What drives rural out-migration? Insights from Kosovo

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Abstract

Drawing on household, network and relative deprivation models of migration, this paper empirically tests the probability to migrate utilising data for agricultural households in Kosovo (circa 13,500 observations). We identify the determinants of the propensity to migrate and length of migration in the previous year, considering gender related differences. The results reveal the significance of household / personal characteristics, farm characteristics, and network effects on the propensity to migrate and length of migration in the previous year. However, we find no significant effect of relative deprivation on the propensity to migrate and length of migration. While education has a strong, positive effect on migration by women, this is not the case for men. Unprofitability and a lack of inputs, manpower and equipment, causing farmland to be left uncultivated, also stimulate out-migration.

Key words

Migration, human capital, networks, post-conflict, gender, Kosovo

Introduction

Rising levels of domestic and international migration, in absolute if not relative terms (Czaika & de Haas, 2014), characterize contemporary societies with the International Organization for Migration (2018) estimating that in 2017 there were 257.7 million international migrants. This was a 63 per cent increase compared with 1990, which in turn was double the figure recorded in 1980. In the European Union (EU), permanent

legal migration from outside the EU is now equivalent to what is recorded in the United States, i.e. about one million a year. Within Europe, out-migration has been highest from the poorest regions and countries in the east and south of the region, most of which were previously governed by socialist / communist regimes (OECD, 2015). Rural areas, that are most reliant on agriculture as a source of income and employment, have been particularly affected as they suffer from structural underdevelopment and a lack alternative, non-farm job opportunities (GVG, 2012; International Organization for Migration, 2018).

Out-migration can have a considerable and negative impact on rural communities. For instance, the disappearance of smaller family farms in the USA resulted in the decline or even death of some rural towns and communities (Moore, 2001). Research in Moldova documents villages where over half of school aged children have at least one parent working abroad with their care left to grandparents or other relatives (Cash, 2015). This is an unfortunate situation, with a social cost, particularly in terms of the educational achievement and emotional welfare of children left behind by migrants (Parreñas, 2001). Migration also may adversely affect agricultural output and efficiency (Atamanov & Van den Berg, 2012; Rozelle, Taylor, & deBrauw, 1999), particularly in the absence of perfect substitutes for lost household labor. Previous research for Kosovo established that rural out-migration negatively impacts on farm technical efficiency (Sauer, Gorton, & Davidova, 2015), an effect amplified for households with better educated adult males.

Against this backdrop, Kosovo is an interesting case study. Kosovo's population appears to be very mobile considering both international and domestic migration.

According to the World Bank (2011), Kosovo's international migration is one of the highest in the world, since every third or fourth household has at least one member living and working abroad. The largest flow of migrants (forced ones) occurred during the armed conflict in the late 1990s. Half of the two million then residents of Kosovo were refugees or internally displaced (Vathi & Black, 2007). The armed conflict also intensified rural-urban migration as its effect on the destruction of houses was greater in rural areas.

However, migration continued in the post-conflict period with official estimates suggesting that 27 per cent of migrants left Kosovo during peaceful times (Gashi & Haxhikadrija, 2012), with the rural population continuing to decline (GVG, 2012). Migration out of rural areas is much higher (in terms of the percentage of the population) than for urban areas (Vathi & Black, 2007), reflecting the pull of greater and better paid employment opportunities elsewhere. Some rural migrants relocate to urban areas, particularly the capital Pristina, while others work abroad. One of the reasons for the latter is that while the armed conflict ended officially in 1999, Kosovo remains beset by political instability and weak public institutions. For instance, the Corruption Perceptions Index, which orders countries based on how corrupt a country's public sector is perceived to be, ranks Kosovo at 103rd place out of 168 countries (Transparency International, 2015). Instead of improving, the situation in Kosovo has deteriorated (World Bank, 2017). Applying the framework of voice, loyalty and exit, Möllers, Arapi-Gjini, Herzfeld, and Xhema (2017) found that recent international out-migration (exit) has mainly been driven by dissatisfaction with the political system. For example, the general elections in mid-2014 led to a protracted political-constitutional

crisis, with 5 per cent of Kosovo's population migrating to the EU during a "winter of discontent" in 2014/15 (The World Bank Group in Kosovo, 2015).

Given this context, the paper addresses the research question – what are the determinants of rural out-migration? To answer the question, the analysis draws on a unique dataset, which combines very detailed household information with extensive income and farm production data. Due to the large scale of migration, the importance of remittances to Kosovo in terms of economic development and poverty alleviation has been studied extensively (e.g. Havolli, 2011; Möllers & Meyer, 2014; Möllers, Meyer, Xhema, & Buchenrieder, 2013). However, little work rigorously analyzes the propensity to migrate out of rural areas. The study draws on individual, household, network and relative deprivation models of migration, testing the extent to which the propositions formulated on the basis of these models hold for Kosovo. The remainder of this section provides important contextual information before considering the wider academic literature on determinants of migration.

