural economies in origin countries. Rural households in developing countries must often cope with both poverty and farm income variability. Similar to other developing countries struggling with rural poverty, Albania is characterized by systemic international out-migration in the pursuit of better economic opportunities. Despite less intense migration push-and-pull factors compared to twenty-five years ago, when communism collapsed in the country, Albanian out-migration is still strong with government policies appearing ineffective in discouraging the outflow (Migration Policy Institute [MPI], 2015). In this study, we address how out-migration and remittances may encourage nonfarm labor diversification and impact origin households' incomes from a variety of local sources. The basic premise motivating the question is that changes in labor endowments and potential income effects due to migration are likely to cause migrant-sending households to adjust their allocation of labor across different income-generating activities. Consequently, international migration has the potential to add to the development process in source economies by inducing a more diverse set of nonfarm labor activities.

There are mainly two conceptual approaches to the relationship between migration and the development of source economies. The optimistic approach, associated with the New Economics of Labor Migration (NELM) pioneered by Stark (1991), argues that migration and remittances are part of rural households' strategy to increase income, overcome investment

barriers, and provide financial protection against farm income risks and unfavorable local economic conditions. Migration, therefore, constitutes an implicit arrangement between migrant and non-migrant household members, with remittances being the direct returns from migration to the non-migrating family members (Stark, 1991; Stark & Bloom, 1985). As such, NELM predicts a positive role of migration and remittances for the development of migrant-sending economies by loosening production and investment constraints of rural households (Taylor, 1999; Taylor & Martin, 2001). The pessimistic approach to international migration argues that remittances are rarely used for productive investment activities, leading to higher consumption and prices for non-tradable goods (eg., Rivera-Batiz, 1982; Wahba, 1998). The analysis in this paper is an implicit test for the validity of the optimistic approach versus the pessimistic approach.

Both the optimistic and pessimistic approaches to migration share the idea that migration decisions are made at the household level rather than at the individual level as the neoclassical theory argues (Harris & Todaro, 1970). International migration is part of a rural household's income diversification strategy and is consistent with the modern portfolio theory (Barrett, Reardon, & Webb, 2001; Wouterse & Taylor, 2008). Income diversification, defined as the allocation of productive assets among different income-generating activities on-the-farm and off-the-farm, implies a risk strategy where households make a tradeoff between potentially higher total income with greater risk of income failure and potentially lower total income with less risk of income failure. Diversification into additional nonfarm income sources may emerge from decreasing or time-varying returns to farm labor or land, local market failures (such as inadequate or limited land, labor, credit, or insurance markets), *ex-ante* risk management concerns, or *ex-post* coping with negative shocks to income (Barrett et al., 2001; Barrett, Bezuneh, Clay, and Reardon, 2005). Income diversification strategies for rural households may involve participating in local nonfarm jobs, receiving remittances from migratory labor, or a combination of both (Reardon, 1997; Ellis, 1998, 2000; Reardon, Taylor, Stamoulis, Lanjouw, & Balisacan, 2000; de Janvry & Sadoulet, 2001).

International migration, as an income diversification strategy, has two major competing effects on migrant-sending rural households. On the one hand, households may face on-farm labor and production constraints when some members migrate abroad for work (lost-labor effect). On the other hand, remittances received from migrant members may allow for farm investments and participation in local off-farm activities (income/remittances effect). Through remittances, migrants essentially play the role of financial intermediaries, enabling rural households to overcome credit and risk constraints to participate in income-generating activities (Taylor, Rozelle, & de Brauw, 2003). In other words, the lack of well-functioning formal credit markets forces rural households to self-finance investments in farming and off-farm activities and to self-insure against various income risks (Wouterse & Taylor, 2008). NELM predicts that international migration will boost income diversification if the positive income (remittance) effect outperforms the lost-labor effect. If this hypothesis is correct, then other things being equal, the presence of international migrants in rural households should be positively associated with income diversification between farm and nonfarm activities. If the lost-labor effect dominates the income (remittances) effect, then international migration may manifest itself through reduced farm income or non-participation in local nonfarm activities. The net effect of international migration on rural households' income from farm and nonfarm activities is an empirical question that requires case-by-case evaluation.

The aim of this study is to empirically examine the net impact of international migration on rural households' labor reallocation decisions and incomes from a portfolio of farm and nonfarm local income-generating activities. Do agricultural households with migrant members (and, potentially remittance streams) diversify their income-generating activities? If so, how are earnings from a portfolio of nonfarm labor activities affected by migration and remittances? Our contribution to the empirical literature on the Albanian experience is our integrated

approach to analyzing the impact of international migration on portfolios of farm and nonfarm incomes of migrant-sending households, taking into account the multifaceted nature of farm and nonfarm labor decisions and incomes, as well as contrasting lost-labor supply and added income (remittance) effects of migration on these outcome variables.

Our results suggest that remittances received from migrant household members induce reallocation of household labor to nonfarm self-employment jobs and increase income from at-home farming. Given the key role it plays in stabilizing incomes and alleviating rural poverty, governments in developing countries have become increasingly interested in promoting income diversification across multiple sources. An accurate analysis of income-generating activities, including international migration, helps policy makers avoid the pitfalls of conventional approaches to increase employment, income, and productivity in a single occupation, such as farming.

The remainder of the paper is structured as follows. In section 2, we explain migration's impact on income diversification and development in migrant-sending communities, and provide a brief overview of agriculture and the rural nonfarm economy in Albania. In section 3, we present our data and discuss some descriptive statistics. Section 4 is where we build our empirical framework and discuss the estimation methodology. In section 5, we present estimation results on both participation in nonfarm occupations, and incomes from farm and nonfarm jobs. Section 6 concludes with a summary of results and their implications for rural development policies.

2. Migration, Remittances, and Income Diversification

2.1. A Brief Literature Review

While the determinants of migration have been studied extensively in the literature, the impacts of migration and remittances on nonfarm labor reallocation decisions and incomes have not gained as much attention. One strand of the literature on international migration has focused on its effects on household agricultural production, excluding the nonfarm labor activities (Rozelle, Taylor, & de Brauw, 1999; Taylor et al., 2003; Taylor & Lopez-Feldman, 2010). The main finding in the majority of these studies is that international migration has no positive impact on farm production, and that it is often used by agricultural households as a means to leave farm work (e.g., McCarthy, Carletto, Kilic, & Davis, 2009; Miluka, Carletto, Davis, & Zezza, 2010). Another strand of the literature on international migration has acknowledged the multiplicity of income-generating actives sourced by agrarian households. Examples include Taylor et al. (2003) for China; Wouterse and Taylor (2008) for Burkina Faso; and Arslan and Taylor (2012) for Mexico. These studies suggest that offsetting labor supply and remittance effects of migration on farm and nonfarm income sources point to the complex mechanism through which migration and remittances impact the migrant-sending households as suggested by the NELM theory.

