International Migration, Remittance Income, and Income Diversification Strategies among Rural Farm Households in Transitional Albania

Ayuba Seidu [a,b] and Gülcan Önel [a]

a Food and Resource Economics Department, University of Florida, Gainesville, FL 32611
b Corresponding author

Selected Paper prepared for presentation at the Agricultural & Applied Economics Association's

2015 AAEA & WAEA Joint Annual Meeting, San Francisco, CA, Jul 26-28, 2015.

International Migration, Remittance Income, and Income Diversification Strategies among Rural Farm Households in Transitional Albania

Ayuba Seidu and Gulcan Onel

Abstract

The overarching consensus in the applied migration literature is that international migration is typically used to transition out of agricultural sector by rural households in transition economies. In this paper, using data on rural Albanian households, we examine whether international migration of some household members affects the household's nonfarm activity choices and earnings generated from these activities. In addition, we test whether remittance income received from migrant household members have an indirect effect on households' agricultural production. We find no apparent relationship between nonfarm activity choice and the number of international migrants in the farm household. However, we find that remittance income is positively and significantly related to households' propensity to reallocate farm labor to nonfarm self-employment activities, resulting in higher income from non-farm self-employment. In addition, remittance income affects farm income in a positive and significant way. This suggests that previous studies likely underestimated the overall impact of international migration on agricultural production in rural Albania, as they usually ignored the additional remittance income effect. Overall, our empirical findings support the basic tenets of rural income diversification, where the farm household has a diversified portfolio of income-generating activities, in addition to farming. The results suggest that international migration facilitates income diversification among Albanian farm households rather than their exit out of agriculture.

Key words: international migration, remittances, nonfarm income, transition economies, rural Albania.

Introduction

The collapse of the Soviet Union triggered structural changes in the agro-industrial sectors of most Central and Eastern European Countries, including Albania. State-subsidized farms and agricultural enterprises that formed the core of the rural economy disappeared. When the state-subsidized farms and agricultural enterprises were abolished agricultural land in Albania was distributed among rural households, creating approximately half a million family farms averaging 1.1 hectares of farmland per household (Cungu and Swinnen 1999; Childress 2003; Davis 2003). Shifting from state ownership to private ownership of farmland was expected to lead to the emergence of more efficient commercial agriculture which would drive the rural economy, but this did not occur due to inadequate economic reforms (Ellman 2003).

Today, in Albania, most rural agricultural production remains subsistent, small-scale, and fragmented, leaving rural farm households trapped in poverty. 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 (Kilic et al. 2009). In the literature, the movement of farm labor to nonfarm sector has been identified as important characteristic of market development in transition economies (Goodwin and Holt 2002). Since the collapse of the Soviet Union in Albania, there has been massive out migration of farm labor from the rural areas to the urban areas, and outside the country, especially Greece and Italy (King and Vullnetari 2003; Carletto et al. 2006; McCarthy et al. 2009; Stecklov et al. 2010). For instance, according to the International Organization for Migration (IOM), total out migration was 3.1% of the Albanian population in 2013. Remittances from international migrants has played a major role of the country's economic renaissance, accounting for roughly 7% of GDP in 2012, compared to 12–15% in 2008 (CIA 2014).

Migration and remittance income trigger socioeconomic changes in the migrant-sending households, and the community as a whole (Lucas 1987; Taylor 1999; Taylor and Martin 2001). Consequently, a number of studies in Albania have focused on international migration impacts on a number of household-level outcomes, especially agricultural production (Germenji and Swinnen 2004; McCarthy et al. 2009; Kilic et al. 2009; Miluka et al. 2010). Majority of these studies conclude that international migration has no positive impact on agricultural production; on the contrary, it is being used by rural households as a means of exiting agriculture (e.g. see Germenji and Swinnen 2004; McCarthy et al. 2009; Miluka et al. 2010). Specifically, Miluka et al. (2010, pp. 158) note *"our results suggest that international migration of one or more household members is being used by rural households in Albania as part of a strategy to move out of agriculture. The impact of family labor is unequivocal: members of households with migrants abroad work significantly fewer hours in agricultural production, both in total and on a per capita basis"*.

In this paper, we argue that international migration in rural Albania has been facilitating income diversification among Albanian farm households rather than their exit out of agriculture[1]. Given that land and labor markets are incomplete in rural Albania, we argue that migrant-sending farm households cannot leave agriculture entirely; they would continue farming while reallocating part of the family labor left behind to nonfarm income-generating activities. Household members who migrate can help with their family's income diversification strategies and their transition to higher-return activities through remittance income they sent home. Existence of migrant members in a household also acts as pseudo-insurance for the family, with the possibility to remit in the event of adverse income shock (Wouterse and Taylor 2008). Most

[1] Income diversification, as used here, refers to the allocation of household productive assets among different income generating activities.

studies on the impact of international migration on agricultural production in rural Albania have overlooked the fact that international migration can also have an indirect effect on the migrant-sending households through remittance income (e.g. see McCarthy et al. 2009; Miluka et al. 2010)[2]. As a result, excluding migrant remittances from models of migration is likely to underestimate the overall impact of international migration on migrant-sending households (Taylor 1999). We take these arguments on remittances into account in our empirical analyses.

The objective of this paper is two folds. First, we empirically examine if availability of international migrants and remittance income in rural Albanian households have any effect on their nonfarm labor reallocation decisions and incomes[3]. Second, when we estimate the determinants of incomes from farm and nonfarm activities, we include remittance income in the system as an explanatory variable. This allows us to test whether international migration if it results in remittance income has an indirect effect on households' farm income. A positive and significant effect on farm income would suggest that previous studies likely underestimated the overall impact of international migration on agricultural production in rural Albania. Specifically, we test the following three hypotheses:

H1: *International migration and remittance income are positively related to local nonfarm activity participation.*

H2: *International migration and remittance income are positively related to local nonfarm activity incomes*.

H3: *International migration and remittance income are negatively related to farm income.*

[2]They are implicitly assumed, but not formally modelled to capture its effects on the migrant-sending farm households.

[3] Nonfarm activities, as used here, refers to all income-generating activities outside the agricultural sector, and which are located within the local rural economy.

Evidence on these three hypotheses would support the existing notion that international migration is causing out-agriculture flows in rural Albania. In addition, taking an integrated approach would present policymakers with sound empirical foundation to guide their decisions.

1. Migration, Remittance Income, and Income Diversification

A. The New Economics of Labor Migration (NELM) Perspective

Income diversification is the norm in rural Albania; very few farm households collect all their income from any one source or use their assets in just one income-generating activity (Barrett, Reardon and Webb 2001). This is due to the fact that income variability has implications for household utility and production decisions (Udry 1995). Farming is a risky activity; therefore, rural farm households have the incentive to diversify their income sources by allocating part of their labor to alternative income-generating activities off the farm. Sending some household members to other areas inside and/or outside the country as migrants is part of this income-diversification strategy, and is a consistent behavior with the modern portfolio theory (Stark and Levhari 1982; Reardon et al. 2000). Therefore, migration represents an income diversification strategy with characteristics that resemble those of other investment activities. It may further act as a catalyst to either "push" or "pull" migrant-sending households into or away from nonfarm activities (Wouterse and Taylor 2008).

