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## Remittances and chain migration: longitudinal evidence from Bosnia and Herzegovina

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IZA DP No. 4083

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# Remittances and Chain Migration: Longitudinal Evidence from Bosnia and Herzegovina

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## **ABSTRACT**

### **Remittances and Chain Migration: Longitudinal Evidence from Bosnia and Herzegovina**

Most of the literature on remittances has focused on their implications for the welfare of family members in the country of origin and has disregarded the possibility for remittances to trigger chain migration. In this paper, we address this issue with the use of longitudinal data from Bosnia and Herzegovina, one of the primary exporters of migrants and recipients of remittances in the world. Our panel data estimates indicate that remittances have a significant positive impact on the migration prospects of those remaining in the country of origin. Highly educated, healthy and young individuals are those most likely to migrate, suggesting that the implications of prospective migration on both the labor market and the rest of the economy in the origin country are likely to be negative.

JEL Classification: J61, 015

Keywords: emigration intentions, Bosnia and Herzegovina, remittances

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## **1/Introduction**

Over the past several decades, and especially in the aftermath of intensified “brain drain” in the context of globalization and growing agglomeration of human capital, there has been a heated debate over the costs and benefits of migration and the related flow of remittances to the migrants’ countries of origin. On the negative side, researchers have considered the possibility that migration would reduce the rural productivity of labor-constrained households and communities (Lucas, 1987; Rozelle et alii, 1999), leave children unprotected and hence decrease the investment in human capital (Hanson and Woodruff, 2002; Cox Edwards and Ureta, 2003), increase the level of inequality in the region or country of origin (Stark et alii, 1986; Milanovic, 1987; Adams, 1989; Taylor, 1992; Taylor and Wyatt, 1996; McKenzie and Rapoport, 2004), and induce moral hazard problems and inactivity among recipients of remittances (Azam and Gubert, 2006).

These concerns were typically overshadowed by evidence on the positive implications of migration and remittances. Specifically, it has been found that migration and remittances tend to increase the investment in human and physical capital (Hanson and Woodruff, 2002; Cox Edwards and Ureta, 2003; Hildebrand and McKenzie, 2003; Mesnard, 2004), reduce the level of poverty and have negative or insignificant impact on inequality in the region or country of origin (Adams, 1992; Taylor and Wyatt, 1996). Furthermore, much of the recent literature has emphasized the “brain gain” potential of the “brain drain”, mostly as a result of a positive and significant impact of migration prospects on human capital formation in developing countries (Beine et alii, 2001; 2008).

An important link that has remained largely unexplored is the possibility for migration and remittances to trigger chain migration. Indeed, most of the literature on remittances has focused on their implications for the welfare of those left behind and has addressed only in passing the use of remittances as sponsorship for future migrants. However, if remittances are mostly channeled to sponsor prospective migrants and skills are primarily acquired to fuel further migration, the logic behind the brain gain potential of the brain drain would be seriously undermined.

A few theoretical studies provide an interesting context for the study of remittances as not only a result, but also a cause for migration. Stark (1995) suggests that remittances may be part of strategic interaction aiming at positive selection among migrants. If migrants are heterogeneous and their productivity is imperfectly observable in the host market, employers may apply statistical discrimination and pay them the average of the minority community to

which they belong. Skilled migrants would then have an incentive to “bribe” unskilled migrants to stay behind. If, however, one assumes that employers in the destination country distinguish between the skills of migrants, the opposite proposition would hold. Skilled and entrepreneurial migrants would have an incentive to pay less skilled migrants to follow in their footsteps in order to dilute the pool of migrant workers (Stark and Wang, 2002).

A positive link between remittances and subsequent migration would be equally easy to justify in the context of a loan repayment model. When a potential migrant turns to the extended family for help to cover the costs of migration, it may be of mutual benefit for both parties to allow for an implicit part of the repayment contract to include helping members of the extended family to migrate in the future (Ilahi and Jafarey, 1999). As a result of such help, the migration costs for subsequent migrants would fall, thus triggering chain migration.

While it is easy to conceptualize remittances as a stimulant for chain migration, little attempt has been made to test empirically the positive (and causal) impact of remittances on migration. To the best of our knowledge, only van Dalen et alii (2005a) have explicitly addressed this issue with the use of data from Egypt, Morocco and Turkey. The authors find that recipients of remittances are more likely to consider migrating than non-recipients. Interestingly, the mechanism behind this link differs across the countries. While in Egypt and Turkey the intention to migrate seems to be primarily driven by family ties, for Morocco, the receipt of remittances seems to also have a signaling effect of a positive chance of success in the destination country.