The majority of studies that have analyzed the impact of migration on agricultural income and investment in Albania have overlooked the fact that international migration can also have an indirect effect on migrant-sending households through remittances (Kilic, Caarletto, Mikuka, & Savastano, 2009; McCarthy et al., 2009; Miluka et al., 2010). Our contribution to the Albanian migration literature is to analyze the impact of international migration on migrant-sending households' economic activity choices and incomes within the income diversification framework. We take an approach where the possibility of holding a full range of income-generating activities, both farm and nonfarm, is recognized. We also take both the direct lost-labor effect and the indirect income (or, remittance) effect of international migration into account. This approach allows a broader view of the relationships among migration, remittances, and farm and nonfarm economic activities in rural economies.

2.2. International Migration and Rural Economy in Albania

Rural Albania has experienced significant structural and institutional changes since the collapse of the Soviet Union. State-subsidized agricultural enterprises have disappeared and almost all available agricultural land has been re-distributed among rural households, creating approximately half a million small family farms with an average of 1.1 hectares of farmland per household (Cungu & Swinnen, 1999; Davis, 2003). This has transformed farming in Albania from a state-held structure to a fully private agricultural sector with rural families holding fragmented plots for production and their own subsistence consumption.

Shifting to private ownership of farmland was expected to facilitate a fast transition to more efficient farmland markets, but a number of issues have decelerated the development of land markets. Post-privatization has created many new landlords who have never owned any real estate before. The lack of well-functioning taxation and registration mechanisms has further discouraged using, selling, or leasing the farmland. Another prevailing issue for rural investment in Albania is incomplete credit markets. Although there have been some initiatives to develop village-level micro-credit funds and a national credit system, the commercial credit sector has mostly stayed outside of rural areas in Albania (Wehinger & Schäfer, 2011). With only limited investment sources, most rural agricultural production remains subsistent, small-scale, and fragmented, leaving rural farm households trapped in poverty (MPI, 2015). As a result, many rural Albanians seek alternative income sources by diversifying into a portfolio of nonfarm income-generating activities, including strategic migration of household members inside and outside the country (Carletto, Davis, Stampini, & Zezza, 2006; Kilic et al., 2009).

Table 1 provides an overview of recent economic and demographic trends in Albania. The real Gross Domestic Product (GDP) per capita has been continuously increasing since 1995, totaling 4543.09 USD in 2015. This has not been the case for agriculture, whose contribution to the GDP has decreased from 55.81% in 1995 to 22.13% in 2015. From 1995 to 2007, the unemployment rate stayed fairly stable at around 14%. Then along came the global financial crisis of 2008, leading to an increase in both total and youth unemployment rates. By 2015, the total unemployment rate was 17.1%, while youth (between 15 and 29 years of age) unemployment was significantly higher. Table 1 also shows how agricultural employment decreased over time to 41.26% of total employment in 2015. In contrast, the Human Development Index (HDI) increased from 0.63 in 1995 to 0.76 in 2015, suggesting development of complex livelihood strategies in Albania since the collapse of communism.

The migration and demographic variables in Table 1 illustrate that international migration has been on the rise since the 1990s, with most migrating to Greece and Italy (Carletto et al., 2006). Migrant flows are primarily from the rural areas of Albania, as reflected by the continuous decrease in rural population in post-communist Albania. As of 2015, Albania's international migrants make up 38.9% of its total population, with a total of 1.1 million emigrants abroad. The net of immigrants and emigrants was –252,930 between 2005 and 2010, and –91,750 between 2010 and 2015. The decrease in migration is attributed to the economic crisis of 2008, which triggered a wave of return migration (Ministry of Internal Affairs, 2016). Most of the return migration to Albania is due to unemployment in the host countries and temporary. On average, returnees remain abroad for more than ten years before returning home with plans to re-emigrate when new opportunities arise (Institute of Statistics of Albania [INSTAT], 2014). The ratio of remittances in Albania's GDP was relatively high, between 15.81% and 17.62%, until the 2008 global economic crisis. In 2015, the share of remittances in total GDP fell to 9.19% (Table 1).

Table 1. Selected Development Indicators for Albania (1995–2015)

Selected indicators	1995	2000	2005	2010	2015
Demographic					
Total population (thousands)	3187.78	3089.03	3011.49	2913.02	2889.17
Population growth (annual %)	-0.62	-0.64	-0.51	-0.50	-0.16
Rural population (% of total population)	61.09	58.26	53.27	47.84	42.59
International migration					
International migrant stock (thousands)	178.51	822.68	964.62	1110.30	1122.91
Net migration (thousands)		-179.61	-175.41	-252.93	-91.75
Annual average net migration rate (per 1000 population)	-27.81	-11.63	-11.65	-17.37	-6.35
Personal remittances received (% of GDP)	17.62	16.46	15.81	9.69	9.19
Economic and development					
GDP per capita (current USD)	760.56	1175.79	2709.14	4094.36	3945.22
GDP per capita (constant USD, 2010 prices)	1702.89	2256.05	3077.68	4094.36	4543.09
Agriculture value added (% of GDP)	55.81	26.49	21.23	20.66	22.13
Agriculture value added per worker (constant USD, 2010 prices)	2170.07	2405.95	2734.33	3487.93	3853.57
Agricultural land (% of total area)	41.13	41.75	39.31	43.84	
Unemployment rate	14.71	14.15	13.83	14.20	17.08
Employment in agriculture (% of total employment)	68.37	71.82	58.47	73.25	41.26
Human Development Index (HDI)	0.63	0.66	0.70	0.74	0.76

Notes: International migrant stock and net migration data were obtained from the 2015 revision of the United Nations, World Population Prospects database. Human Development Index (HDI) data were from the United Nations, Human Development Reports. All other demographic and economic indicators were extracted from the World Bank, World Development Indicators (2015). Net migration values reported under 2000, 2005, 2010, 2015 are average values between 1995-2000, 2000-2005, 2005-2010, and 2010-2015, respectively.