There is a growing body of literature exploring the impact of migration and remittance income on migrant-sending households (Taylor and Martin 2001). This strand of literature is grounded in the NELM theory. NELM argues that migration is a strategic household decision to raise income, obtain liquidity for investment in new activities, and insure against income and production risks. Migration is not an individual decision, but rather a family decision (Stark

1982; Stark and Levhari 1982; Stark and Bloom 1985; Stark 1991; Taylor 1999). Unlike the neo-classical theory of labor migration, NELM is based on on the assumption of imperfect factor markets. As a result, NELM's predictions on the impact of migration on the household differ. For instance, based on the neo-classical theory of labor migration, migration, through remittances, affects household consumption decisions only by shifting the budget line outwards. This hypothesized impact only holds under the condition of perfect factor markets, where separability of the household production and consumption decisions holds. NELM, on the other hand, argues that migration in the presence of market failures affects household's production decisions (Taylor 1999). Therefore, earlier studies on migration focused on its investment-enhancing and risk-reducing effects on household agricultural production (see e.g., Lucas 1987; Rozelle, Taylor and deBrauw 1999; Taylor, Rozelle and deBrauw 2003).

B. Brief Literature Review

In this section, we emphasize studies on migration's impact on the household ability to diversify off-farm income sources. Do farm households with prior migrant stock and/or remittance stream diversify at all in their income-generating activities off the farm? If so, how are earnings from portfolio of these non-farm activities affected by migration and remittance income? The impact of migration and remittances on income diversification depend on a number of factors, including motivations for income diversification, the constraints on income diversification. For instance, if the household diversifies income sources for the purpose of reducing its income risk, the household may not be motivated to invest the remittances received from migrant members to start alternative income-generating activities off the farm. In this case, migration is merely used as a risk-management strategy to protect the household against income

shocks from agricultural production. [4] If the household would like to invest in alternative income-generating activities but faces entry constraints or if the new activities are risky, migrant remittances may facilitate such investments by relaxing the entry constraints or acting as *de facto* insurance policy (Stark and Levhari 1982; Wouterse and Taylor 2008).

It is hard to determine *ex- ante* the reasons underlying the farm household decision to participate in migration; however, such an inference can be made *ex-post* by examining the impact of migration and remittances on the portfolio of productive activities the farm household is engaged. Finding that migration and remittance income impact farm household's nonfarm labor reallocation decisions would also be considered as a test of the NELM.

Taylor, Rozelle and de Brauw (2003), using Chinese household data, find that farm household's migrant stock has positive but insignificant effect on income from nonfarm self-employment, and a negative and significant effect on cropping income. They also find that migration resulting in remittance income has a negative and insignificant effect on income from nonfarm self-employment. These offsetting effects of migrant stock and remittance income on non-farm employment point the complex mechanism through which migration and remittances impact the migrant-sending households.

In Burkina Faso, Wouterse and Taylor (2008) report that the probability of a household choosing a nonfarm activity decreases when it has earlier stock of continental and intercontinental migrants in the household, and that this effect is significant in the case of intercontinental migrants. Arslan and Taylor (2012) argue that existence of internal and international migrant networks increase the probability of Mexican farm households engaging in different nonfarm income-generating activities. This indicates migration may be relaxing cash constraints for investing into entrepreneurial activities.

[4] Remittances are likely to be uncorrelated with farm income.

We find that while the determinants of migrations has been studied extensively in the literature, the impacts of migration and remittances on nonfarm labor reallocation decisions and incomes have not been gained as much attention. We aim to contribute to the empirical migration literature by empirically testing the hypotheses H1 through H3 for farm households in rural Albania. Restricting the analysis to only capture migration and agricultural production linkages may underestimate migration's impacts in a diversified rural economy. We take an integrated approach, where possibility of holding a full range of income-generating activities, both farm and nonfarm, is recognized. This approach allows a broader view of the relationships among migration, remittances, and farm and nonfarm economic activities that take place in the rural economy.

2. Data and Descriptive Statistics

The data are from the widely-used 2005 Albanian Living Standard Management Survey (ALSMS05), conducted by the Albania Institute of Statistics (INSTAT) with the World Bank. A total of 3840 representative households, covering 455 census enumeration areas were sampled using stratified two-stage cluster sampling. The ALSMS05 included survey instruments with well-detailed information on household demographics, agricultural production, nonfarm income-generating activities, and community and district-level characteristics. Further, the ALSMS05 had an in-depth migration module, with detailed information on households' past and current migration status.

Current international migrants are defined as the spouse, and/or all the children —15 and older—of the household head and/or spouse who are no longer living in the household and are outside of Albania. Information about the current international migrants were obtained from the head of the household or the spouse. Table 2 gives summary statistics on international migrants.

Current international migrants are fairly young, with a mean age of 32 years. Farm households with migrants on average sent 1.76 of their family labor abroad. The migration module of the survey also has information on farm households' total remittance income (cash and in-kind) in the past year. Average nominal exchange rates for 2005 were obtained from the Bank of Albania, and were used to convert the total remittance income from the currency it was remitted in to Albanian *Lek* in order to conform to the other income variables. Given participation in international migration, the average remittance income in rural Albania was 158,130 Leks per year.

The other income aggregates used in this paper were obtained from the Rural Income-Generating Activities (RIGA) database. This is a joint collaborative effort by the Food and Agriculture Organization (FAO), the World Bank, and American University that combines data on sources of income from a variety of surveys, including ALSMS05. It covers nineteen countries in Eastern Europe, Asia, Africa, and Latin America[5]. Missing income variables of interest were retrieved from the ALSMS05. Both RIGA and ALSMS05 maintain unique household ID, which makes cross-referencing possible. Consistent with the RIGA dataset, we identify two main nonfarm income sources: (1) nonfarm wages income, and (2) nonfarm self-employment income. Nonfarm wage income comes from supplying household labor to wage-employment activities outside the farm. Nonfarm self-employment income primarily comes from microenterprises owned by a member of the household. Other nonlabor income sources such as public transfers (mainly pension payments), social transfers, and nonfarm rental income are also identified in the RIGA dataset. A total of 1,515 rural households reporting nonzero value of agricultural production (crop and livestock) are identified. After deleting observations with missing values, data on 1,355 rural farm households are used for the empirical analysis.

[5] For details on the methodology of creating income aggregates for the RIGA database, see Quiñones et al. (2009).