This study has several shortcomings. To begin with, there are data limitations, for instance, the fact that the samples are quite small<sup>1</sup>. As a result, unlike for instance van Dalen et alii (2005b), the authors are not able to consider the impact of the variables of interest on more detailed indicators of migration or migratory intentions than a simple answer to a question on whether the reference individual wants to migrate to a foreign country. Furthermore, Van Dalen et alii (2005a) find a positive correlation between the receipt of remittances and emigration intentions of household members living in Morocco, but this does not imply that remittances have a causal impact on the emigration intentions. There is a high probability that these findings may have been tarnished by problems such as endogeneity and unobserved heterogeneity. In sum, further enquiries into the link between remittances and migration are certainly worthwhile.

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<sup>1</sup> The Egyptian sample includes 1180 observations, the Moroccan sample includes 615 observations and the Turkish sample includes 665 observations (see van Dalen et alii, 2005a).

We attempt to fill the gap in the literature by addressing the possibility of a trigger effect of remittances on migration with the use of panel data from Bosnia and Herzegovina. The questionnaires include detailed information on both the probability of respondents to migrate to a foreign country in the forthcoming twelve months and on the receipt of remittances during the preceding twelve months. To avoid econometric biases when assessing the probability of individuals to migrate, we first use a propensity score estimator to account for the possibility of selection bias, based on observable characteristics. We then correct for unobserved heterogeneity by estimating random and fixed effect models.

The focus on South-East Europe, and in particular Bosnia and Herzegovina, as a context of this study is especially relevant. According to OECD statistics, the countries of former Yugoslavia represent the second largest non-OECD emigrant community in the OECD with a total of 2.2 million emigrants, after the former USSR with a total of 4.2 million emigrants (OECD, 2008). This places them ahead of as large emigrant exporting countries as India (1.9 million emigrants) and China (1.7 million emigrants). In just 5 years after 1989, Bosnia and Herzegovina (BiH) alone exported 650,000 individuals, which led to a decrease of its population by 14.7%. The percentage of emigrants with tertiary education from BiH is approximately 28.6%, which is not as high as that of other major exporters of skilled labor.

However, even if the brain drain quality of the emigrant flow is to be ignored, the sheer labor force shrinking effect of as high an emigrant flow as 37.7% of the population is likely to be substantial. Aside from being one of the most substantial exporters of emigrants to the OECD, BiH represents the second largest recipient of remittances in East Europe after Moldova, the remittance share of GDP being equal to 19.7% (World Bank, 2008). In view of the significant flow of out-migrants from the country, exploring the link between the receipt of remittances and the possible trigger of further migration seems especially pertinent<sup>2</sup>.

The rest of the study is organized as follows. In Section 2, we present the data and describe the main variables used in our analysis. Section 3 outlines our empirical strategy and we also discuss our empirical results. Finally, Section 4 concludes.

## **2/ Description of the data**

### *2.1. The BIH panel survey*

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<sup>2</sup> We are not aware of rigorous research on the uses of remittances in Bosnia-Herzegovina.

Our empirical analysis is based on longitudinal data collected by the World Bank in Bosnia and Herzegovina between 2001 and 2004. These data are part of the Living Standards Measurement Study (LSMS) household surveys, which are an important tool for the measurement and understanding of poverty in developing countries. The three statistical organizations in the country, i.e. the State Agency for Statistics for BiH, the RS Institute of Statistics and the FBiH Institute of Statistics, began to work on the design of the LSMS questionnaire in 1999. The purpose of the survey was to collect data on the living standards of the population and provide indicators needed for social and economic policy formulation.

The first wave of the LSMS survey was carried out in the fall of 2001 by these three statistical organizations, with support from the Department for International Development of the British Government, the United Nations Development Program, the Japanese Government, and the World Bank. A sample of 5402 households was considered adequate for the needs of the survey. It includes about 2,400 households in the Republika Srpska and 3,000 households in the Federation of BiH<sup>3</sup>. The panel survey sample covering the 2001-2004 period is (understandably) smaller. It consists of more than 3000 households drawn from the 2001 sample and re-interviewed in 2002, 2003 and 2004<sup>4</sup>.

The LSMS in Bosnia-Herzegovina is a multi-topic household survey covering a wide range of topics that are related to welfare. It includes the demographic composition of the household and detailed information on housing, education, health, labor, migration, credit, consumption, agricultural and non-agricultural activities. Interestingly, the BiH survey also includes questions on the probability to migrate and on private transfers from both family members abroad and from family members living in BiH. In what follows, we restrict our attention to the 2002-2004 period as there is no information on private transfers (either from abroad or from family members living in Bosnia-Herzegovina) in the 2001 survey.