3. Data and Descriptive Statistics

We use data from the 2005 Albanian Living Standard Management Survey (ALSMS05) conducted by the Albania Institute of Statistics (INSTAT) and the World Bank. The ALSMS05 is unique in the sense that it has an unusually in-depth migration module, with detailed information on household migration status as well as household demographics, education, consumption expenditures, agricultural production, assets, incomes from a variety of nonfarm jobs, and community and district-level characteristics. ALSMS05 is accompanied by the Rural Income-Generating Activities (RIGA) database, which provides matching data on sectoral income aggregates for each household in the ALSMS05 – key outcome variables in our analyses (Quiñones, de la O-Campos, Rodriguez-Alas, Hertz, & Winters, 2009).

International migrant is defined as the household head's spouse or children ages 15 years or older who lived outside of Albania at the time of the interview. International migrants in the sample have a mean age of 29, and have been abroad for an average of 5 years. Households have an average of 1.76 migrant members. The international migratory stream is dominated by males (74%). The migration module of ALSMS05 also has information on farm households' total remittances in the past year from their current migrant members. Average nominal exchange rates for 2005 from the Bank of Albania are used to convert the total remittances from the payment form of currency into Albanian *Leks* in order to conform to the other income

variables in the dataset. The average amount of remittances received by a migrant-sending household is 158,995 Leks per year (1616 USD in 2005).

Consistent with RIGA classifications, we identify two income sources: (1) nonfarm wage income and (2) nonfarm self-employment income. Nonfarm wage income is earned from wage-employment activities outside the farm. Nonfarm self-employment income is earned from microenterprises owned by a member of the household. We consider 1515 rural households reporting nonzero value for agricultural production (crop or livestock). After deleting observations with missing values on key variables, 1383 rural farm households are left in the final sample.

Table 2 reports weighted averages of dependent and explanatory variables as well as tests of mean differences between migrant-sending and non-sending farm households in rural Albania. Overall, 40% of rural farm households in Albania participate in at least one nonfarm income-generating activity besides agricultural production. This is mainly driven by nonfarm wage-employment, with a 31% participation rate. Migrant-sending households are less involved in nonfarm wage-employment (27% vs 33%) and nonfarm self-employment (10% vs 12%). Incomes from different activities are also reported in the upper panel of Table 2. Migrant-sending households earn significantly more farm income than non-sending households (195,884 vs 172, 6755 Leks). This might be due to ownership of agricultural assets—larger farm size and more agricultural machinery (Table 2). However, the opposite is observed for nonfarm incomes. Given participation in nonfarm activities, migrant-sending farm households earn less off the farm than do their counterparts with no migrants (160,904 vs 205,249 Leks); this appears to be driven by nonfarm wage employment.

Overall, the summary in Table 2 suggests that while migrant-sending farm households participate less in nonfarm income-generating activities and earn significantly less income than households without international migrants, their average farm income is significantly higher.

4. Empirical Framework

4.1. The Model

A farm household model is used as a basis for our empirical estimation along the lines of Wouterse and Taylor (2008) and Wouterse (2012). The problem facing the household is to maximize the Expected Utility (EU), subject to budget and labor availability constraints

$$\max_{l_F,\, l_i} EU[\{P_F f(L, l_F) + g(l_i) + R(M) + A\}, \ell : \tau] + \lambda[T - l_F - \ell - M], \quad (1)$$

where L denotes land, l_F is farm labor; P_F represents the net price of farm output, Q, where $Q = f(L, l_F)$ describes a stochastic crop or livestock production function; l_i is the household's labor engaged in nonfarm activity, where i indicates nonfarm wage-employment or nonfarm self-employment. R is remittances received from international migrant members of the household (M). A is household's non-labor income (public transfers, social payments, and nonfarm rental income). T is the total labor available to the farm household, ℓ is household leisure time, and τ is a vector of household characteristics influencing utility.

Given participation in nonfarm activities, the solution to the household utility maximization problem involves allocating labor resources among farm and nonfarm activities until the marginal expected utilities from these activities are equalized. At the equilibrium, some households would diversify income across a portfolio of income-generating activities. The first-order conditions of the maximization problem in equation (1) can be solved to derive reduced-form equations, which relate the outcome variables (net income) and the participation in nonfarm activity *i* to a set of both endogenous and exogenous variables.

Table 2. Migrant-Sending Households versus Non-Migrant Households

	Total Sample	Households with Migrants	Households with no Migrants	Mean Difference
Dependent variables				
Participation rates:				
Nonfarm work	0.40	0.36	0.42	-1.94**
Wage employment	0.31	0.27	0.33	-1.70*
Self-employment	0.11	0.10	0.12	-0.95
Household income by source:				
Farm income	180.78	195.88	172.67	3.03***
Nonfarm work income	189.75	160.90	205.25	-1.66*
Wage employment income	104.76	83.10	116.39	-2.62***
Self-employment income	84.99	77.80	88.85	-0.45
Explanatory variables				
Number of migrants	0.62	1.77	—	—
Total remittances (1000 Leks)	55.56	159.00	—	—
Household characteristics				
If household head is female	0.06	0.08	0.04	2.69***
Age of household head	50.64	57.25	47.09	14.42***
If household head is married	0.93	0.92	0.94	-1.49
Education of household head	8.13	7.18	8.63	-6.04***
Household size (without migrants)	4.74	4.46	4.9	-4.03***
Nonagricultural assets				
If household has a telephone	0.03	0.03	0.03	-0.76
If household has an internal flush toilet	0.51	0.53	0.50	0.74
Nonlabor income (1000 Leks)	57.09	64.88	52.91	1.99**
Agricultural assets				
Land size cultivated (ha)	0.87	1.03	0.78	6.71***
No. Of farm plots	3.44	3.61	3.35	4.53***
No. Of tropical livestock unit	1.74	1.84	1.69	1.33
Community characteristics				
If there is crime problem	0.07	0.09	0.07	1.05
If there is credit source	0.60	0.58	0.61	-0.83
District nonfarm employment rate in 2001	0.46	0.45	0.46	-1.63*
If coastal region	0.32	0.38	0.29	3.19***
If mountain region	0.15	0.12	0.17	-3.36***
If central region	0.53	0.5	0.54	-1.40
Instruments for number of migrants				
If household member spoke Greek/Italian in 1990	0.09	0.13	0.07	2.53***
Minimum distance (km) from Greece cross point	176.53	177.72	175.89	0.30
Minimum distance (km) from Italy ferry cross point	101.10	100.19	101.59	-0.37
Instrument for remittances				
Average district remittances (1000 Leks)	75.66	90.61	67.63	2.65***
No. of obs.	1383	458	925	