The upper panel of Table 1 reports weighted averages and tests of mean differences between international migrant-sending and nonmigrant-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 31% participation rate. The rate of participation in nonfarm activities is significantly lower for migrant-sending households than households with no migrants (36% vs 42%). At the disaggregate level, migrant-sending households are less involved in nonfarm wage-employment (28% vs 33%) and nonfarm self-employment (11% vs 12%). Incomes from different activities are reported in the lower panel of Table 1. Migrant-sending farm households significantly earn more farm income than non-migrant-sending households (198,336 vs 173,004 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. Overall, given participation in nonfarm income-generating activities, migrant-sending farm households earn less off the farm than their counterparts with no migrants (164,222 vs 208,675 Leks); however, this difference is not statistically significant. When we examine disaggregates nonfarm activities, this difference becomes statistically significant for nonfarm wage-employment.

Summary in Table 1 suggests that migrant-sending farm households participate less in nonfarm income-generating activities, and given participation, they earn significantly less income than households without international migrants. However, their average farm income is significantly higher. These statistics are at odds with some of the previous studies on rural Albania which suggest that migrant-sending farm households use international migration to exit out of agriculture (e.g. see McCarthy et al. 2009; Miluka et al. 2010).

3. Econometric Methodology

A. *Empirical Framework*

A simple household modeling framework is developed in this section as a basis for our empirical estimation[6]. Consider a farm household that maximizes a one-period well-behaved, and twice differentiable utility function,

$$U = EU\left(C, \ell : \tau\right), \tag{1}$$

where E is the expectation operator, C is a vector of consumption goods, ℓ is household leisure (home time), τ is a vector of household characteristics influencing utility. The problem facing the household is to maximize (1) by choosing C and ℓ subject to a budget constraint,

$$PC = P_F Q + \sum_i Y_i + R\left(M\right) + A \tag{2}$$

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 remittance income received from international migrant members of the household $\left(M\right)$. A is a vector of household's nonlabor income variables (e.g. public transfers, social payments, and nonfarm rental income). All households in our analysis are involved in agricultural production. Following Just and Pope (1978), Q is produced according to a stochastic production function using land (L) and farm labor $\left(l_F\right)$,

[6] This empirical framework is consistent with extant literature on income diversification (see e.g. Dercon and Krishnan, 1996; Reardon et al. 2000; Abdulai and CroleRees 2001; Wouterse and Taylor 1998), and the related literature on activity choice (see e.g. Just and Zilberman, 1983).

$$Q = f\left(L, l_F : \tau\right) + \upsilon . \tag{3}$$

where τ is a vector of household characteristics influencing agricultural production, and $\upsilon \sim N\left(0, \sigma^2\right)$ represents the stochasticity in agricultural production due to agro-climatic and other shocks. We assume further that $f'\left(l_F\right) > 0$ and $f''\left(l_F\right) < 0$. Equation (3) 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 with farm income. Therefore, the farm household is assumed to have access to nonfarm activities. Each nonfarm activity generates a net income according to the following mapping,

$$Y_i = \left[g\left(l_i : \tau\right) \right] | S_i \tag{4}$$

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 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 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 stock of international migrants as well as non-migration assets, κ (Wousterse and Taylor 2008). Assets are at least as large as the entry constraints,

$$\sum_i S_i \le \Omega , \quad \Omega = h\left(M, \kappa\right) \tag{5}$$

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

$$T \geq \ell + l_F + \sum_i l_i - M\,, \quad \sum_i l_i \leq T - \ell - l_F + M \tag{6}$$

where T is the total labor available to the farm household, less stock of migrant labor, such that $T \in \Omega$. The constraint above suggests a potential trade-off 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,

$$\max_{l_F, l_i} EU\left[\left\{P_F f\left(L, l_F\right) + g\left(l_i\right) + R\left(M\right) + A\right\}, \ell : \tau\right] + \lambda\left[T - l_F - l_i - \ell + M\right]. \tag{7}$$

Assuming an internal solution, the first-order conditions for maximizing (7) subject to the cash, labor, and nonnegativity constraints are:

$$\frac{\partial \mathcal{L}}{\partial l_F} = EU_C P_F f_{l_F}(.) - \lambda = 0 \tag{8a}$$

$$\frac{\partial \mathcal{L}}{\partial l_i} = EU_C g_{l_i}(.) - \lambda = 0, \qquad \text{for all } i \tag{8b}$$

$$\frac{\partial \mathcal{L}}{\partial \lambda} = \left(T - l_F - l_i - \ell + M\right) = 0 \tag{8c}$$

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 (8a) and (8b) can be expressed as[7]:

[7] E.g. see Dercon and Krishnan (1996), Reardon et al. (2000) and Abdulai and CroleRees (2001).

$$E\left[U_C P_F f_{l_F}(.)\right] \leq E\left[U_C g_{l_i}(.)\right] | \frac{\Omega}{S_i}, \qquad \text{for all } i \tag{9}$$

The relationship in equation (9) 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. The farm household would continue reallocating household labor to nonfarm activities as long as equation (9) holds with strict inequality. Therefore, labor allocation of the farm household is optimized when (9) holds with equality for all i(s) chosen by the household. At the equilibrium, some households would have a portfolio of nonfarm income-generating activities. The first-order conditions, at the equilibrium, can be solved to derive reduced-form equations, which relate the outcome (net income) of agricultural production, and participation in nonfarm activity *i* to a set of both endogenous and exogenous variables (see e.g. Wousterse and Taylor 2008). The reduced-form equations can be written as,

$$Y_{n,F} = \gamma_{0,F} + \gamma_{1,F} X + \gamma_{2,F} M + \gamma_{3,F} R + \eta_{n,F} \tag{10}$$

$$Y_{n,i} = \gamma_{0,i} + \gamma_{1,i} X + \gamma_{2,i} M + \gamma_{3,i} R + \eta_{n,i}, \qquad \text{for all } i. \tag{11}$$

where $Y_{n,F}$ and $Y_{n,i}$ denote net income of household *n* from agricultural production, and nonfarm activity *i*, respectively; X is a vector of individual, household, and community characteristics; M is the number of migrants farm household, n, has in international migration; R is the total amount of remittance income (cash and in-kind) household, n, 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. η are disturbance terms, which are assumed to be distributed $N\left(0, \sigma^2\right)$.