The key variables for our study are remittances and the probability to emigrate. The BiH data set includes the following question on the receipt of remittances by the reference household during the preceding year: "In the last 12 months, have you received any money, gifts or services in kind from friends or family working abroad?". For households who give a

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<sup>3</sup> The master sample is based on a selection of 146 municipalities, which were grouped into three strata, urban, rural and mixed. Urban municipalities are those where 65 percent or more of the households are considered to be urban, and rural municipalities are those where the proportion of urban households is below 35 percent.

<sup>4</sup> To be exact, the samples provided by the World Bank include 3003 households in 2001, 3086 in 2002, 3077 in 2003 and 2837 in 2004. For further information on the data, see [www.worldbank.org](http://www.worldbank.org). These data are publicly available.

positive answer to this question, we also know the total amount of the transfer. Given that high quality information on actual migration is not available, we rely on information on intentions to emigrate. Specifically, the probability to migrate is measured with the use of the following indicators.

The first indicator captures the desire of the respondent to migrate as an answer to the question: “If you could choose, would you stay here in your present place of residence or would you prefer to move somewhere else?”. For respondents indicating that they would like to move, there is a second question: “Where would you like to move to: within the same municipality, another municipality, abroad, other?”. We construct a dummy variable which is equal to one when the respondent has expressed a desire to emigrate to a foreign country. Our second variable highlights the probability to migrate, as an answer to the question: “How likely do you think it is that you will move in the coming year: very likely, quite likely, not very likely, not likely at all?”. Our indicator of probability to emigrate is equal to one if either of the first three situations hold, and to zero when migrating to a foreign country is not likely at all<sup>5</sup>.

The use of data on migratory intentions as a proxy for probability to migrate has now become popular in the literature (Dustmann, 2003; van Dalen et alii, 2005a, 2005b; van Dalen and Henkens, 2008). The justification of this choice of proxy is based on the theory of reasoned action of social psychologists, which looks at a person’s intention to undertake certain actions as a function of his or her beliefs about the consequences of his or her actions (Ajzen, 1985; Manski, 1990). Its plausibility has been confirmed by numerous studies on internal migration, which have found that the intention to migrate was a powerful predictor of the actual realization of the decision to emigrate permanently (see van Dalen et alii, 2005b).

Nevertheless, it could be argued that the realization of the decision to migrate to a foreign country may be more problematic due to higher incidence of legal or financial hurdles (Gardner et alii, 1986). While an intention to emigrate without any indication of the timing and the strength of the motivation is certainly less informative, we are convinced that an indication of high probability that the respondent will migrate in the next 12 months is much more plausible. Indeed, there is empirical evidence that positive answers to questions aimed at

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<sup>5</sup> Note that van Dalen et alii (2005a) use the first of these indicators, which is perhaps more tentative than the second. We have also constructed an ordered indicator ranging from 1 (migration in the coming year not likely at all) to 4 (migration very likely) to assess the robustness of our findings. The results are very similar to the ones that we obtain with the use of our second indicator.

a more definite assessment of the probability to migrate in the very near future, as opposed to a mere statement of desire to migrate, turn out to be good proxies of the actual probability to migrate (Dustmann, 2003; van Dalen et alii, 2005b; van Dalen and Henkens, 2008).

To properly explain the decision to migrate, we account for basic individual characteristics like gender, age, marital status, number of persons in the household, education, health, employment status, financial situation, wealth, number of rooms in the dwelling and living area (rural, mixed, urban). We obtain our final sample by constructing a longitudinal data set where each individual in the household is counted as one observation. Individuals of only ages 15 to 45 are kept, since these individuals are more likely to migrate. After deleting the few observations with missing variables, we are left with a sample of 10127 observations corresponding to more than 3000 individuals<sup>6</sup>.

## *2.2. Descriptive statistics*

Our data indicate that 30.2% of the respondents would like to migrate to a foreign country, which is quite substantial. However, some of the stated desire to migrate may be very weak and the realization of some of these intentions may be very unlikely due to financial and other constraints. Among those who have stated that they want to migrate to a foreign country, 69.2% indicate that emigration in the coming year is not likely at all. Hence, the proportion of respondents who consider migration in the coming year possible amounts to 9.3%. The percentage is slightly higher for those living in a rural area (9.8%).

The results highlighted in Figure 1 indicate that the intention to emigrate is strongly correlated with the receipt of remittances. Respondents who have received transfers from abroad are much more likely to want to migrate to a foreign country than non-recipients, 37.6% against 29.5%. The difference between recipients and non-recipients is much higher when we consider the possibility of migrating to a foreign country in the coming year, 18.9% against 8.4%. Although preliminary, these descriptive statistics suggest that remittances may indeed have a positive influence on the probability to migrate. We note that the probability of recipients to migrate is higher than that of non-recipients if they live in a rural area.