Notes: Income is in 1000 Albanian Leks. ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

$$Y_{n,F} = \gamma_{0,F} + \gamma'_{1,F}X + \gamma_{2,F}M + \gamma_{3,F}R + \eta_{n,F} \quad (2)$$

$$Y_{n,i} = \gamma_{0,i} + \gamma'_{1,i}X + \gamma_{2,i}M + \gamma_{3,i}R + \eta_{n,i}, \quad \text{for all } i \quad (3)$$

where $Y_{n,F}$ and $Y_{n,i}$ denote net income of household n from agricultural production and nonfarm activity i, respectively;$X = \tau$ is a vector of individual, household, and community characteristics; M is the number of migrants a farm household, n, has in international migration; R is the total amount of remittances (cash and in-kind) household, R, receives from its stock of international migrants (M); γ_F and γ_i are the conformable parameters to be estimated in the farm and nonfarm income equations, respectively; and ηs are disturbance terms, which are assumed to be distributed $N(0, \sigma^2)$.

4.2. Methodological Approach

Given the complex effects described in the conceptual section, determining the causal relationship between migration, remittances and productive activities is not straightforward. Before estimating equations (2) and (3), a number of methodological issues need to be addressed to obtain consistent estimates of the parameters of interest. One issue is the censorship of the nonfarm income variables. We observe the nonfarm income (Y_i) of a farm household given participation in a nonfarm activity i. This underlying latent participation decision introduces the censorship/self-selectivity problem with the nonfarm income variables, which left untreated, would yield inconsistent parameter estimates. We correct the censorship of the dependent variables in equation (3), by adopting Lee's (1981) generalization of Amemiya's (1974) two-stage estimator for limited dependent variables.

Another issue is migrant self-selection. If households were randomly assigned to migrant and non-migrant status, we could easily identify migration and remittance effects in equations (2) and (3). However, participation in international migration is a self-selective process. As a result, migrant households may be different from nonmigrant households in terms of both observable and unobservable characteristics. Failing to control for the differences in unobservable characteristics (such as skills beyond the observable education levels or risk preferences) is likely to lead to biased estimates since γ_2 in equations (2) and (3) may capture both the impact of migration and the influence of unobservable factors on the outcome of interest. One solution to this problem is to use instrumental variables (IV) that are correlated with migration or remittances but orthogonal to the outcome of interest. In addition to the vector of individual, household, and community characteristics (X), we include instruments Z_M and Z_R to eliminate the statistical problems associated with endogeneity of the international migration variable (M) and remittances (R), respectively.

We use the IV approach to account for the endogeneity of migration (M) and remittances (R) in estimating farm income in equation (2) and the nonfarm activity-incomes in equation (3). Three sets of instruments are used to identify the migration equation: (1) a dummy equal to one if any member of the farm household had knowledge of the Greek or Italian languages in 1990 prior to the legalization of international migration, (2) the minimum distance between the household and the two border crossings with Greece (Kakavije and Kapshtice), and (3) the minimum distance between the household and the two ferry crossings to Italy (ports of Vlora and Durres). Knowledge of either Greek or Italian—the main languages spoken in the top two destination countries for international migrants from Albania—by a current or previous household member in 1990 not only reduces the psychic cost of international migration, but may also reflect cultural affinity or geographical proximity of the household to these countries. This tends to increase the likelihood of international migration (Kilic et al., 2009; Miluka et al., 2010). The other two instruments are justified based on the fact that distance can discourage migration by raising transportation costs. We use average total remittances in the district—

after dropping the observed household from the district—as the instrument, Z_R , to identify the remittances equation. This instrument was used by Taylor et al. (2003) in a cross-section study as a proxy for local norms to remit. The approach avoids the collinearity problem in a cross-section setting, and implicitly assumes that the village norm to remit affects each household's remittance level but has no independent effect on household income.

The labor allocated to international migration is modeled as a function of household and community characteristics (X) as well as instrumental variables (Z_M) controlling for the endogeneity.

$$M = \varphi(\alpha: X, Z_M) + \varepsilon_M \tag{4}$$

The remittances (R) are also likely endogenous and selective because they are only observed for households with international migrants (M). Note that not all farm households with international migrants receive remittances. Given participation in international migration, remittances (R) are determined by unobserved characteristics such as migrants' human capital and willingness to remit, household characteristics (X), and local norms motivating remittances (Z_R).

$$R = \omega(\beta: X, M, Z_R) + \varepsilon_R, \qquad \varepsilon_R \sim N(0, \sigma_R^2) \tag{5}$$

Finally, equations (2) and (3) are estimated as a system with iterated three-stage least squares (3SLS) to exploit any information in the cross-correlations of the error terms in the income equations. In the first stage of the iterated 3SLS, we estimate equation (4) with a negative binomial regression and then generate predicted values, $\widehat{M}$. The $\widehat{M}$ for each farm household is used in place of the observed number of international migrants M to estimate the remittances equation in (5) with a Tobit estimator. Similarly, we generate predicted remittances $\hat{R}$ (in logs) for each farm household. $\widehat{M}$. and $\hat{R}$ are then used to replace their respective observed counterparts in the system estimation of equations (2) and (3). Given that consistency of 3SLS is satisfied by construction but the variance-covariance formulae will be infeasible to obtain in most cases, we use bootstrap standard errors.

5. Empirical Results

5.1. Determinants of International Migration and Remittances

The results from estimation of the migration equation in (4) and the remittances equation in (5) are presented together in Table 3. Two of the instruments—minimum distances to Greece and Italy—used to identify equation (4) are positive and significant; this shows that the distance instruments capture cultural affinity, which reduces information costs and risks associated with international migration. Additionally, a Wald test of joint significance of all three instruments rejects the null that these variables do not explain any variation in equation (4). Table 3 also suggests that life-cycle effects are important determinants of the number of household members sent abroad for international migration; age of the household has a concave relationship with the number of international migrants. Migration from the household is more likely when the household head is female-headed and married, which is consistent with the finding by Stecklov, Carletto, Azzarri, & Davis (2010).