B. *Econometric Issues*

Before estimating equations (10) and (11), a number of econometric issues need to be addressed in order to obtain consistent estimates of the parameters of interest. First 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, after satisfying entry constraint, S_i. This underlying latent participation decision introduces the censorship/self-selectivity into the nonfarm income variable. Second is the endogeneity of the international migration variable (M). Participation in international migration is a selective process, where farm household with the comparative advantage will allocate part of their family labor to it. Therefore, the labor allocated to international migration will be a function of household and community-level characteristics (X) as well as other variables (Z_M) used to control for the endogeneity. The reduced form equation is specified formally as:

$$M = h(\alpha : X, Z_M) + \varepsilon_M \tag{12}$$

Similarly, the remittance income variable (R) is likely to be endogenous and censored because it is observed only for households with an international migrant (M) (e.g. see Quisumbing and McNiven 2010)[8]. Given participation in international migration, remittance income is

[8] Not all farm households with an international migrant receives remittance income.

determined by migrants' human capital, household characteristics, and other local norms (Z_R) motivating remittances. The remittance income (R) equation is thus specified as[9],

$$R = \beta_0 + \beta_1 M + \beta_3 X + \beta_4 Z_R + \varepsilon_R, \qquad \varepsilon_R \sim N\left(0, \sigma_R{}^2\right) \tag{13}$$

C. *Estimation Issues*

First, we have to choose an appropriate stochastic functional specification for equation (12), the international migrant equation. The household labor in international migration is realization of a nonnegative integer-valued random process. As a result, we model it as a count variable, using a functional specification of the Poisson family. Due to overdispersion in the count variable (number of international migrants), we use a negative binomial regression to fit equation (12). It provides a more efficient estimation than the ordinary Poisson regression[10] (Cameron and Trivedi 2005). Our modeling of equation (12) departs from those of previous studies on Albania, which used a Tobit specification (e.g. see McCarthy et al. 2009; Miluka et al. 2010)[11].

In addition, to correct for the censorship/sample-selection of the dependent variables in (11), we adopt Lee's (1978) generalization of Amemiya (1974) two-stage estimator for censored dependent variable[12]. This estimation procedure is unique in the sense that it helps gaining efficiency in the estimation while allowing us to simultaneously investigate the impacts of

[9] Our specification allows for negative remittance income in a manner consistent with the assumption of the NELM, where farm households may initially send money to their international migrants to help them adjust to life in the host country.

[10] 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 92.59, and is distributed chi-square with one degree of freedom. At the 0.05 significance level, we fail to reject the negative binomial as an appropriate stochastic functional specification for equation (12).

[11] Stochastic specification captures the discrete and nonnegative nature of the data (Winkelman and Zimmerman 1993).

[12] Such a treatment is not necessary for the farm income variable in (10), since it is observed for all farm households.

international migration and remittances on nonfarm activity participation as well as the activity incomes. In the first stage, we model the latent participation decision that activates the censoring for each nonfarm income source i [13],

$$I_{n,i} = \begin{cases} 1, & if \;\; I^*_{n,i} = \pi X + \epsilon \geq 0 \\ 0, & if \;\; I^*_{n,i} = \pi X + \epsilon < 0 \end{cases}, \qquad \epsilon \sim N(0,1) \tag{14}$$

$$Y^*_{n,i} = \begin{cases} Y_{n,i}, & if \;\; I_{n,i} = 1 \\ 0, & if \;\; I_{n,i} = 0 \end{cases} \tag{15}$$

Equation (14) is estimated with a probit using some of the variables in X [14]. We also control for M and R (using their predicted values) in testing hypothesis H1 above. The estimated coefficients from the probit regressions are, then, used to calculate inverse Mills ratio (IMR) for each nonfarm activity participation decision, such that:

$$IMR_{n,i} = -\phi(\pi X) / \Phi(\pi X), \tag{16}$$

where $\phi(.)$ and $\Phi(.)$ denote the normal density and cumulative distribution functions, respectively. In the second stage, the $IMR_{n,i}$ is used as additional covariate in estimating (11) as:

$$Y_{n,i} = \gamma_{0,i} + \gamma_{1,i} X + \gamma_{2,i} M + \gamma_{3,i} R + \lambda_{n,i} IMR_{n,i} + \mu_{n,i} \;, \quad \text{for all } i \tag{17}$$

D. *Instruments for International Migration and Remittance Income*

Once the above issues addressed, an instrumental variable approach is employed to correct for the endogeneity of (12) and (13) in estimating farm income in equation (10), and censorship-corrected nonfarm activity-incomes in equation (17). In addition to the vector of individual, household, and community-level characteristics (X), we include a number of

[13] The same procedure is applied to treat possible censorship in the remittance income variable in (13).
[14] The probit regression is used for convenience sake to generate the inverse Mills ratios.

variables from Z_M and Z_R to eliminate the statistical problems associated with endogeneity of the international migration variable (M) and remittance income, respectively. The key to an instrumental variable estimation is choosing appropriate instruments. Following studies on international migration in Albania, two sets of instruments are used: (i) proportion of farm households with at least one family member in international migration, (ii) a dummy equal to one if any member of the farm household had knowledge of Greek or Italian in 1990, prior to the legalization of international migration in 1991 when the Soviet Union collapsed.

The first instrument is a standard proxy for migration networks, which have been identified to reduce the costs and risks of international migration. This causes the probability of migration and the number of household members to be allocated to international migration to increase (Massey et al. 1993). The justification for the second instrument is provided by Kilic et al. (2009) and Miluka et al. (2010). Knowledge of either Greek or Italian, the main language spoken in the top two destination countries for international migrants from Albania, not only reduces the psychic cost of international migration, but may also reflect cultural affinity to these countries. Appropriately controlling for household's human capital and wealth position in 1990, and regional and district-level characteristics ensures that this instrument affect nonfarm activity participation and incomes only through the international migration variable (M).

Similarly, we include average total remittance income in the district as an additional regressor from Z_R to identify equation (13). This is used as a proxy for local norms to remit, which has been identified in the literature to be strongly correlated with remittance income. Additionally, the IMR used to correct for the censorship in the remittance income plays a role as an instrument. This is based on the fact that it brings in information from the farm household's

participation in remittance income stream to determine how much it receives from each international migrant, if any.

Finally, equations (10) and (17) are estimated as a system, using 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 (12) with a negative binomial regression, and then generate predicted values of M. The predicted numbers of international migrants $(\hat{M})$ for each farm household are, then, used in place of the observed number of international migrants to estimate the censorship-corrected remittance income equation in (13). Similarly, we generate predicted remittance income $(\hat{\mathrm{R}})$ for each farm household. $\hat{M}$ and $\hat{R}$ are, then, used to replace their respective observed counterparts in the system estimation of equations (10) and (17).

4. Empirical Findings

A. *Determinants of Migration and Remittance Income*

Table 3 reports the results from estimation of the international migrant equation in (12). Only one of the two instruments used to identify the migration is significant: district-level international migration network. This shows the role migrant networks play in stimulating further migration through information-provision at the source community, and risk-management in the host country (Massey et al. 993). Household knowledge of Greek or Italian in 1990 is positively related to the number of migrant household members, but is not statistically significant. Miluka et al (2010) find language variable to be positive and significant with their tobit functional form for the international migrant equation. At the household level, the number

of dependents (both young and elderly) negatively affects the number international migrants. Overall household size is positively related to the number of international migrants, but is significant only at 11% [15]. Current wealth status of the farm household is positively related to the number of international migrants. This is not surprising since international migration involves a significant cost. In terms of regional heterogeneity, farm households in the mountain region send out more international migrants compared to the central region. This is consistent with other studies on Albania (e.g. see McCarthy et al. 2009, pp.3). Although the coastal region sends out more international migrants compared to the central region, this difference is not statistically significant. Moreover, urbanized rural communities—proxied by access to credit—send out more international migrants.