Poverty in Kosovo is widespread. The World Bank Group in Kosovo (2015) estimates that the average per capita income is about one-tenth of the EU level, with poverty rates of 80 per cent if the threshold of USD 5 per day is applied (at Purchasing Power Parity). Kosovo's Agency of Statistics (ASK), applying a poverty line of €1.72 per day, classifies 29.7 per cent of the population as poor. Poverty rates are higher in rural Kosovo (Macours & Swinnen, 2008), which remains heavily dependent on agriculture. Agricultural land ownership and management is extremely fragmented. For example, agricultural census data reveal that the average size of agricultural holding is 3.2 hectares (ha), with the majority of holdings smaller than 1 ha (ASK, 2015). Such a

fragmented farm structure is common to other Western Balkan countries (Volk, Rednak, & Erjavec, 2012), with rural households struggling to generate reasonable incomes without recourse to other gainful activities outside of agriculture. However, several barriers to engagement in off-farm employment exist for Kosovo's rural households. These include the shortage of salaried positions (Osmani, Gorton, & White, 2013), with approximately 35 per cent of the workforce unemployed (UNDP, 2016). Another reason is that the access to roads, measured in kilometres per 1,000 persons, is worse than in comparator countries - Albania, Montenegro and North Macedonia – and there is under-investment in road maintenance which often hinders commuting to urban areas (IMF, 2016). Under these circumstances, migration to larger cities and abroad is often a preferred livelihood strategy.

Determinants of Out-migration

The literature emphasizes the importance of individual characteristics (Germenji & Swinnen, 2005; Hatton & Williamson, 2005), household decision-making (Stark & Bloom, 1985), networks (Taylor, Rozelle, & de Brauw, 2003), and relative as well as absolute differentials in expected earnings (Massey et al., 1993) as motivators for migration. Each of these are reviewed in turn.

Individual characteristics

Neoclassical models treat migration as an outcome of a cost-benefit analysis conducted by individuals (Harris & Todaro, 1970), whereby workers compare the differential in incomes between destination and existing locations, and the costs involved in migration (transport, documentation, risks of being deported if undocumented etc.). Hatton and Williamson (2005) express this as:

$$d_i = w_{f,i} - w_{h,i} - z_{i>} - c > 0 \quad (1)$$

So that the decision of individual *i* to migrate from home (*h*) to a foreign (*f*) destination is a function of the differential in earnings $\left(w_{f,i} - w_{h,i}\right)$, z_i is the individual's compensating differential in favor of *h*, and *c* is the direct cost of migration. This assumes that individuals possess a preference (z_i) in favor of remaining in their current location, reflecting the psychological costs of relocation (Massey, et al., 1993). The differential in wages depends on whether the returns to skills are greater in the destination relative to current location. If interpreted as present values, it is expected that the likelihood of migration declines as individual *i* ages and their remaining working life shortens.

Empirical research suggests that age significantly affects the propensity to migrate in a non-linear fashion. Specifically, the likelihood of migration rises until peaking in the age range of late twenties and early thirties, before falling as individuals grow older (Efendic, 2016; Germenji & Swinnen, 2005). Generally, the returns to education will be higher in more developed markets (Grogger & Hanson, 2011), so that the differential in expected earnings grows as human capital increases and education thus makes migration more attractive (Efendic, 2016). However, not all forms of human capital may transfer from home to destination labor markets. For instance, qualifications from one market may not be recognized in another, or if illegal or undocumented, migrants may be restricted to the informal economy and relatively unskilled jobs.

While neo-classical theory assumes that individuals possess a compensating differential (z_i) in favor of remaining in their current location, its presence and strength varies across groups. For instance, in societies where women are expected to care for older relatives, maintain the family home and relocating alone is considered culturally unacceptable, the psychological costs of migration for women are likely to be high. In such cases, female migration may be limited to that instigated by marriage or following husbands abroad (Rosenzweig & Stark, 1989), so that the determinants of migration differ significantly according to gender (Mendola & Carletto, 2009). This is evident in many predominantly Muslim societies, like Kosovo, but not all cases (Hondagneu-Sotelo & Cranford, 2006). While generally it is assumed that z_i takes a positive value, for young people in particular, there might be a desire to seek foreign adventures and experience different lifestyles (Arrehag, Sjöberg, & Sjöblom, 2006). So if the destination is perceived as socially more attractive, a negative earnings differential may be required to stop migration (Massey, et al., 1993).

Household Characteristics

In contrast to the neo-classical assumption of decision-making by individuals, the New Economics of Labor Migration (NELM) takes a household perspective (Stark, 1991; Stark & Bloom, 1985). NELM models assume that households jointly make migration decisions to increase income, obtain funds for investment, and insure against production and income risks in the face of market failures in credit and insurance markets (Taylor, 1999). The selection of who within the household migrates and for how long depends on their expected earning potential and 'at home' family commitments (Davis, Stecklov, & Winters, 2002; Massey, et al., 1993).

Regarding family structures, migration may be curtailed by marriage and the presence of dependent children. In some societies it may be socially unacceptable for a wife to leave the matrimonial home and / or the husband to leave his wife and children either at all or for any length of time (Fleury, 2016). Consistent with this, empirical analysis of German *gastarbeiter* reveals that the first waves of migrants were heavily biased toward unmarried males without dependent children and that the propensity to return home rose with having a spouse and children in the country of origin (Constant & Massey, 2002). For Albania, Germenji and Swinnen (2005) found that the presence of children in the household had a negative but insignificant effect on migration.

The expected income differential $(w_{f,i} - w_{h,i})$, *ceteris paribus*, will be larger for poorer households, so that the motivation to migrate will be stronger for lower income groups. In contrast, wealthier households, as a result of the diminishing marginal utility of income, possess weaker incentives (Kotorri, 2010). However, migration involves direct costs such as transportation, documentation, upfront rent and, in some cases, bribes (c in equation 1). In the presence of imperfect credit markets and household budget constraints, poorer households may lack the financial means to meet the direct costs of migration (Arrehag, et al., 2006). This suggests that the impact of household income on migration is non-linear, with the propensity to migrate lowest for those from the very poorest and very richest households.