Table 3. Determinants of the Number of International Migrants and Remittance Inflows

	Equation:		
Explanatory Variables	**Number of Migrants** (Negative Binomial Estimation)	**Remittances** (Tobit Estimation Under Log-Normality)	Marginal effects given positive remittances (dlny/dx)
Number of Migrants (predicted)		0.74 (1.24)	0.40 (0.66)
Household Characteristics			
If household head is a female	1.27*** (0.27)	1.47 (1.84)	0.79 (0.99)
Age of household head	0.21*** (0.03)	0.73*** (0.20)	0.40*** (0.10)
Age of household head squared	-0.001*** (0.000)	-0.01*** (0.002)	-0.003*** (0.001)
Married household head	1.09*** (0.28)	1.13 (1.64)	0.61 (0.90)
Education of household head	-0.05*** (0.02)	-0.17 (0.09)	-0.09 (0.05)
Household size	-0.10*** (0.03)	-0.25 (0.17)	-0.13 (0.09)
Nonagricultural Assets			
Nonlabor income	-0.16 (0.11)	-0.38 (0.42)	-0.20 (0.23)
Landline in the household	0.08 (0.24)	-0.88 (1.11)	-0.47 (0.59)
Internal flush toilet in the household	0.04 (0.10)	0.32 (0.41)	0.17 (0.22)
Agricultural Assets			
No. of farm plots	-0.02 (0.04)	-0.34* (0.14)	-0.18* (0.06)
Land size cultivated (Ha)	0.20* (0.10)	1.09** (0.42)	0.59** (0.22)
No. of tropical livestock unit	-0.03 (0.03)	-0.15 (0.11)	-0.08 (0.06)
Instruments			
If household member spoke Greek/Italian in1990	0.17 (0.15)		
Minimum distance (Km) from Greece cross point	0.00000852* (0.00000521)		
Minimum distance (Km) from Italy ferry cross point	0.003** (0.001)		
Village norms to remit (average district remittances)		0.00000487*** (0.00000128)	0.00000262*** (0.000000727)
Community Characteristics			

District nonfarm employment rate in 2001	-0.08 (0.36)	-0.80 (1.44)	-0.43 (0.77)
If there is credit access	0.08 (0.10)	-0.89* (0.38)	-0.48* (0.21)
If Coastal region	0.35* (0.14)	-0.41 (0.53)	-0.22 (0.28)
If Mountain region	-0.28* (0.15)	0.10 (0.52)	0.05 (0.26)
Constant	-7.97*** (0.96)	-16.90** (5.80)	
Sigma		5.00*** (0.15)	
(Joint) significance test for instruments (p-value)	0.01	0.01	
Log Likelihood	-1320.80	-1281.758	
No. of uncensored obs.		300	
No. of obs.	1383	1383	

Notes: Robust Standard errors in parentheses; ***, **, * denote significance at 1%, 5%, and 10%, respectively.

The number of years of education of the household head and the size of the household are inversely related to the number of household members sent abroad. Cultivated land size is positively and significantly associated with the number of household members sent abroad. In terms of regional heterogeneity, farm households in the mountain region of Albania are less likely to send out international migrants than those in the central region. Households in the coastal region tend to send out relatively more international migrants.

The second and third columns of Table 3 present the estimation results of the remittances equation in (5), and the marginal effects given that households receive remittances. The instrument—local norms to remit— used to identify the remittances equation is positive and significant at the 5% level. Age of the household head affects remittance receipts in a nonlinear fashion. While education of the household head negatively affects total remittance receipts, cultivated land size is positively associated with total remittances received. An interesting but expected result is that access to local credit reduces remittances received by a household, signaling migration's role in overcoming liquidity constraints.

5.2. International Migration, Remittances, and Nonfarm Activity Participation

Table 4 reports marginal effects from the probit estimation of nonfarm activity choice as a function of the number of international migrants (predicted) a farm household has and the amount of remittances (predicted) the household receives, if any. We also control for household human capital, agricultural and nonagricultural assets, and district heterogeneity.

Although the change in the number of international migrants in a household has no statistically significant impact on the propensity to participate in nonfarm self-employment, a 100% increase in household remittances leads to a 2% increase in a farm household's likelihood of participation in nonfarm self-employment activities (column 1, Table 4). This agrees with the findings of Funkhouser (1992), and Woodruff and Zenteno (2007) for the cases of Nicaragua, and Mexico, respectively. Remittances appear to help remove liquidity and capital constraints, thus enable households to reallocate some nonmigrating labor to operate nonfarm microenterprises. Remittances may also act as insurance for the farm households by reducing the risks associated with setting up new microenterprises (Stark, 1991; Taylor, 1999).

Table 4. Marginal Effects from Probit Estimation of Nonfarm Activity Choice

	Participation Equation:	
Explanatory Variables	**Self-employment**	**Wage employment**
No. of migrants (predicted)	-0.04 (0.05)	-0.003 (0.07)
Remittances (predicted)	0.02* (0.01)	-0.000 (0.02)
Household Characteristics		
If female household head	-0.07 (0.07)	-0.07 (0.07)
Age of household head	-0.02*** (0.01)	0.02 (0.01)
Age of household head squared	0.000*** (0.000)	-0.000 (0.000)
Married household head	-0.05 (0.05)	-0.04 (0.07)
Education of household head	0.01*** (0.003)	0.04*** (0.01)
Household size	0.02*** (0.01)	0.01 (0.01)
Nonagricultural Assets		
Nonlabor income	-0.000** (0.000)	-0.000*** (0.000)
If telephone in the household	0.12*** (0.04)	0.05 (0.07)
If internal flush toilet in the household	0.08*** (0.02)	0.07*** (0.02)
Agricultural Assets		
No. of farm plots	0.01* (0.01)	-0.004 (0.01)
Land size cultivated (Ha)	-0.02 (0.02)	-0.03 (0.03)
No. of tropical livestock unit	-0.01 (0.01)	-0.03*** (0.01)
Community Characteristics		
District nonfarm employment rate in 2001	0.09* (0.05)	0.56*** (0.08)
If there is credit access	-0.01 (0.02)	-0.05* (0.03)
If Coastal region	0.03 (0.02)	-0.04 (0.03)
If Mountain region	-0.01 (0.02)	-0.003 (0.03)
Log Likelihood	-396.00	-692.00
No. of obs.	1383	1383

Note: Robust standard errors in parentheses. ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

Human capital variables have a significant nonlinear impact on the selection into nonfarm self-employment. Age of the household head has a convex relationship with participation in nonfarm self-employment activities. The work experience of the household head is a key factor in reallocating nonmigrating labor to self-employment activities. Education of the household head and household size each positively affects participation in nonfarm self-employment. Also, households who own telephone or internal flush toilet have a higher propensity to own microenterprises. Similarly, the higher the number of farm plots owned by a household, the higher the propensity to reallocate labor to nonfarm self-employment. Non-labor income sources—pension payments, social payments, and nonfarm rental income—reduce the propensity to engage in nonfarm self-employment.