Table 4 report the estimation results of remittance income equation in (13). The censorship-corrected remittance income is estimated as a function of number of international migrants (predicted), in addition to a number of individual, household and district-level variables including district norms to remit. Remittance income is a positive and significant function of the number of members farm household sends out. Each international migrant on average sends home 63,539 Leks (Table 4). The instrument used to identify remittance income —district average of remittances— is positive and significant. Both the number of dependents that a farm household has and the size of the household negatively and significantly impact remittance income. Moreover, farm size affects the remittance income in a positive and significant way. However, number of farm plots the household owns impacts remittance income negatively. Lastly, the IMR used to correct for the censorship in the remittance income variable is significant, validating the need for the correction.

[15] Our findings for the household composition are consistent with Rozelle, de Brauw and Taylor (1999) and Taylor, Rozelle and de Brauw (2003) in the case of internal migrants for China.

B. *Migration, Remittance and Nonfarm Activity Choice*

We now turn our attention to the hypothesis that international migration and the resulting remittance income positively impact farm households' nonfarm activity choice (H1 in the Introduction section). Table 5 reports the results of 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 remittance income (predicted) the household receives, if any. We also control for household characteristics, agricultural, nonagricultural, and district heterogeneity.

The higher the number of international migrants a farm household has, the higher the propensity to participate in nonfarm self-employment; however this relationship is not statistically significant. On the other hand, if international migrants remit to the farm household, remittance income is positively and significantly associated with the farm household's choice of nonfarm self-employment. This suggests that remittance income helps remove liquidity constraints and enables the household to reallocate part of labor to operate nonfarm microenterprises. It is known that in cases where households consider remittance income to be transitory, they are more likely to invest it in productive activities (e.g. Adams and Cuecuecha 2010). Alternatively, remittance income may act as insurance for the farm households by reducing increased risk associated with setting up new microenterprises (Stark and Levhari 1982; Amuendo-Dorrantes and Pozo 1996). Human capital variables have mixed impacts on the choice of nonfarm self-employment. For instance, education of the household head increases participation in nonfarm self-employment. The coefficient for household size is positive and significant.

No significant relationship exists between household's ownership of agricultural machinery and participation in nonfarm self-employment activities. Farm size is not significant; however, the number of farm plots owned by the farm household has a significant and positive impact on the participation in nonfarm self-employment activities. This likely captures the introduction of fragmented agricultural land ownership system after the Soviet Union dissolved. Finally, farm households with livestock production are less likely to participate in nonfarm self-employment activities.

The second column of Table 5 gives estimation results for the case of nonfarm wage-employment. Similar to the case of self-employment, we find a positive but insignificant impact of international migrants on participation in nonfarm wage employment. However the remittance income sent to the farm household reduces the propensity to allocate labor to nonfarm wage-employment. One plausible explanation for this is that if the international migrants send remittance income to the farm household, this offsets the propensity to participate in nonfarm wage-employment, as the remittance income can be used to supplement farm income for the upkeep of the household. Human capital variables, such as age and education of the household head, all positively and significantly impact nonfarm wage-employment participation. Additionally, household agricultural assets—farm size, number of farm plots, and number of agricultural machinery owned—do not have a significant impact on participation in nonfarm wage-employment. One interesting finding is that farm households producing livestock are less likely to participate in nonfarm wage-employment activities. This may be expected since livestock production tends to be labor intensive.

In summary, we find limited evidence in support of hypothesis H1. While the number of international migrants is positively related to participation in nonfarm activity—self and wage

employment—, this relationship is not statistically. However, remittance income received from these migrants does have a significant impact on participation in nonfarm self-employment and nonfarm wage-employment activities. Remittances increase the probability of nonfarm self-employment and reduce the probability of nonfarm wage employment.

C. *Migration, Remittance, Farm and Nonfarm Activity Incomes*

Table 6 reports results of the system estimation of nonfarm activity incomes. Testing hypothesis H2 is equivalent to testing the null of $\gamma_{2,i}, \gamma_{3,i} > 0 \ \forall \ i$. Similarly, testing H3 is equivalent to testing the null of $\gamma_{2,\mathrm{F}}, \gamma_{3,\mathrm{F}} < 0$. Evidence in favor of H2 and H3 would support that farm households in rural Albania use international migration and the resulting remittance income to diversify their income sources by participating in nonfarm income-generating activities.

The impacts of number of migrants and remittance income on self-employment income are similar to the estimation results for the corresponding activity choice. The number of international migrants (predicted) is not a statistically-significant determinant of self-employment income. However, remittances positively affects the income earned from nonfarm self-employment activities. A 1% increase in remittances from migrant household members is associated with 0.3% increase in self-employed income.

Education of the household head has a negative effect on nonfarm self-employment income. This is surprising since it is found to be a significant determinant of participation in nonfarm self-employment. The lower the level of economic activity in the district—represented by the district-level nonfarm unemployment rate in 2001—the lower the income earned from nonfarm self-employment activities. Additionally, there is regional heterogeneity in nonfarm

self-employment income. Farm households in the coastal region significantly earn more nonfarm self-employment income relative to those in the central region.

Neither international migration nor remittances is a significant determinant of nonfarm wages. The key significant determinant of nonfarm wage-income is education of the head of the household. We find a nonlinear effect of age on nonfarm wage-income, which is well-documented in the literature.

Next, we test the null of $\gamma_{2,F}, \gamma_{3,F} < 0$. Results are reported in the third column of Table 6. Having international migrant members is not a significant determinant of farm income of the household. However, remittances have a positive and significant impact on the household's farm income. A 1% increase in remittance income from migrant members of the household is associated with a 0.2% increase in farm income. This suggests that migrant-sending farm households use remittance-income to invest in agricultural technologies which, in turn, increase farm income. Households' agricultural assets—farm size, number of farm plots, number of agricultural machinery, and livestock unit— are positively and significantly related to farm income. Farm households who receive extension advisory services earn significantly more farm income. While farm households in the mountain region of rural Albania earn significantly less farm income than their counterparts in the central region, those in the coastal region earn significantly more.

Conclusions

Using data from 2005 Albanian Living Standard Management Survey (ALSMS05), we examine the impact of migration and the resultant remittance income on farm household's nonfarm activity participation and incomes. We accomplish this using a more pragmatic two-step approach to deal with endogeneity, and censorship in our variables.

First we examine whether the number of international migrant members in a household (predicted), and the remittances they send home (predicted) are significant determinants of household's choice of nonfarm income-generating activities. We find that the number of international migrants in the household is not a significant variable explaining participation in neither nonfarm self-employment nor nonfarm wage-employment activities.