Network effects

Massey et al. (2010, p.317) define a migration network as a "set of interpersonal ties that link migrants, former migrants and non-migrants in origin and destination areas through the bonds of kinship, friendship and shared community origin" and thus a form

of social capital. Migration networks can provide information on employment opportunities in destination markets, direct assistance in the form of housing, transport and food in the host environment, and reduce some of the social costs of migration (loneliness, psychological distance from one's own culture etc.). Migration networks may thus lower the differential in favor of remaining in the current location (z_i) as well as reducing the direct costs of migration and, through the identification of employment opportunities, increase the expected wage differential. Substantial empirical evidence exists that such networks facilitate migration (Davis, et al., 2002; McKenzie & Rapoport, 2007) with the strongest network bonds developing with other household members who are or were previously migrants (Fleury, 2016; Germenji & Swinnen, 2005).

Relative Deprivation

The NELM posits that migration stems not only from a desire of households to improve their incomes in absolute terms but also to increase *income relative to others*. In other words, the marginal utility of income depends also on the income of others (Stark, 1991), so that migration propensities will be positively correlated with the level of inequality in the origin community (Czaika & de Haas, 2012). As a result, migration from poor households will be greater if they live amongst richer, rather than equally poor, neighbors (Quinn, 2006). In this regard the origin community remains the focal reference group and such relative deprivation may explain why migrants accept employment that is "dangerous, dirty and demeaning" (Czaika & de Haas, 2012), which native workers refuse, if it raises their standing and socio-economic status in the origin community (Czaika, 2013). There is some, although far from universal, empirical evidence supporting the notion that migration and its length depends on a household's

income relative to its reference group (origin municipality or village) rather than just absolute income levels (Quinn, 2006; Stampini, Carletto, & Davis, 2008; Stark, 1991).

Security effects

The greatest flows of migrants in history stemmed from wars, and in a post-conflict environment, on-going feelings of insecurity may prompt further migration (Ibáñez & Vélez, 2008; Morrison & May, 1994) or prevent return migration (Joireman, 2017). Insecurity may relate to personal safety or security of assets. Regarding the latter, much attention has been paid to land registration and titling as a mechanism for securing property rights, particularly following regime change, such as after the downfall of state socialism in Central and Eastern Europe or separation from the former Yugoslavia as in the case of Kosovo (Hartvigsen, 2014; Todorovski, Zevenbergen, & van der Molen, 2016). However, land registration may be insufficient to provide the security required for farming land effectively. For example, drawing on research in Bulgaria, Fredriksson, Bailey, Davidova, Gorton, and Traikova (2017) document cases of land abandonment following repeated theft of crops and / or equipment, or a neighboring farmer allowing his guard dogs to roam freely over the land of others. The lack of personal safety and security of property can devastate returns to farming activities and precipitate migration.

Modelling and Data

As the literature suggests that migrants self-select out of the general population non-randomly (McKenzie & Rapoport, 2010), it is necessary to control for selection bias. We employ therefore a Heckman selection modelling approach to effectively control for potential selection bias with respect to the estimation of the propensity to migrate at

the individual level. The first stage of the model estimates whether a particular member of a household migrated or not during 2012, while the second stage considers the length of time the household member migrated in the previous year (expressed in months). We estimate determinants for the variation in the propensity to migrate and length of migration, considering gender related differences, as recommended by McKenzie and Rapoport (2007). Data for 2012 is enriched by observations on the same household in 2008. This allows us to test, for example, if there is continuity in household members who are migrating in both years and the role of network effects (e.g. the importance of family members being absent in 2008 on migration in 2012). Beside migrant related characteristics, we test for the effect of household, as well as farm and network effects on migration. Following McKenzie and Rapoport (2010), we estimated the average level of migration for agricultural households in each municipality to capture the potential effect of community migration networks.

We enrich our econometric models by considering the reasons, if applicable, why households left land fallow and did not engage in production, as these can relate to the decision to migrate. For instance, leaving land fallow because of a shortage of inputs indicates underdeveloped factor markets. In contrast, leaving land fallow because of a lack of security reflects different concerns and potential policy interventions. A bootstrap based re-sampling procedure ensures the robustness of our estimates.

We expect that an individual's decision to migrate or not is influenced by a multitude of factors: household related and personal characteristics, farm and production related conditions, security, community networks, and relative deprivation.

It is likely that, in these regards, the characteristics of migrants will differ from non-migrants. Unobservable characteristics affecting the decision to migrate will be correlated with the unobservable characteristics affecting an individual's length of migration. Selectivity bias would be present, therefore, if we were to draw inferences about the determinants of the length of migration in the previous year for all individuals based on the observed length of migration in the previous year for the subset which actually migrated. Heckman's two-stage sample selection model copes with such a selection problem by assuming that two judgements are made with regard to migration and the length of migration (months of the previous year absent from the household), with each determined by a set of explanatory variables (Heckman, 1979).

There are, hence, two latent dependent variables models, where the decision to migrate or not is modeled as a selection equation specified as:

$$P_i = \begin{Bmatrix} 1 \; if \; \alpha + \sum_j \beta_j hh_{ij} + \sum_k \gamma_k net_{ik} + \sum_l \delta_l dep_{il} + u > 0 \\ 0 \; otherwise \end{Bmatrix} \qquad [2]$$

where P_i is a binary variable which takes the value one if the individual is a migrant and zero if the individual decided not to migrate, *hh* denotes the vector of household related and individual characteristics, *net* stands for social network effects, *dep* for factors related to relative economic deprivation. $\alpha, \beta, \gamma,$ and δ are the parameters to be estimated, and *u* is the error term with the corresponding log-likelihood function for [2] given in Maddala (1998).