Column 2 of Table 4 reports the associated marginal effects for nonfarm wage employment participation. We find no significant impact of the number of international migrant members or remittances on participation in nonfarm wage employment. Education of the household head positively impacts participation in nonfarm wage employment. Households that own livestock are less likely to participate in nonfarm wage-employment activities. Farm households located in districts with higher nonfarm employment opportunities supply more of their labor to nonfarm wage-employment. Overall, remittances increase the probability of a household to participate in a nonfarm self-employment activities, but not nonfarm wage employment.

5.3. International Migration, Remittances, and Farm and Nonfarm Activity Incomes

Table 5 illustrates system estimation of determinants of farm and nonfarm activity incomes. We report the results in terms of elasticities to allow for easier interpretation. The impact of the number of international migrants (predicted) and remittances (predicted) on self-employment and wage employment incomes are not statistically significant. Farm households in the mountain region significantly earn more nonfarm self-employment income relative to those in the central region of rural Albania.

The key determinant of nonfarm wage-income is education of the head of the household as documented in the literature. The negative education elasticity of nonfarm wage income in column 2 of Table 5 shows that the cost of one additional year of education exceeds its return in nonfarm wage-employment. This result is aligned with the fact that the nonfarm wage sector in our sample is dominated by workers with less than ten years of education (Table 2). Higher district-level nonfarm employment rates open up employment opportunities and lead to higher income from nonfarm wage-employment.

Conditional elasticities of farm income are reported in column 3 of Table 5. The lost-labor effect of international migration on farm income is not statistically significant. On the other hand, remittances from migrant members have a positive and significant impact on the origin household's farm income. A 100% increase in remittances from migrant members of the household is associated with an approximately 8% increase in farm income, suggesting that Albanian rural households likely use remittances to invest in agricultural technologies to increase farm income.

Moreover, a number of household characteristics and human capital variables significantly affect farm income. Female-headed households earn less from farming compared to male-headed households. If the education of the household head increases from the sample average of 8 years to 16 years, then farm income goes up by 3.8%. Net average effect of a one-year increase in the age of the household head is associated with a 0.05% decline in farm income. As expected, household size has a positive and significant impact on farm income though increasing labor supply for the farm. Table 5 (column 3) also shows that households' agricultural assets—number of family plots, farm size, and livestock units—are associated positively with their farm income. Farm households located in the mountain regions of rural Albania earn significantly less farm income than their counterparts in the central region,

whereas households in coastal communities earn significantly more from farming relative to those in the central region.

Table 5. Elasticity Estimates from The System Estimation Of Farm And Nonfarm Incomes

	Income Source:		
Explanatory Variables	**Self-employment income**	**Wage income**	**Farm income**
No. of migrants (predicted)	0.19 (0.31)†	0.02 (0.16)	-0.02 (0.05)
Remittances (predicted)	0.00000634 (0.17)	0.001 (0.07)	0.08*** (0.03)
If female household head	-0.01 (0.04)	-0.01 (0.02)	-0.03*** (0.01)
Married household head	-0.13 (0.64)	-0.21 (0.32)	-0.22** (0.10)
Age of household	0.14 (0.14)	-0.004 (0.05)	-0.05*** (0.02)
Education of household head	0.01 (0.06)	-0.19** (0.05)	0.04*** (0.01)
Household size	0.10 (0.57)	0.26 (0.20)	0.19*** (0.06)
Nonlabor income	-0.17 (0.18)	-0.14* (0.08)	-0.01 (0.02)
No. of farm plots			0.14*** (0.05)
Land size cultivated (Ha)			0.17*** (0.04)
No. of tropical livestock unit			0.25*** (0.02)
District nonfarm employment rate in 2001	-0.56 (0.41)	0.48** (0.24)	-0.26*** (0.05)
If there is credit access	-0.05 (0.22)	-0.05 (0.08)	0.05** (0.02)
If Coastal region	-0.001 (0.10)	-0.04 (0.05)	0.04*** (0.01)
If Mountain region	0.24* (0.13)	-0.004 (0.05)	-0.08*** (0.01)

Note: † Standard errors in parentheses are based on 1000 bootstrap replications; ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

6. Concluding Remarks

We provide a complete empirical framework to analyze the impact of international migration on migrant-sending households' economic activity choices and incomes within the income diversification framework. We consider full range of farm and nonfarm income-generating activities, and take both the direct lost-labor effect and the indirect income (remittance) effect of international migration into account. Using a large dataset on Albanian farm households, we evaluate whether international migration leads to agricultural out-migration or diversification of income between farm and nonfarm sources.

We find that, in rural Albania, the indirect income (remittance) effect outperforms the lost-labor effect of international migration. Additional remittances income reduces liquidity constraints for microenterprises, thereby encouraging participation in nonfarm self-employment. At the same time, remittances increase income from a household's own farming activities. This result contrasts with the findings of McCarthy et al. (2009) and Miluka et al. (2010), who omit the income effect through remittances and conclude that the number of international migrants in a household has no significant impact on a household's farm income in rural Albania.

Results suggest that omitting remittance effect underestimates the net impact of international migration on household income from farm and nonfarm jobs. We find limited evidence to support the assertion that international migration is being utilized by agricultural households in Albania to leave agricultural work. Our findings support the basic tenets of income diversification, where the farm household tends to diversify into nonfarm income-generating activities in addition to farming. This strategy may be undertaken to reduce income risk by diversifying *ex ante*, to reduce income shocks by diversifying *ex post*, and to earn additional income to overcome liquidity constraints and finance farm investments.