A system estimation of farm income, nonfarm self-employment income, and nonfarm wage-income reveal some interesting results. First, we find that a 1% increase in remittances received from migrant members leads to a 0.3% increase in nonfarm self-employment income. This suggests that remittance income helps farm households to overcome entry barriers that otherwise prevent engaging in nonfarm self-employment activities. Further, we find that remittance income from international migrants is also positively and signficantly associated with farm income. A 1% increase in remittances increases farm income by 0.15%.

Overall, we find limited evidence to support the assertion that international migration is being utilized by farm households in rural Albania to leave the agricultural sector. Though remittances certainly help increasing nonfarm self-employment income, it is also positively and significantly associated with income from household's own farming activities—cropping and/or livestock rearing. These findings support the basic tenets of income diversification, where the farm household holds a diversified portfolio of 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 finance farm investments. These form complex livelihood strategies employed by the farm households in a diversified rural economy. These findings encourage policymakers in Albania to exercise caution

in their efforts to reverse the out-migration, since remittances that migrants send back home seem to have positive impacts on both farm and nonfarm sectors.

References

Abdulai, A. and A. CroleRees. 2001. "Determinants of Income Diversification amongst Rural Households in Southern Mali". *Food Policy* 26: 437–452.

Adams, R. H. and A. Cuecuecha. 2010. "Remittances, Household Expenditure and Investment in Guatemala". *World Development* 38(11), 1626–1641.

Amemiya, T. 1974. Multivariate Regression and Simultaneous Equation Models When the Dependent Variable Are Truncated Normal. *Econometrica* 42(6): 999–1012.

Amuedo-Dorantes, C. and S. Pozo. 2006." Remittances as Insurance: Evidence from Mexican Immigrants". *Journal of Population Economics* 19(2): 227–254

Arslan, A. and J. E. Taylor. 2012. "Transforming Rural Economies: Migration, Income Generation and Inequality in Rural Mexico". *Journal of Development Studies* 48(8): 1156–1176.

Barrett, B., T. Reardon and P. Webb. 2001. "Nonfarm Income Diversification and Household Livelihood Strategies in Rural Africa: Concepts, Dynamics, and Policy Implications". *Food Policy* 26: 315–331.

Barrett, C. B., M. Bezuneh, D. C. Clay, and T. Reardon. 2005. "Heterogeneous Constraints, Incentives and Income Diversification Strategies in Rural Africa". *Quarterly Journal of International Agriculture* 44(1): 37–60.

Cameron, A. C. and P. K. Trivedi. 2005. "Regression Analysis of Count Data". New York: Cambridge University Press.

Carletto, C., B. Davis, M. Stampini and A. Zezza. 2006. "A country on the move: International Migration in Post-Communist Albania". *International Migration Review*. 40(4): 767–785.

Childress, M. D. 2003. "Land Consolidation and Agricultural Services in Albania". In *Transition, Institutions, and the Rural Sector*, edited by M. Spoor, 123-142. New York: Lexington Books.

Central Intelligence (CIA). 2014. World Factbook, Albania. Retrieved from https://www.cia.gov/library/publications/the-world-factbook/geos/al.html

Cungu A. and J. F. M. Swinnen. 1999. “Albania’s Radical Agrarian Reform”. *Economic Development and Cultural Change* 47(13): 605-619.

Davis, J. R. 2003. “The Rural Non-Farm Economy, Livelihoods and their Diversification: Issues and Options”. *NRI report* (2753). Retrieved from core.ac.uk/download/pdf/9309004.pdf

De Janvry, A. and E. Sadoulet. 2001. “Income Strategies among Rural Households in Mexico: The Role of Off-Farm Activities”. *World Development* 29(3): 467–480.

Ellis, F. (1998). “Household Strategies and Rural Livelihood Diversification”. *Journal of Development Studies* 35(1): 1–38.

Dercon, S. and P. Krishnan. 1996. “Income Portfolios in Rural Ethiopia and Tanzania: Choices and Constraints”. *The Journal of Development Studies* 32(6):850-875.

Ellis, F. 2000. The Determinants of Rural Livelihood Diversification in Developing Countries. *Journal of Agricultural Economics*, 51(2): 289–302.

Ellman, M. 2003. “Expectations and Reality: Reflections on a Decade of Agricultural Transformation”. In *Transition, Institutions, and the Rural Sector*, edited by M. Spoor, 1-3. New York: Lexington Books.

Germenji, E. and J. F. M. Swinnen. 2004. “Impact of Remittances on Household-based Farms in Rural Albania”. Paper presented at the International Conference on New Perspectives on Albanian Migration and Development, Albania.

Goodwin, B. K. and M. T. Holt. 2002. Parametric and Semiparametric Modeling of the Off-farm Labor Supply of Agrarian Households in Transition Bulgaria. *American Journal of Agricultural Economics*, 84(February): 184–209.

Just, R. E. and R. D. Pope. 1978. “Stochastic Specification of Production Functions and Economic Implications”. *Journal of Econometrics* 7: 67-86.

Just, R. E. and D. Zilberman. 1983. “Stochastic Structure, Farm Size and Technology Adoption in Developing Agriculture”. *Oxford Economic Papers, New Series* 35(2): 307-328.

Kilic, T., C. Carletto, J. Miluka and S. Savastano. 2009. Rural Nonfarm Income and its Impact on Agriculture: Evidence from Albania. *Agricultural Economics* 40: 139–160.

King, R. and J. Vullnetari. 2003.” Migration and Development in Albania”. Retrieved from http://sro.sussex.ac.uk/11053/

Lee, L.-F. 1981. “Simultaneous Equations Models with Discrete and Censored Dependent Variables”. In *Structural Analysis of Discrete Data with Economic Applications*, edited by C. F. Manski and D. McFadden, 346-364. Cambridge MA: The MIT Press.

Lucas, R. E. B. 1987." Emigration to South Africa's Mines". American Economic Review 77(3): 313–330.

Massey, D. S., J. Arango, G. Hugo, A. Kouaouci, A. Pellegrino and J. E. Taylor. 1993. "Theories of International Migration" : A Review and Appraisal. *Population and Development Review* 19(3): 431–466.

McCarthy, N., C. Carletto, T. Kilic and B. Davis. 2009. "Assessing the Impact of Massive Out-Migration on Albanian Agriculture". *European Journal of Development Research* 21: 448–470

Miluka, J., C. Carletto, B. Davis and A. Zezza. 2010. "The Vanishing Farms? The Impact of International Migration on Albanian Family Farming". *Journal of Development Studies* 46: 140–161.

Quiñones, E. J., A. P. de la O-Campos, C. Rodríguez-Alas, T. Hertz and P. Winters. 2009. "Methodology for Creating the RIGA-L Database". Retrieved from http://www.fao.org/fileadmin/templates/riga/docs/Country_survey_information/RIGA-L_Methodology.pdf

Quisumbing, A. and S. McNiven. 2010. "Moving Forward, Looking Back: the Impact of Migration and Remittances on Assets, Consumption, and Credit Constraints in the Rural Philippines". *Journal of Development Studies* 46(1): 91–113.