The length of migration in the previous year equation is given by:

$$length_i = \mu + \sum_m \tau_m hh_{im} + \sum_n \varphi_n net_{in} + \sum_o \omega_o dep_{io} + \sum_q \epsilon_q fal_{iq} + v \qquad [3]$$

where *length* is expressed in months, *hh* denotes again the vector of household related and individual characteristics, *net* stands for social network effects, *dep* for factors related to relative economic deprivation, and *fal* for the variables related to stated reasons to leave land fallow. $\mu, \tau, \varphi, \omega,$ and ϵ are the parameters to be estimated, and v is the error term. We estimate [2] and [3] by following Heckman's two-stage estimation procedure (1979) to address the potential selection bias. The first stage of the estimation procedure consists of estimating equation [2] as the migration equation. The second stage of the estimation procedure is the ordered probit equation of length of migration in the previous year which contains the inverse Mill's ratio as a correcting term.

To address the potential problem of heteroscedasticity, we estimate the robust covariance matrix using the Huber-White sandwich estimator (Huber, 1967; White, 1980). The latter provides consistent estimates of the covariance matrix for parameter estimates even when the fitted parametric model fails to hold because of misspecification or violation of the error related assumptions. Puhani (2000) demonstrated that the one-stage full-information ML estimation of the Heckman selection model is preferable in the case where collinearity problems are absent. Auxiliary regressions performed showed that some minor collinearity in the explanatory variables could be excluded. Hence, we prefer to apply a two-stage estimation procedure. To examine the validity of the final model specification, we test for the group wise insignificance of the parameters in [2] and [3] by a common generalized likelihood ratio testing procedure. Finally, a White (1980) test checked for possible heteroscedasticity.

Dataset

Data employed in the study were extracted from agricultural household surveys conducted by the Statistical Office of Kosovo (SOK) in 2008 and 2012.[1] These unique datasets contain information on household characteristics (age, gender, education, and months absent from the household for each member), location, farming patterns (size of farm, number of plots, labor input, and production patterns), value of agricultural machinery and gross farm incomes. In 2012, 8.14% of male and 5.67% of female household members were migrants. The surveys did not collect information on the destination of migrants, however, so it is not possible in the analysis to distinguish between internal and international migration. Data collection occurred face to face with the sample stratified by region and farm size to ensure its representativeness. For the purpose of the survey, SOK defined agricultural households as those that cultivate more than 0.10 ha of arable land or less than 0.10 ha of utilized arable land but had at least one cow or three pigs or five sheep/goats, or 50 poultry, or 20 beehives. Based on the theoretical and empirical evidence presented above, variables were selected for the empirical analysis (Table 1). Table 2 details the descriptive statistics.

Tables 1 and 2 about here

Results

Tables 3 and 4 present the results of the econometric analysis. Column 1, outcome, shows the effect of the explanatory variables on the length of migration, i.e. the months in the previous year away from the household, and column 2, selection, shows the effect

[1] During this period the statistical institution was called the Statistical Office of Kosovo. It is now known as *Agjencia e Statistikave të Kosovës* (Kosovo Agency of Statistics).

of the explanatory variables on the probability to be selected as a migrant in 2012. Columns 3 and 4 show the marginal effects of the explanatory variables on the length of migration in the previous year and on the probability of being selected, respectively. Table 3 details the analysis for the full sample, with two sets of estimations presented which differ in terms of inclusion of variables relating to the reasons for land being left fallow. Table 4 presents the estimations for the sub-samples of male and female household members respectively, as the factors motivating migration may differ between the two groups (Fernández-Huertas Moraga, 2013). Considering the different diagnosis tests performed and measures of model quality, the estimated model specifications are statistically significant at a satisfactory level with no severe signs of misspecification.

Tables 3 and 4 about here

Model results identify the significance of household / personal characteristics, farm characteristics, and network effects in explaining variations in the selection and outcome variables. Considering both the propensity to migrate and length of migration in the previous year, for the full sample of respondents, the coefficients for age and age squared are significant and with differing signs. This is as expected - the likelihood of migration increases with age but only up to a certain point, after which it declines. On average, the tipping point is around 25 to 26 years of age *ceteris paribus*. The tipping point is, however, significantly different for men and women: between 31 and 32 years of age for men, but between only 15 and 16 years of age for female migrants (Graph 1). The low threshold for women suggests that they may move out as teenagers either to receive a better education or follow a relative / husband – a phenomenon observed in

some other low income countries (Kudo, 2015; Rosenzweig & Stark, 1989). In the last year of the so-called 'upper secondary school' in Kosovo, attended by 15 to 18 years old, 46.1 per cent are girls (UNICEF, 2013).