Our results also suggest some spillover effect of migrant remittances onto the rural Albanian economy through participation in local nonfarm activities. Even though out-migration from agrarian households in Albania still predominantly impacts rural farm incomes at the origin, policies aiming to alleviate poverty would benefit from taking into account the income diversification effect of migration toward increased participation in nonagricultural activities. Economic instability in neighboring countries and the ongoing migration crisis in main migrant destinations, such as Italy and Greece, challenge the Albanian government's migration management approach as thousands of long-term emigrants return and economic growth in Albania stalls. While agriculture will continue to be the dominant source of employment in rural Albania in the foreseeable future, expanding income opportunities for rural Albanians will depend on a strong complementary local nonfarm sector. Remittances can be a vehicle for new nonfarm investment in rural areas; however, if sustained development is to be achieved, migrant remittances need to be supplemented by financial services and government support in the form of competitive grants, vocational training in business skills, and further improvements in property markets and commercial regulations.

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Supplementary Material for "Do Agricultural Households use International Migration as an Income Diversification Strategy?"

Appendix A – Derivation of the Farm Household Model

Consider a farm household that maximizes a one-period well-behaved, and twice differentiable utility function,

$$U = EU(C, \ell : \tau), \tag{A1}$$

where E is the expectation operator, C is a vector of consumption goods, ℓ is household time for leisure, and τ is a vector of household characteristics influencing utility. The problem facing the household is to maximize (A1) by choosing C and ℓ subject to a budget constraint,

$$PC = P_F Q + \sum_i Y_i + R(M) + A, \tag{A2}$$

where P represents the prices of consumption goods, which are assumed, for no loss of generality, to be unitary. P_F represents the net price of farm output (Q)—crop and/or livestock. Y_i represents net income from nonfarm activity i, for $i =$ nonfarm wage-employment, and nonfarm self-employment. R is remittances received from international migrant members of the household (M). A is the total households' nonlabor income variables.

Q is produced according to a stochastic production function using land (L) and farm labor l_F,

$$Q = f(L, l_F : \tau) + v, \tag{A3}$$

where τ is a vector of household characteristics influencing agricultural production, and $v \sim N(0, \sigma_v^2)$ represents the stochasticity in agricultural production due to agro-climatic and other shocks. We assume further that $f'(l_F) > 0$ and $f''(l_F) < 0$. Equation (A3) assumes that farm income is variable. If insurance markets do not exist, risk-averse farm households manage farm income variability through reallocation of the family's resources, including labor, from stochastic farm production to alternative income-generating activities, which are not perfectly correlated to farm income. Therefore, the farm household is assumed to have access to nonfarm income-generating activities within the local economy. Each nonfarm activity generates a net income according to the following mapping,

$$Y_i = [g(l_i : \tau)] | S_i \tag{A4}$$

where l_i is the household's labor engaged in non-farm activity, i. Participation is conditional upon being able to overcome entry constraints, S_i, for activity i. S_i can be factors such as the minimum level of capital input for investment or specific skill. Therefore, farm households who have access to S_i can allocate part of their labor to activity i to earn a return Y_i in addition to the return from agricultural production. Here, S_i is modelled as a function of the farm household's assets. The maximum assets available to the farm household, Ω, include migratory assets—stock of international migrants and remittances sent back home—as well as nonmigratory assets, κ. Assets are at least as large as the entry constraints,

$$\sum_i S_i \leq \Omega, \quad \Omega = \psi[M, R(M), \kappa] \tag{A5}$$

The absence of a near-perfect rural labor markets in transition economies imposes a labor constraint on the farm household:

$$T - M \geq \ell + l_F + \sum_i l_i, \quad \sum_i l_i \leq T - \ell - l_F - M \tag{A6}$$

where T is the total labor available to the farm household, such that $T \in \Omega$. The constraint above suggests a potential tradeoff between household agricultural production, nonfarm activities, and international migration.

Substituting the cash constraint into the expected utility function and ignoring choice of leisure, the maximization problem becomes

$$\max_{l_F,\, l_i} EU[\{P_F f(L, l_F) + g(l_i) + R(M) + A\}, \ell : \tau] + \lambda[T - l_F - \ell - M]. \tag{A7}$$

Assuming an internal solution, the first-order conditions for maximizing (A7) subject to the labor and nonnegativity constraints are

$$\frac{\partial \mathcal{L}}{\partial l_F} = EU_C P_F f_{l_F}(.) - \lambda = 0 \tag{A8a}$$

$$\frac{\partial \mathcal{L}}{\partial l_i} = EU_C g_{l_i}(.) - \lambda = 0 \qquad \text{for all } i \tag{A8b}$$

$$\frac{\partial \mathcal{L}}{\partial \lambda} = (T - l_F - \ell - M) = 0, \tag{A8c}$$

where EU_C denotes expected marginal utility of consumption, $P_F f_{l_F}$ and g_{l_i} are the marginal net revenue products of household labor allocated to agricultural production and nonfarm activity, i, respectively, and λ is the Langrange multiplier. It measures the "shadow wage" of the household's labor allocation to agricultural production and nonfarm activities. The relationship between (A8a) and (A8b) can be expressed as

$$E[U_C P_F f_{l_F}(.)] \leq E[U_C g_{l_i}(.)] \frac{\Omega}{S_i}, \qquad \text{for all } i \tag{A9}$$

The relationship in equation (A9) implies that, given participation in nonfarm activities, the solution to the household utility maximization problem involves allocating labor resources among farm and nonfarm activities until the marginal effects on expected utility are equalized. Finally, the first-order conditions, at the equilibrium, are solved to derive reduced-form equations given in equation (2) and (3).

Appendix B – Other Econometric Details

Functional Forms of Migration and Remittances Equations:

The household labor in international migration is the realization of a nonnegative integer-valued random process. As a result, we model it as a count variable using negative binomial regression, which provides a more efficient estimation than the ordinary Poisson regression in the presence of overdispersion. We perform a likelihood ratio test of the dispersion parameter in the negative binomial to be equal to one. This yields a test statistic of 107.43, and is distributed chi-square with one degree of freedom. At the 5% significance level, we fail to reject the negative binomial as an appropriate stochastic functional specification for equation (4). The appropriate estimator to estimate the remittances equation in (5) is Tobit. Diagnostic analysis reveals that the remittances variable is heavily skewed and has considerable

nonnormal kurtosis. Therefore, the tobit estimator is specified assuming a log-normal distribution, which significantly improves the model fit for equation (5)—with a log-likelihood value of –1282.35 compared to –4833.83 for the normal specification.