*Insert Figure 1 here*

Table 1 highlights some characteristics of the individuals in the sample by desire to migrate to a foreign country, probability to migrate in the coming year and receipt of

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<sup>6</sup> We consider an unbalanced panel with 3551 observations in wave 2, 3444 in wave 3 and 3132 in wave 4. Recall that there are no observations from wave 1 since there is no information on remittances in 2001.

remittances. When we compare the characteristics of people who either intend to migrate or face a high probability of migrating to a foreign country with those who are quite unlikely to migrate, we see that unemployment is a strong push factor for migration. Similarly, those who show interest in migrating to a foreign country are less likely to have a job (34.6% against 44.9%). The pattern is similar if the propensity to migrate is captured by an indicator of the likelihood to migrate in the coming year (33.9% instead of 42.6%).

We also find that the proportions of people in the different education categories are very comparable among those who are more likely to migrate and those who are less likely to migrate. Furthermore, as expected, healthier people face a higher probability of migrating, and the same is true for younger and single individuals.

*Insert Table 1 here*

People in the lowest income categories are more likely to express a desire to migrate, but people in the intermediate income categories face a higher probability of migrating. The emigration probability is also strongly affected by the wealth index, which captures a more stable or long-term financial status of the household than the current income variable. The wealth indicator is a linear index of asset ownership, constructed with the use of the principal-component analysis suggested by Filmer and Pritchett (2001). The average value of the wealth index is 0.337 for people who report a definite probability of migrating in the coming year, compared to an average index value of 0.216 for people who evaluate their migration chances as very low. At the same time, the average index value is 0.051 for people who would just want to migrate to a foreign country, against 0.304 for those who have answered in the negative when asked whether they wish to migrate to a foreign country.

There is a high probability that this pattern is driven by the receipt of remittances. On the one hand, poor individuals may think that their financial situation would be improved if they emigrate, but migration is very unlikely due to high migration costs or absence of adequate skills. On the other hand, those who indicate that the probability of migrating in the near future is very high may have family members abroad who send them remittances, and in fact, the wealth index of these people may be higher as a result of the remittances received.

As there may be a strong causal link between remittances and the realization of the desire to migrate by way of releasing the financial constraint to migration, it would be instructive to have a look at the characteristics of people receiving remittances. The results highlighted in Table 1 indicate that in general people who live fairly comfortably are less likely to receive remittances than people who have financial difficulties. The same is true for

unemployed and sick people. These observations are consistent with the altruistic motive for transfers, whereby people in greater need are more likely to receive remittances than people who are relatively better off<sup>7</sup>. At the same time, the wealth index is higher among people receiving remittances than people not receiving remittances, but this is probably on account of increased wealth accumulation through remittances. Finally, we observe that less educated people are slightly more likely to receive remittances than more educated people<sup>8</sup>.

In sum, we see that while poverty and unemployment are strong push factors for migration, the likelihood to migrate appears to be positively correlated with the financial ability to cover the migration costs. From our descriptive results, it is difficult to find out whether any specific theory on the motivation for sending remittances holds, given that we do not have information on the characteristics of the migrants. However, this is anyway not the purpose of our paper whose aim is to find out whether remittances, irrespective of their driving motivation, have a positive impact on the development of chain migration. We do find some indication that remittances may be releasing the financial constraint of potential migrants and thus facilitating the realization of their desire to migrate. In what follows, we shall explore this relationship in a more rigorous way.

### 3. Econometric results

#### 3.1. Empirical strategy

Let us suppose that there exists a latent variable  $I_{it}^*$  that represents the desire or likelihood of a person  $i$  to emigrate at date  $t$ . By definition, the latent variable is unobserved, but we have information on the self-reported intention denoted by  $I_{it}$  such that  $I_{it} = 1$  when  $I_{it}^* > 0$ , and  $I_{it} = 0$  otherwise. The latent variable  $I_{it}^*$  can be modeled in the following linear way:

$$I_{it} = Z_{it}\beta + \delta R_{it} + \varepsilon_{it} \quad (1)$$

where  $Z_{it}$  is a set of individual characteristics (not including remittances) which influence the emigration intention,  $\beta$  is the associated vector of parameters,  $R_{it}$  indicates the receipt of

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<sup>7</sup> For a survey on the different motives for remittances, see Rapoport and Docquier (2006).