Reardon, T. 1997. "Using Evidence of Household Income Diversification to Inform Study of the Rural Nonfarm Labor Market in Africa". *World Development* 25(5): 735–747.

Reardon, T., J. E. Taylor, K. Stamoulis, P. Lanjouw and A. Balisacan. 2000. "Effects of Non-farm Employment on Rural Income Inequality in Developing Countries: An Investment Perspective". *Journal of Agricultural Economics* 51(2): 266–288.

Rozelle, S., J. E. Taylor and A. de Brauw. 1999. "Migration, Remittances, and Agricultural Productivity in China". *American Economic Review* 89(2): 287–291.

Stark, O. 1982. "Research on Rural-to-Urban Migration in LDCs: The Confusion Frontier and Why We Should Pause to Rethink Afresh". *World Development*, 10(1): 63–70.

Stark, O. 1991. "The Migration of Labor". Cambridge MA: Basil Blackwell.

Stark, O. and E. D. Bloom. 1985. "The New Economics of Labor Migration". *American Economic Review* 75(2): 173–178.

Stark, O. and D. Levhari. 1982. "On Migration and Risk in LDCs". *Economic Development and Cultural Change* 31(1): 191.

Stecklov, G., C. Carletto, C. Azzarri and B. Davis. 2010. “Gender and Migration from Albania”. *Demography* 47(4): 935–961.

Taylor, J. E. 1999. “The New Economics of Labor Migration and the Role of Remittances in the Migration Process”. *International Migration* 37(1): 63-88.

Taylor, J. E. and P. L. Martin. 2001. Agricultural Production. *Handbook of Agricultural Economics* 1: 457–511.

Taylor, J. E., S. Rozelle and de Brauw, A. 2003. “Migration and Incomes in Source Communities: A New Economics of Migration Perspective from China.” *Economic Development and Cultural Change* 53*(*1): 983–986.

Udry, C. 1995. “Risk and Saving in Northern Nigeria”. *American Economic Review* 85(5): 1287–1300.

Winkelmann, R and K. F. Zimmermann. 1994. “Count Data Models for Demographic Data”. *Mathematical Population Studies* 4(3): 205-221.

Winters, P., B. Davis, G. Carletto, K. Covarrubias, E. J. Quiñones, A. Zezza and K. Stamoulis. 2009. “Assets, Activities and Rural Income Generation: Evidence from a Multicountry Analysis”. *World Development* 37(9): 1435–1452.

Wouterse, F. and J. E. Taylor. 2008. “Migration and Income Diversification: Evidence from Burkina Faso”. *World Development* 36(4): 625–640.

Table 1. Weighted Means and Results of Test of Mean Differences of Nonfarm Activity Participation and Incomes

	Overall	Migrants	Non-migrants	t-value
Activity				
Nonfarm	0.4	0.36	0.42	-1.88*
Wage-employment	0.31	0.28	0.33	-1.7*
Self-employment	0.11	0.1	0.12	-0.95
Income				
Farm income	181,819.45	198,335.56	173,003.78	3.28**
Nonfarm income	193,205.15	164,221.78	208,675.38	-1.63
Wage-income	106,561	79,633.8	118,289.66	-2.6**
Self-employed income	86,644	79,633.8	90,385.72	-0.43
No. of observations	1355	446	909	

** Significant at the 0.05 level, *Significant at the 0.1 level

Table 2. Weighted Means of Explanatory Variables and Results of Test of Mean Differences

Variables	Overall	Migrants	Non-migrants	t-value
Number of migrants	0.61	1.76	—	—
Total remittance	55,030.7	158,130	—	—
HH Characteristics				
Female HH head	0.06	0.08	0.04	2.74**
Age of HH head	50.84	57.75	47.15	15.33**
Married HH head	0.93	0.91	0.94	-1.54
Education of HH head	8.28	7.35	8.78	-6.15**
HH size	4.75	4.47	4.9	-3.93**
No. of HH members < 14 years	1.29	0.82	1.54	-10.75**
No. of HH members between 14 -60 years	2.92	2.97	2.89	0.94
No. of HH members between > 61 years	0.5	0.63	0.44	3.99**
Nonagricultural Assets				
Telephone in HH	0.03	0.03	0.03	-0.55
Internal flush toilet in HH	0.51	0.53	0.5	0.9
HH wealth index in 1990	-0.24	-0.16	-0.28	1.89*
Nonlabor income	57,937.9	66,322.8	53,462.29	2.1*
Agricultural Assets				
Farm size in hectares	0.88	1.04	0.79	5.89**
Number of farm plots	3.46	3.63	3.37	2.27**
HH receives extension service	0.38	0.4	0.36	1.11

No. of machinery owned by HH	0.36	0.4	0.34	1.3
No. of tropical livestock unit	1.76	1.86	1.71	1.45
Community characteristics				
Crime problem	0.07	0.08	0.07	1.06
Credit access	0.6	0.59	0.61	-0.68
District nonfarm unemployment in 2001	0.46	0.45	0.46	-1.69*
Coastal	0.32	0.39	0.29	3.26**
Mountain	0.15	0.12	0.17	-3.52**
Central	0.53	0.5	0.54	-1.42
Migration Instruments				
Knowledge of Greek/Italian in 1990	0.09	0.13	0.07	2.59**
Average HHs at the district in international migration	0.36	0.4	0.34	7.5**
HH has >1 male labor	0.36	0.37	0.35	0.63
Remittance Instrument				
Mean district remittance	76,267	91,506.6	68,132.74	2.64**
No. of observations	1,355	446	909	

** Significant at the 0.05 level, *Significant at the 0.1 level

Table 3. Negative Binomial Estimation Results of the Determinants of International Migration

	Number of International Migrants
HH Characteristics	
Female HH head	1.522**
	(0.299)
Age of HH head	0.057**
	(0.006)
Married HH head	1.297**
	(0.305)
Education of HH head	-0.010
	(0.016)
HH size	0.067
	(0.042)
No. of young dependents	-0.278**
	(0.058)
No. of elderly dependents	-0.292**
	(0.087)
Nonagricultural Assets	
Telephone in HH	0.390*

	(0.233)
Internal flush toilet in HH	0.028
	(0.099)
HH wealth index in 1990	-0.115*
	(0.061)
Agricultural Assets	
Farm size per capita	0.059
	(0.113)
Farm plots per capita	0.387
	(0.325)
No. of tropical livestock unit	-0.022
	(0.028)
Community Characteristics	
crime problem	-0.163
	(0.199)
Credit access	0.197*
	(0.104)
District Nonfarm unemployment in 2001	0.524
	(0.368)
Coastal	0.123
	(0.124)
Mountain	0.290**
	(0.146)
Instruments	
Knowledge of Greek/Italian in 1990	0.118
	(0.152)
Average HHs at the district in migration	3.628**
	(0.533)
Constant	-6.682**
	(0.676)
No. of observations	1,355
Log Likelihood	-1250.707