Censored non-farm income variables:

We correct the censorship of the dependent variables in (3), by adopting Lee's (1981) generalization of Amemiya's (1974) two-stage estimator for limited dependent variables. This estimation procedure is unique in the sense that it helps in gaining efficiency in the estimation while allowing us to simultaneously investigate the impacts of international migration and remittances on nonfarm activity participation and activity incomes. We model the mapping from the latent participation decision to observed participation as

$$I_{n,i} = \begin{cases} 1 & if \quad I_{n,i}^{*} = \delta' Z + \varepsilon \geq 0 \\ 0 & if \quad I_{n,i}^{*} = \delta' Z + \varepsilon < 0 \end{cases}, \qquad \varepsilon \sim N(0,1) \tag{B1}$$

where the variables in vector Z overlap with X. Equation (B1) activates the censoring for each nonfarm income source i, such that we observe the income of household n in nonfarm activity i conditional on participation in that activity. This is expressed formally as

$$Y_{n,i}^{*} = \begin{cases} 1 & if \quad I_{n,i} = 1 \\ 0 & if \quad I_{n,i} = 0 \end{cases} \tag{B2}$$

In the first stage of Lee's (1981) generalization of Amemiya's (1974) two-stage estimator, we estimate Equation (B1) using probit maximum likelihood estimator. Here, in addition to the variables in Z, we also control for M and R (using their predicted values). This is due to the fact that international migration and remittances may influence nonfarm activity choice through their impacts on labor supply, credit, and liquidity constraints. The estimated coefficients from the probit regressions then are used to calculate Inverse Mills Ratio (IMR)—generalized residuals for the probit model—for each nonfarm activity participation decision, such that

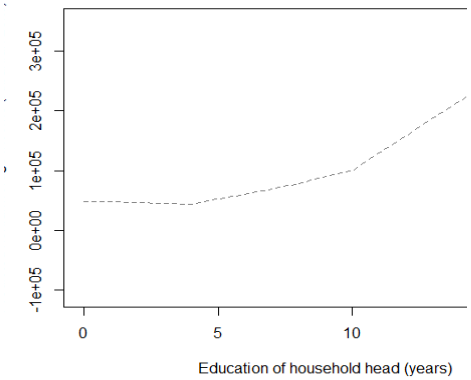
$$IMR_{n,i} = -\hat{\phi}(.)/\hat{\Phi}(.). \tag{B3}$$

In the second stage of Lee's (1981) generalization of Amemiya's (1974) two-stage estimator, the $IMR_{n,i}$s are used as an additional covariate in estimating equation (3) as

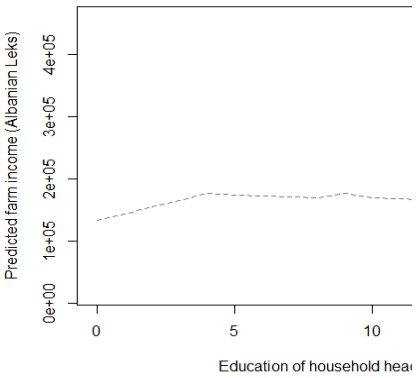
$$Y_{n,i} = \gamma_{0,i} + \gamma_{1,i}' X + \gamma_{2,i} M + \gamma_{3,i} R + \sigma IMR_{n,i} + u_{n,i}, \qquad \text{for all } i \tag{B4}$$

where $u_{n,i}$ are the new disturbance terms uncorrelated to X, M, and R and has zero conditional means, i.e. $E(u_{n,i}|I = 1) = 0$, and $\sigma_{n,i} = cov(\eta_{n,i}, \varepsilon)$.

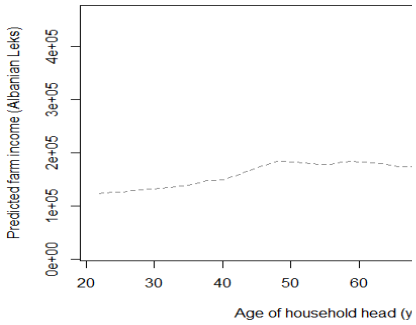
Appendix C- Supporting Figures and Tables



a-) Functional relationship between education of household head and household nonfarm wage income.



a-) Functional relationship between education of household head and household farm income.



c-) Functional relationship between age of household head and nonfarm wage income.

Source: Authors' own calculations using the ALSMS05 data).

Figure C1. Nonparametric curves to investigate potential for nonlinear relationships among age, education, and income variables

Table C1. Iterated 3SLS Estimation Results of the Impact of International Migration and Remittances on Farm and Nonfarm Incomes

	Self-employment income	**Wage income**	**Farm income**
No. of migrants (predicted)	24.092.868 (41387.139)†	283.586 -24.836.314	-5.223.526 -14.739.532
Remittances (predicted)	49.361 -12.914.220	103.759 -6.430.312	13396.743*** -4.409.943
Household Characteristics			
If female household head	-13.967.904 -55.255.409	-9.262.645 -33.726.703	-79204.588*** -19.933.342
Age of household head	10.683.202 -10.797.993	-372.108 -4.657.072	-8786.567** -3.594.351
Age of household head squared	-96.788 -86.132	5.837 -36.291	61.327** -27.664
Married household head	-9.519.161 -53.354.400	-17.432.172 -32.790.980	-41530.603** -17.707.416
Education of household head	779.078 -5.046.783	-20839.005*** -5.403.087	7151.726*** -2.163.868
Education of household head squared	-208.784 -359.183	1389.182*** -303.659	-297.749** -122.314
Household size	1.306.820 -9.375.474	3.952.715 -3.846.422	6631.951*** -2.008.780
Nonagricultural Assets			
Nonlabor income	-0.059 (0.077)	0.037 (0.071)	0.013 (0.029)
Agricultural Assets			
No. of farm plots			7717.832*** -2.440.766
Land size cultivated (Ha)			36534.066*** -8.036.857
No. of tropical livestock unit			21330.740*** -1.739.122
Community Characteristics			
District nonfarm employment rate in 2001	-96.723.526 -72.699.465	72.350.157 -53.438.900	-98519.624*** -18.197.554
If there is credit access	-4.329.502 -26.508.693	-3.207.043 -11.898.900	14769.963** -5.875.139
If Coastal region	6.023 -26.357.543	-8.741.009 -14.777.727	20986.893*** -7.725.601
If Mountain region	48560.148* -28.289.082	-1.386.988 -12.068.058	-35754.009*** -5.756.681
Inverse Mills ratio	-235711.447*** -54.383.129	-131653.250*** -23.361.015	
Constant	277458.284 (239024.114)	297906.777** (127268.852)	329901.233*** -87.674.795

Notes: †Standard errors in parentheses are based on 1000 bootstrap replications; ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.