Graph 1 about here

Whilst the ratio of older people in the household (above 65 years of age) does not affect either the propensity to migrate or the length of migration, the ratio of children and young adults (up to 15 years of age) reduces the length of migration. For the full sample, it affects negatively the length of migration, and this holds for both male and female sub-samples at the 10 per cent level of significance. For men, having children also negatively affects the likelihood of migration, which mirrors results for Turkish *gastarbeiter* in Germany (Constant & Massey, 2002). It is also consistent with evidence for China, where migration becomes less likely as the number of pre-school children rises (Li & Zahniser, 2002)

The likelihood of an individual migrating falls as gross income per household member rises but only up a certain point, after which rises in household income per capita positively affect the likelihood of migration (Graph 2). This suggests that migration may be motivated by desperation in the case of the poorest households and by greater opportunities for the wealthiest households, with those in the middle least inclined to migrate. On average, the tipping point in the model is around €3000 per capita per year *ceteris paribus*. For men this point is around €2600 to €2700 per capita per year with the equivalent figure for women of around €2500 to €2600 per capita.

When other factors are controlled for, women are significantly less likely to migrate than men.

Graph 2 about here

The propensity to be a migrant in 2012 was positively related to whether any other member of the household was a migrant in 2008 and the level of migration in the household's locality (municipality) in 2008, but not, surprisingly, to whether the individual was a migrant in 2008. This pattern also holds for the length of migration in the previous year. The level of migration in the household's municipality is a significant determinant for both male and female migration. Overall, the analysis underlines the importance of a household perspective for understanding migration, rather than focusing merely on individuals in isolation. It supports expectations based on the NELM about the role of migration networks (Davis, et al., 2002; McKenzie & Rapoport, 2007). The findings also support previous research on Kosovo, that the diaspora, enlarged by conflict and war, retain strong links with family members and local communities (Möllers, et al., 2017; Möllers, et al., 2013), which facilitates further migration.

Most independent variables have a similar effect on the propensity of men and women to migrate, apart from education. The level of education achieved has a strong, negative effect on male migration but displays a positive sign for women. This holds for both the likelihood and length of migration in the previous year. This may reflect gender differences in the labor markets for migrants. Male migration is biased toward construction and physical work, while the public sector and office work is far more

common for women and requires a higher level of education (Gashi & Haxhikadrija, 2012). The size of the farm negatively influences the likelihood of migration in the case of men, but has no influence in the case of women. This again reflects labor market differences – men are more likely to be required to work on the labor-intensive family farm than women.

Two variables, gross household income relative to the mean for the region and hectares of land per household member relative to the mean for the region, capture the effect of relative deprivation on migration. There is no strong support for the importance of either measure as a determinant of migration. Across the four models, these two variables are not significant, in any cases, at the 5 per cent level.

Empirical results support the notion that an inability to cultivate a household's farmland may stimulate migration. Land left fallow because of a farm household's lack of inputs, manpower, equipment and poor economic profitability positively affect the propensity to migrate (Table 3). This echoes research for China, where poor farm profitability motivates out-migration (Li & Zahniser, 2002). However, land left fallow because of a lack of security negatively affects the likelihood of migration. This may reflect a belief that family members are required to stay on farm to ensure the security of property and other assets. While insecurity is thus often regarded as a 'push' factor (Huysmans, 2006), remaining on farm to preserve assets and protect other family members may inhibit migration, particularly whilst the memories of the armed conflicts, in which people lost their houses and land, are still fresh.

Conclusions

This paper investigates the determinants of rural out-migration in Kosovo during the post-conflict era. To measure the determinants of rural out-migration, the analysis employed data from an agricultural household survey conducted at two points in time (2008 and 2012). Although the dependent variables were the propensity to migrate in 2012, and for migrants, the length of migration in the previous year, several variables relating to 2008 reveal how past developments affected migration subsequently.

The results support some of the key tenets of the NELM. Estimations underline the importance of taking a household perspective in studying migration. For instance, having another household member as a migrant in 2008 had a positive effect on both propensity to migrate and the length of migration of other household members in 2012. The study also reveals the importance of networks and social capital as pull factors. However, whilst the NELM hypothesizes a positive relationship between the propensity to migrate and relative deprivation in the origin community (Stark, 1991; Stark & Bloom, 1985), this study finds no supporting evidence, when measured in terms of both household and per capita incomes and farm size compared to regional means. In absolute terms, incomes have a non-linear effect on migration. Individuals from poorer and richer households have a higher propensity to migrate – at one end of the scale pushed by poverty, and at the other end pulled by opportunities to achieve better returns in more developed labor markets.

Differences in the determinants of migration between men and women are, overall, fairly minor. One notable exception is the role of education. Whilst better educated men are less likely to migrate or stay longer away from the household, better

educated women are significantly more likely to migrate and migrate for longer. This reflects gender divisions in the nature of labor market opportunities.

An important policy message of this study is that the main push factors for rural out-migration linked to farmland being left fallow are primarily economic. In the model that includes the reasons to leave land fallow, the variables that increase the propensity to migrate are a lack of inputs, manpower and equipment, and the lack of farm profitability. In contrast, insecurity leads to individuals staying on the farm. The intuition behind this result is that some people do not move off their farms in order to protect their families, houses and land. Given the relationships between the reasons for why land is left fallow and migration, the results suggest that policies seeking to decrease rural out-migration should focus on stimulating competitive input markets and devising strategies to improve farm profitability.