Standard error in the parenthesis,**Significant at the 0.05 level, *Significant at the 0.1 level

Table 4. OLS Estimation Results of the Determinants of Censorship-Corrected Remittance Income

	Remittance Income
Number of migrants (predicted)	63,539.003**
	(27267.379)
HH Characteristics	

Female HH head	380,882.940
	(241207.110)
Age of HH head	32,158.187**
	(15424.382)
Married HH head	360,031.697*
	(192523.394)
Education of HH head	21,787.355*
	(11313.102)
Education of HH head squared	-1,783.397**
	(635.898)
HH size	-15,322.492*
	(8727.539)
No. young dependents	-95,107.590*
	(54392.522)
No. elderly dependents	-103,367.103
	(70467.871)
Nonagricultural Assets	
Telephone in HH	-113,444.011*
	(68310.289)
Internal flush toilet in HH	54,718.577**
	(27422.094)
HH wealth index in 1990	-5,459.625
	(17351.235)
Nonlabor income	0.019
	(0.146)
Agricultural Assets	
Farm size	168,999.862*
	(86787.878)
Farm plots	-56,037.300**
	(24214.847)
Community Characteristics	
crime problem	-34,807.296
	(44998.133)
Credit access	-106,716.325*
	(54897.316)
Coastal	66,390.505
	(54134.284)
Mountain	7,622.251
Instrument	
Average district remittance income	0.435**

	(0.097)
Inverse Mills ratio (IMR)	918,220.304**
	(462735.551)
Constant	-3,089,333.354**
	(1483336.014)
No. of observations	1,355
Adj. R^2	0.053

Standard error in the parenthesis,**Significant at the 0.05 level, *Significant at the 0.1 level

Table 5. Probit Estimation Results of Nonfarm Activity Choice

	Nonfarm self-employment	Nonfarm wage-employment
No. of migrants (predicted)	0.105	0.084
	(0.119)	(0.117)
Remittance income (predicted)	1.377×10^{-6}*	-1.384×10^{-6}**
	(7.893×10^{-7})	(6.938×10^{-7})
HH Characteristics		
Female HH head	-0.656*	-0.281
	(0.362)	(0.277)
Age of HH head	-0.013**	0.011**
	(0.006)	(0.005)
Married HH head	-0.500*	-0.026
	(0.278)	(0.238)
Education of HH head	0.031*	0.137**
	(0.018)	(0.015)
HH size	0.135**	0.070**
	(0.041)	(0.033)
No. of young dependents	-0.030	-0.057
	(0.057)	(0.046)
No. of elderly dependents	-0.023	0.024
	(0.092)	(0.075)
Nonagricultural Assets		
Telephone in HH	0.685**	0.151
	(0.237)	(0.220)
Internal flush toilet in HH	0.500**	0.258**
	(0.109)	(0.084)
Nonlabor income	-1.528×10^{-6}**	-2.5×10^{-6}**
	(7.689×10^{-7})	(6.002×10^{-7})
Agricultural Assets		

Farm size	-0.035	-0.133
	(0.108)	(0.090)
No. of farm plots	0.061*	-0.012
	(0.037)	(0.030)
No. of machines	-0.003	-0.092
	(0.072)	(0.061)
Extension service	-0.104	0.048
	(0.113)	(0.088)
No. of tropical livestock unit	-0.086**	-0.103**
	(0.037)	(0.028)
Community Characteristics		
crime problem	-0.220	-0.020
	(0.245)	(0.179)
Credit access	-0.192*	-0.137
	(0.110)	(0.087)
District nonfarm unemployment rate in 2001	0.410	2.153**
	(0.378)	(0.314)
Coastal	0.189	-0.109
	(0.132)	(0.109)
Mountain	-0.007	-0.012
	(0.142)	(0.109)
Constant	-1.476**	-2.993**
	(0.543)	(0.453)
No. of observations	1,355	1,355
Log Likelihood	-392.477	-682.669

Standard error in the parenthesis,**Significant at the 0.05 level, *Significant at the 0.1 level

Table 6. Iterated 3SLS Estimation Results of the Impact of International Migration and Remittance Income on Farm and Nonfarm Incomes

	Self-Employed Income	Nonfarm Wages	Farm Income
No. of migrants (predicted)	13,390.108	-5,693.178	-5,752.057
	(29000.867)	(15287.351)	(6442.544)
Remittance income (predicted)	0.308*	0.005	0.154**
	(0.174)	(0.094)	(0.039)
HH Characteristics			
Female HH head	-48,394.271	-2,558.700	-49,385.251**
	(70152.243)	(34634.517)	(15345.206)
Age of HH head	-1,533.608	525.190	-452.238
	(1393.737)	(705.310)	(302.439)

Married HH head	-52,448.172	-18,966.018	-24,325.998*
	(60755.973)	(29892.005)	(13336.485)
Education of HH head	-13,538.499**	-15,813.730**	-527.932
	(6453.793)	(6756.085)	(830.968)
Education squared		1113.936**	
		(355.299)	
HH size	13,483.208	-765.387	7,474.528**
	(8686.947)	(4339.996)	(1941.722)
No. of young dependents	2,579.022	6,993.689	-5,653.575**
	(12153.872)	(6092.593)	(2697.643)
No. of elderly dependents	-622.232	11,071.585	-12,016.749**
	(19377.611)	(9799.592)	(4262.860)
Agricultural Assets			
Farm size			44,324.032**
			(5070.332)
No. of farm plots			4,543.097**
			(1726.333)
No. of machines			7,781.860**
			(3461.252)
Extension service			23,734.985**
			(5142.394)
No. of tropical livestock unit			17,314.768**
			(1399.031)
Nonlabor income	0.043	0.005	0.036
	(0.162)	(0.080)	(0.031)
Community Characteristics			
crime problem	31,252.307	-21,355.935	-18,869.675*
	(46690.017)	(22859.599)	(10286.304)
Credit access	-6,723.414	-3,769.232	4,420.279
	(23053.334)	(11287.207)	(5025.098)
District nonfarm unemployment rate in 2001	-343,125.453**	75,065.688	-119,570.991**
	(115377.188)	(56943.332)	(18494.574)
Coastal	50,300.680*	-8,964.612	19,876.758**
	(28224.425)	(13830.625)	(6482.283)
Mountain	21,143.901	-5,297.414	-37,573.210**
	(27052.419)	(13254.750)	(6264.639)
Inverse Mills ratio (IMR)	-231,423.356**	-130,489.153**	
	(49478.493)	(24243.398)	
Constant	654,627.887**	263,693.793**	160,996.588**

	(187198.555)	(96610.908)	(25512.410)
Adj. R^2	0.024	0.121	0.392

Standard error in the parenthesis,**Significant at the 0.05 level, *significant at the 0.1 level