<sup>8</sup> This observation is difficult to pin down to any specific known theory on remittances. It is consistent with the altruistic motive in that people with lower levels of education are also financially more vulnerable. It is equally easy to interpret with reference to the strategic motive, in that more educated migrants may prefer to bribe their less educated relatives to stay behind (Stark, 1995).

remittances,  $\delta$  is our parameter of interest (i.e. the effect of remittances on emigration intention) and  $\varepsilon_{it}$  is a residual. Our null hypothesis is that the sign of  $\delta$  is positive. Under the assumption that  $R_{it}$  is exogenous, a Probit model would give us an unbiased estimate of  $\delta$ .

Whether the exogeneity assumption is plausible in our context is an important issue that one needs to take into account. There are two important potential causes of endogeneity bias<sup>9</sup>. To begin with, there is the issue of unobserved heterogeneity, i.e. the possibility that the same unobserved factors affect both the transfer receipt and the intention to emigrate. Let us consider for instance the case of a poor country, subject to frequent economic crises and conflicts, whose inhabitants are trying to leave. There is a high probability that a poor financial status of family members left behind increases their desire to migrate and at the same time increases their probability of receiving remittances. Unless we have perfect controls for the household's financial situation (which is always difficult, if not impossible), we would get biased estimates of the effect of the transfer on the emigration intentions of household members left behind.

Secondly, there is the issue of simultaneity. Given that we use the intention to migrate as a dependent variable, simultaneity would be less of a problem than if we used instead an actual (contemporaneous) measure of migration. But even if we consider the impact of remittances on the desire or likelihood to migrate, we cannot completely rule simultaneity out. Consider for instance a household, consisting of two members: a person who has already migrated and his/her spouse or child who is still in the country of origin. There is a high probability that the person who is still in the country of origin wants to migrate and join the migrant and therefore the observed receipt of remittances could be conditional on that desire to reunite.

Hence, there is a high chance that remittances are allocated to a non-random sample of people according to their intention to migrate, and we need to take this possibility of selection into account in our empirical analysis. The ideal way to address both the unobserved heterogeneity and simultaneity issues simultaneously would be to use an instrumental variable approach. This means that we need at least one variable influencing the decision of migrants to send back money to their origin country, but having no direct effect on the intention to emigrate. However, it is virtually impossible to find such an instrument, especially in a data

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<sup>9</sup> We do not explicitly consider for instance the possibility of a measurement error in the recording of remittances as there is little one could do about it and any study in this area would potentially be fraught with this problem.

set like ours, which does not have information on the characteristics of the people that have already migrated. We therefore proceed in the following two distinct ways.

As the receipt of remittances can be seen as a treatment (recipients are the treated group, non-recipients form the control group), we first use a propensity score matching estimator, to reduce the endogeneity bias (Becker and Ichino, 2002)<sup>10</sup>. The comparison of outcomes between recipients and non-recipients is performed using treated and control individuals who are as similar as possible, thus avoiding the possibility that the effect of the treatment depends on systematic differences between the groups. Only when these systematic differences are ruled out, we can interpret the differences in outcomes between the two groups as a “causal” impact of the treatment.

Interestingly, the matching estimator is not biased only when exposure to treatment can be considered as purely random among respondents characterized by the same value of the propensity score (i.e. the pre-treatment characteristics of each respondent, summarized in a single-index variable). Nevertheless, the propensity score analysis does not eliminate the bias generated by unobservable factors. Since we have repeated information on respondents over time, as a second step in our analysis, we therefore control for unobserved heterogeneity with the use of random and fixed effects models.

#### ***4.2. A propensity score analysis***

Let us first focus on the estimation of the causal impact of remittances on the probability to migrate, using a propensity score model. As a first step, we estimate a Probit regression explaining the probability that a respondent receives remittances. The list of covariates  $X$  which we use to explain the treatment  $R$  includes gender, age, marital status, number of people in the household, educational attainment, a dummy variable for excellent self-reported health, occupation status (having a job or being unemployed, the omitted variable being out of the labor force), and urban, mixed or rural residence. We exclude the set of indicators related to the financial situation and wealth of the household as these covariates may themselves be a consequence of remittances.

Using the Probit estimates, we then compute for each individual the propensity score  $\Pr(R = 1|X) = E(R|X)$ . Next, we estimate the causal effect of the receipt of remittances on the

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<sup>10</sup> Note that in our context, we cannot rely on a before-after comparison since all respondents could potentially benefit from remittances over all the period. There is thus no possibility to compare the situation of individuals before and after the treatment occurs.

respondent's intention to emigrate using the Kernel matching estimator described in Heckman et alii (1998). By definition, the average effect of the treatment on the treated is given by  $ATT = E(I_1 - I_0 | R = 1)$ , where  $I_1$  and  $I_0$  are the outcomes in terms of intention to migrate of respondents in the treated group (receipt of remittances) and the control group, respectively. We have assured that the balancing property holds. This amounts to verifying that the means of each covariate do not differ between treated and control units after the matching.