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Table 1: Variables from the Farm Survey Selected / Computed for the Empirical Analysis

Dependent variable	Notes / *a priori* expectation	Link with theory
Whether individual *i* is a migrant in 2012 (first stage). Number of months migrant absent from household in the previous year (second stage)	Heckmann	
Independent variables		
Household / personal characteristics		
Age of household member *i*	Negative	Young person has more years over which to recover the cost and receive the gains of migration
Age squared of household member *i*	Non-linear	Very young and very old may not migrate – non-linear
Gender	Lower for females	Females more tied to household for cultural reasons
Level of education of household member *i*	Positive	Education (human capital) increase potential returns from migration
Farm characteristics		
Total gross farm income per capita in 2008	Conflicting theory	Lower incomes per household member increase incentives to migrate but low incomes may act as a barrier to financing migration (wealth effect)
Farm income per capita squared in 2008	Non-linear	Migration rates should first increase and then decrease with wealth
Farm size (ha farmed in 2008)	Negative	Migration means to overcome credit and liquidity constraints which will be less pressing where have higher agricultural asset base
Total resale value of agricultural machinery in 2008 (euros)	Negative	As above
Network effects		
If member *i* was a migrant in 2008	Positive	Migration network effect
If any other member of household migrated in 2008	Positive	As above
Level of migration in municipality	Positive	As above
Relative deprivation		
Total gross income of household in 2008 relative to mean for region	Relatively deprived more likely to migrate	Households send workers abroad not only to improve income in absolute terms, but also to increase income relative to other households, reducing their relative deprivation compared with some reference group
Total farmed area (ha) per capita relative to regional mean (income figures may be unreliable)	Relatively deprived more likely to migrate	As above
Total farmed area (ha) per capita relative to regional mean (income figures may be unreliable)	Relatively deprived more likely to migrate	As above

Table 2: Descriptive Statistics of Variables[1]

Variable	No of observations	Mean	St Dev	Min	Max
Household / individual effects					
Household member number of months away in previous year	14570	0.800	2.972	0	12
Age_{12}	14570	31.409	20.530	0	99
Age^2_{12}	14570	1407.988	1599.184	0	9801
Gender (1 male, 2 female)$_{12}$	14567	1.464	0.499	1	2
Education$_{12}$[2]	14567	3.666	2.059	1	9
Gross income per capita$_{12}$	13808	173.834	476.252	0	8378
Gross income per capita^2	13808	257018.100	2533771.000	0	70200000
Ratio of household members up to 15 years old$_{12}$	15481	0.240	0.228	0	0.9
Ratio of household members over 65$_{12}$	15481	0.081	0.167	0	1
Hectares (ha) farmed$_{08}$	14570	3.882	6.629	0.04	125
Network effects					
Migrant in$_{08}$	14570	0.085	0.279	0	1
Other household member migrant$_{08}$	14570	0.304	0.460	0	1
Average migration level per household in municipality$_{08}$	14570	2.835	4.111	0.05	15
Relative deprivation					
Relative gross income per capita$_{08}$	13808	173.834	476.252	0	8378
Relative ha per household member$_{08}$	14570	0.918	1.121	0.01	16
Reasons to leave land fallow					
Lack of inputs$_{08}$	15481	0.073	0.261	0	1
Lack of manpower$_{08}$	15481	0.024	0.155	0	1
Lack of equipment$_{08}$	15481	0.013	0.114	0	1
Low economic profitability$_{08}$	15481	0.069	0.254	0	1
Lack of security$_{08}$	15481	0.004	0.065	0	1

[1] Subscripts 08 and 12 refer to years 2008 and 2012respectively.

[2] The nine categories of education are 1 No education; 2 Some primary school; 3 Primary school completed; 4 Some secondary school; 5 Secondary school completed; 6 Some high school; 7 High school completed; 8 Some University study; 9 University completed.

Table 3: Heckman Selection Model for All Observations[12]

Variable	Reasons for leaving land fallow not included				Reasons for leaving land fallow included			
			Marginal effects				Marginal effects	
	Outcome (1)	Selection (2)	Outcome (3)	Selection (4)	Outcome (1)	Selection (2)	Outcome (3)	Selection (4)
Age_{12}	0.177 [0.0302]***	0.022 [0.0047]***	0.035 [0.0086]***	0.003 [0.0006]***	0.192 [0.0274]***	0.023 [0.0047]***	0.034 [0.0081]***	0.003 [0.0006]***
Age^2_{12}	-0.003 [0.0005]***	-0.000 [0.0001]***	-0.001 [0.0001]***	-0.000 [0.0000]***	-0.004 [0.0004]***	-0.000 [0.0001]***	-0.001 [0.0002]***	-0.000 [0.0000]***
$Gender_{12}$	-0.915 [0.2532]***	-0.168 [0.0342]***	-0.182 [0.0346]***	-0.022 [0.0044]***	-0.359 [0.2463]	-0.170 [0.0351]***	-0.063 [0.0557]	-0.022 [0.0045]***
$Education_{12}$	-0.150 [0.0794]*	-0.028 [0.0103]***	-0.029 [0.0149]**	-0.004 [0.0013***]	-0.112 [0.0759]	-0.030 [0.0108]***	-0.019 [0.0157]	-0.004 [0.0014]**
Gross income per $capita_{08}$	-0.002 [0.0007]**	-0.000 [0.0001]***	-0.000 [0.0001]**	-0.000 [0.0000]***	-0.002 [0.0008]***	-0.000 [0.0001]*	-0.000 [0.0002]**	-0.000 [0.0000]*
Gross income per $capita^2_{08}$	0.000 [0.0000]**	0.000 [0.0000]***	0.000 [0.0000]**	0.000 [0.0000]***	0.000 [0.0000]**	0.000 [0.0000]***	0.000 [0.0000]*	0.000 [0.0000]***
Ratio of household members up to 15 $years\ old_{12}$	-1.552 [0.6501]**	-0.108 [0.0770]	-0.309 [0.1097]***	-0.014 [0.0099]	-0.897 [0.7283]	-0.149 [0.0723]**	-0.159 [0.1541]	-0.018 [0.0095]**
Ratio of household members over 65_{12}	-1.625 [1.2519]	0.118 [0.1125]	-0.324 [0.2461]	0.015 [0.0145]	-0.457 [1.3306]	0.155 [0.1085]	-0.081 [0.2378]	0.020 [0.0144]
Hectares (ha) $farmed_{08}$		-0.009 [0.0053]*		-0.001 [0.0007]*		-0.009 [0.0059]		-0.001 [0.0007]
$Migrant\ in_{08}$	-0.1177 [0.3856]	-0.011 [0.0621]	-0.023 [0.0769]	-0.001 [0.0080]	0.238 [0.3855]	-0.032 [0.0663]	0.042 [0.0681]	-0.004 [0.0084]
Other household $member\ migrant_{08}$	0.4774 [0.2589]*	0.074 [0.0406]*	0.095 [0.0533]*	0.010 [0.0052]*	0.371 [0.2486]*	0.079 [0.0436]*	0.066 [0.0468]	0.009 [0.0055]*