The results of the propensity score analysis are highlighted in Table 2. Panel A indicates the impact of the selected covariates on the treatment, while Panel B summarizes the results on the impact of the treatment on the outcome variable. The results reported in Panel A show that unemployed people face a higher probability of receiving transfers and the opposite is true for people who have a job. Similarly, divorced or widowed people face a higher probability of receiving remittances and the opposite is true for single individuals when compared to the omitted category of married people. Both of these results are consistent with the altruistic hypothesis.

At the same time, we find that women face a lower probability of transfer receipt than men, while people living in mixed areas face a higher probability of receiving remittances than people living in rural areas. Furthermore, neither education nor age, have significant impact on the receipt of transfers. Overall, the results perhaps indicate that remittances are driven by a more complex set of motives than sheer altruism. However, in the absence of detailed characteristics of the donors of remittances, it is difficult to pin our set of results to any specific theory of remittance behavior<sup>11</sup>.

Let us now try to find out whether there is a positive (causal) effect of the receipt of remittances on the propensity of their recipient to emigrate. As shown in Panel B of Table 3, under the assumption of exogeneity of remittances, the difference in desire to migrate to a foreign country between the treated and the control groups is equal to 0.081, which is positive and significant. After matching, we find a very similar value for the ATT estimate. It is equal to 0.077 and remains significant at the 1 percent level. The results based on the second indicator of possible emigration to a foreign country in the coming year are similar. The unmatched difference is equal to 0.104, while the ATT estimate is equal to 0.106. In other words, we find a positive impact of transfers on the probability to emigrate, after controlling

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<sup>11</sup> Even with detailed data, it is typically difficult to discriminate between the various motives for remittances. See Rapoport and Docquier (2006) for a detailed discussion.

for the possibility of non-random selection of individuals into the transfer treatment, at least on the basis of observable characteristics. As indicated earlier, these results have to be interpreted with caution as the potential bias due to unobserved heterogeneity is not yet taken into account.

#### ***4.3. Results from random effects and fixed effects models***

As our dependent variables on emigration intentions are binary, we estimate random effects Probit and conditional fixed effects Logit models of the impact of remittances on the propensity to migrate. Columns 1A and 1B of Table 3 highlight the results from our random and fixed effect estimations of the impact of remittances on the desire of an individual to migrate, while columns 2A and 2B report the respective estimates on the more affirmative likelihood of an individual to migrate during the coming year.

Let us first have a look at the random effect estimates. These estimates indicate that educated people are both more interested in migration and more likely to migrate. Interestingly, while the effect of primary education on the desire to migrate is stronger than the effect of higher than primary levels of education compared to the omitted category of no education, the opposite is true when the outcome variable is the likelihood of an individual to migrate in the coming year. In other words, while people with lower levels of education have a stronger desire to migrate, those with higher levels of education appear to be more likely to actually realize that decision.

While the current financial situation is more likely to influence the desire to migrate, with people in worse financial status expressing a greater desire to migrate, the current financial situation does not have a significant impact on the likelihood to migrate in the coming year<sup>12</sup>. This likelihood is positively influenced by the wealth status of the household. Unemployment has a strong positive impact on not only the desire, but also the likelihood to migrate, and people in rural and mixed areas are more likely to migrate than people in urban areas. We also find that single and younger people are much more likely to migrate than middle-aged and married people, and the same is true for healthy individuals. Finally, larger household sizes have a negative impact on the likelihood to migrate to a foreign country. It is

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<sup>12</sup> The only positive and significant financial situation variable in the likelihood to migrate regression is that of a quite difficult situation compared to the omitted category of a very difficult situation. However, even this variable is only significant at the 10% level.

possible that the smaller size of households is a result of migration that has already taken place.

Let us now focus on the remittance dummy variable. The results reported in column (1A) indicate that the receipt of remittances has a positive and significant influence on the desire to migrate to a foreign country. After calculating the corresponding marginal effect (at the mean of the sample), we find that the mean probability of wishing to migrate changes from 23.06% among non-recipients to 30.45% among recipients, which corresponds to an increase of 32.05% in the intention to migrate. Similar calculations show that there is an increase of 210.7% in the more definite probability to migrate to a foreign country in the coming year (from 3.4% among non-recipients to 10.5% among recipients), an effect which is once again significant at the 1 percent level.

The random effects framework is based on the restrictive assumption that the individual specific errors are uncorrelated with the different explanatory variables. In what follows, we relax this assumption by estimating the conditional likelihood fixed effects model described in Chamberlain (1980). Specifically, the regressions are now estimated on the subsamples of individuals who have indicated at least once over the selected period that they intend to migrate. We drop from the regression all the characteristics which are constant over time (e.g. gender, education, wealth), as they are picked up by the individual fixed effects.

The corresponding results are highlighted in columns (1B) and (2B). While several covariates lose their significance vis-à-vis the corresponding random effects estimates, the story does not change significantly. Hence, we do not go into too much detail here, except in the case of the following two estimates, which are of special interest to us. On the one hand, the coefficient of the remittance variable in the fixed effects model of the desire to migrate loses its significance. However, recall that this indicator of migration plans may be little more than a vague desire of living somewhere else, without any assurance that this would eventually translate into actual migration. On the other hand, the coefficient of the remittances variable in the fixed effect model of the likelihood to migrate continues to be positive and significant (at the 1 percent level).

In sum, all our results support the hypothesis of a positive impact of remittances on the probability to migrate, especially when this probability is proxied with a more definite measure of migration potential like the likelihood to migrate in the forthcoming twelve months. It is possible that remittances from abroad are seen as the signal of successful migration of other family members, and this, in turn, increases the probability for other family

members to migrate in the future. It is also possible that individuals who intend to migrate request their family members abroad to send them some money to cover their migration costs. While this second explanation follows a different logic, that of remittances being part of a family loan, the important finding is that whatever the mechanism, we do find that the receipt of remittances acts as a stimulant for chain migration.

## **5. Conclusion**

The impact of migration and remittances on the welfare of family members and communities remaining in the country of origin has long attracted the attention of both academics and policy makers. Findings on the positive implications of remittances, such as increase in investment in human and physical capital and poverty reduction seem to have overshadowed worries about the negative implications of migration and brain drain on the local economy and the welfare of households left behind. Indeed, there seems to be a consensus in the literature that there is a high dose of gain even in the brain drain phenomenon, by virtue of a positive impact of potential migration on the human capital formation of emigrant exporting developing countries.

At the same time, little attempt has been made to explore the important issue as to whether migration and remittances sent back to the country of origin stimulate chain migration. If this is indeed the case, and if remittances are mainly channelled to sponsor prospective migrants, much of the rationale behind arguments in favour of the positive implications of migration and the brain drain would be seriously undermined. In this paper, we attempt to close the gap in the literature by testing the hypothesis of a positive impact of remittances sent by family members abroad on the migration prospects of those still in the country of origin, after accounting for selectivity and unobserved heterogeneity. We use as a case study Bosnia and Herzegovina, one of the primary exporters of migrants and recipients of remittances in the world.

We find that remittances indeed have a positive impact on the migration prospects of potential migrants. Indeed, while poverty and unemployment have an important positive impact on the desire of people to leave the country of origin, there is significant evidence suggesting that remittances help out the actual realization of that decision by way of reducing the costs of migration. As expected, we also find that young, healthy and well-educated people are the ones most likely to migrate, which of course has significant implications on issues such as labor shortage and growth prospects of the community and country of origin.

While data limitations such as absence of concrete information on the migrants who sent back money to the country of origin prevent us from testing any concrete theories on the specific mechanism behind the link between remittances and chain migration, our results point to the need of closer investigation of this issue in future research.