Average migration level per household in municipality$_{08}$	0.233 [0.0231]***	0.040 [0.0035]***	0.046 [0.0065]***	0.005 [0.0005]***	0.246 [0.0224]***	0.039 [0.0034]***	0.044 [0.0133]***	0.005 [0.0004]***
Relative gross income per capita$_{08}$	0.109 [0.1991]	0.038 [0.0220]*	0.022 [0.0397]	0.005 [0.0028]*	0.353 [0.2233]*	0.021 [0.0215]	0.062 [0.0445]	0.003 [0.0027]
Relative ha per household member$_{08}$	-0.061 [0.1899]	-0.012 [0.0260]	-0.012 [0.0375]	-0.002 [0.0033]	-0.183 [0.1927]	-0.022 [0.0293]	-0.032 [0.0368]	-0.003 [0.0036]
Fallow due to lack of inputs$_{08}$						0.462 [0.0618]***		0.058 [0.0078]***
Fallow due to lack of manpower$_{08}$						0.651 [0.1014]***		0.083 [0.0130]***
Fallow due to lack of equipment$_{08}$						0.369 [0.1618]***		0.047 [0.0204]**
Fallow due to unprofitability$_{08}$						0.205 [0.0673]***		0.026 [0.0086]***
Fallow due to insecurity$_{08}$						-4.828 [0.0879]***		-0.614 [0.0204]***
Mill's Ratio		6.1467 [0.3036]***				5.3763 [0.3151]***		
Rho		1.000				1.000		
Sigma		6.1467				5.3763		
Constant		-1.360 [0.0851]***				-1.408 [0.0935]***		
Observations		13805				13805		

[1] Subscripts 08 and 12 refer to 2008 and 2012.

[2] Standard errors in brackets.

Table 4: Heckman Selection Model according to Gender

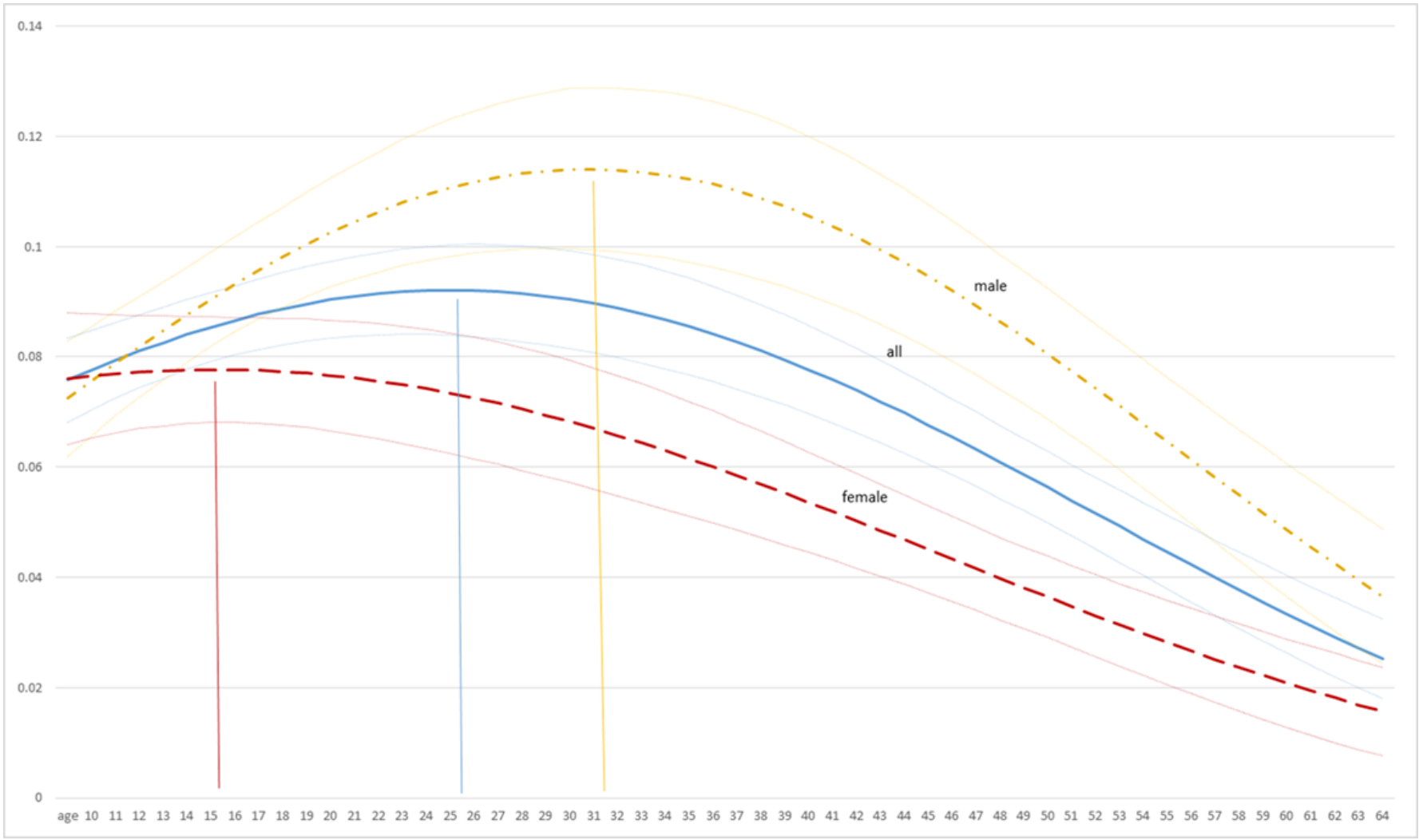
Variable	Male only				Female only			
			Marginal effects				Marginal effects	
	Outcome (1)	Selection (2)	Outcome (3)	Selection (4)	Outcome (1)	Selection (2)	Outcome (3)	Selection
Age_{12}	0.253 [0.0369]***	0.035 [0.0067]***	0.042 [0.0091]***	0.005 [0.0010]***	0.050 [0.0423]	0.010 [0.0068]	0.011 [0.0099]	0.001 [0.0007]
Age^2_{12}	-0.004 [0.0006]***	-0.001 [0.0001]***	-0.001 [0.0001]***	-0.000 [0.0000]***	-0.001 [0.0007]**	-0.000 [0.0001]***	-0.000 [0.0002]**	-0.000 [0.0000]***
$Education_{12}$	-0.404 [0.116]***	-0.082 [0.0145]***	-0.067 [0.0282]***	-0.012 [0.0021]***	0.167 [0.099]*	0.030 [0.0153]**	0.036 [0.0219]*	0.003 [0.0017]*
Gross income per $capita_{08}$	-0.001 [0.0009]	-0.000 [0.0001]	-0.000 [0.0002]	-0.000 [0.0000]	-0.003 [0.0015]*	-0.000 [0.0001]**	-0.001 [0.0002]**	-0.000 [0.0000]**
Gross income per $capita^2_{08}$	0.000 [0.000]	0.000 [0.0000]**	0.000 [0.0000]	0.000 [0.0000]**	0.000 [0.0000]*	0.000 [0.0000]*	0.000 [0.0000]*	0.000 [0.0000]*
Ratio of household members up to 15 $years\ old_{12}$	-1.285 [0.6863]*	-0.206 [0.1008]**	-0.212 [0.1501]	-0.029 [0.0143]**	-2.140 [1.318]*	0.005 [0.1102]	-0.459 [0.2408]**	0.001 [0.0122]
Ratio of household $members\ over\ 65_{12}$	-0.9733 [1.3804]	0.026 [0.1511]	-0.161 [0.2364]	0.004 [0.0215]	-3.369 [2.399]	0.248 [0.1670]	-0.723 [0.5048]	0.027 [0.0185]
Hectares (ha) $farmed_{08}$		-0.015 [0.0087]*		-0.002 [0.0012]*		-0.004 [0.0071]		-0.000 [0.0008]
$Migrant\ in_{08}$	-0.263 [0.4871]	-0.030 [0.0831]	-0.043 [0.0812]	-0.004 [0.0121]	0.134 [0.5761]	0.020 [0.1019]	0.029 [0.1237]	0.002 [0.0113]
Other household $member\ migrant_{08}$	0.431 [0.2971]	0.049 [0.0552]	0.071 [0.0508]	0.007 [0.0081]	0.459 [0.4201]	0.122 [0.0621]**	0.0987 [0.0916]	0.013 [0.0070]*
Average migration level per household in $municipality_{08}$	0.213 [0.0257]***	0.042 [0.0045]***	0.035 [0.0105]***	0.006 [0.0006]***	0.204 [0.0374]***	0.037 [0.0055]***	0.044 [0.0074]***	0.004 [0.0006]***

Relative gross income per capita$_{08}$	-0.164 [0.2281]	0.000 [0.0324]	-0.027 [0.0369]	0.000 [0.0047]	0.357 [0.4296]	0.064 [0.0328]*	0.077 [0.0919]	0.007 [0.0036]*
Relative ha per household member$_{08}$	0.129 [0.2087]	0.040 [0.0368]	0.021 [0.0333]	0.006 [0.0053]	-0.249 [0.3433]	-0.067 [0.0489]	-0.053 [0.0719]	-0.007 [0.0053]
Mill's Ratio		5.4599				5.7226		
Rho		1.0000				1.0000		
Sigma		5.4598				5.7226		
Constant		-1.5136 [0.0967]***				-1.720 [0.1152]***		
Observations		7388				6417		

[1] Subscripts 08 and 12 refer to 2008 and 2012.

[2] Standard errors in brackets

Graph 1: Marginal Probabilities and 95% Confidence Intervals for Migration by Age



Graph 2: Marginal Probabilities and 95% Confidence Intervals for Migration by Income