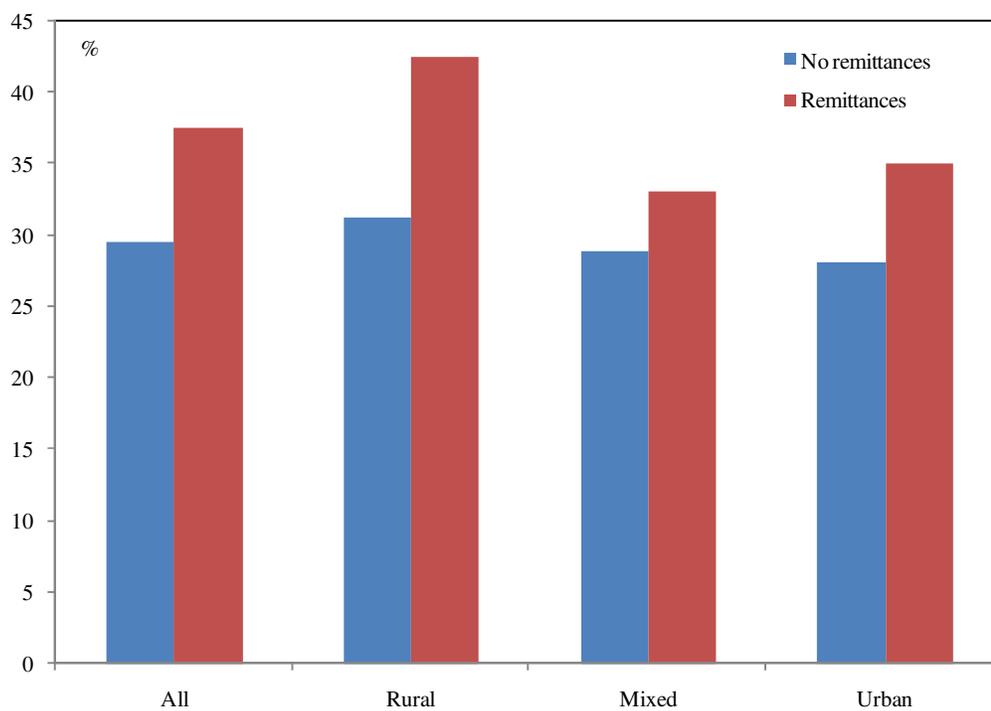
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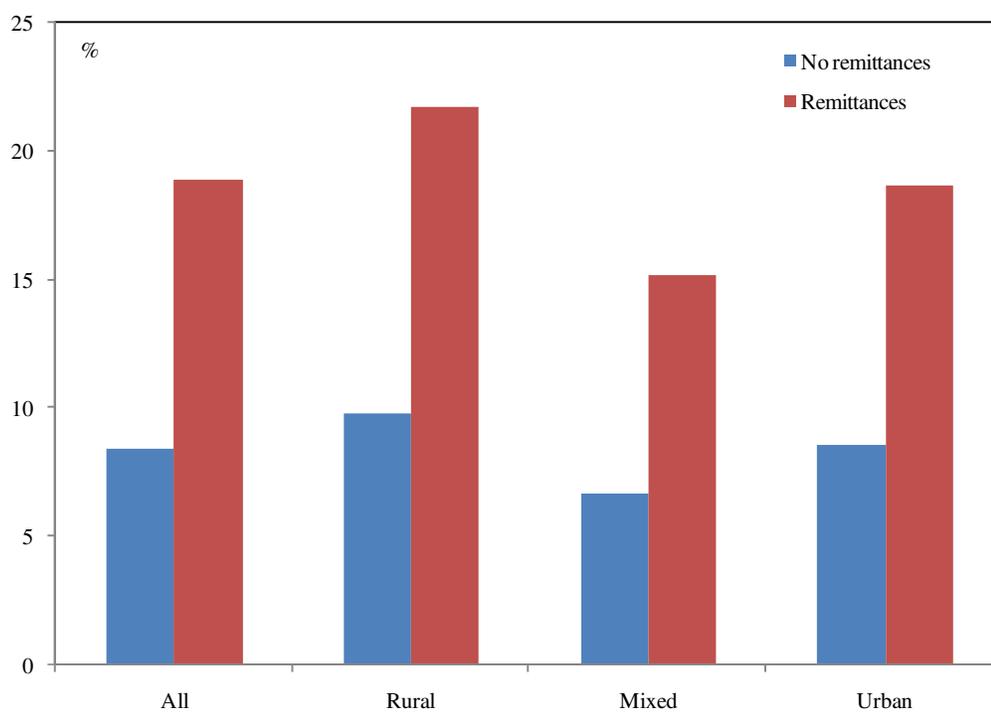
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**Figure 1. Emigration intention and receipt of remittances**

*A. Preferences for moving abroad*



*B. Possible migration to a foreign country in the coming year*



Source : LSMS BIH 2002-2004.

**Table 1. Descriptive statistics of the sample**

Variables	Preferences for moving abroad		Possible migration in the coming year		Remittances		All
	No	Yes	No	Yes	No	Yes	
Female	0.509	0.467	0.503	0.430	0.488	0.584	0.496
Age	31.833	29.011	31.323	27.634	30.942	31.409	30.980
Marital status							
Married	0.574	0.465	0.560	0.361	0.537	0.584	0.541
Divorced/widowed	0.045	0.035	0.044	0.024	0.039	0.075	0.042
Single	0.381	0.500	0.396	0.614	0.423	0.342	0.417
Number of persons in the household	4.011	3.978	4.019	3.826	4.024	3.753	4.001
Education							
No diploma	0.060	0.042	0.058	0.022	0.055	0.058	0.055
Primary school	0.309	0.349	0.320	0.330	0.318	0.351	0.321
Secondary school	0.578	0.577	0.575	0.608	0.580	0.554	0.578
Junior college – University	0.052	0.032	0.047	0.039	0.047	0.037	0.046
Excellent self-reported health	0.299	0.328	0.294	0.442	0.312	0.267	0.308
Has a job	0.449	0.346	0.426	0.339	0.426	0.332	0.418
Unemployed	0.230	0.365	0.260	0.379	0.264	0.344	0.271
Financial situation							
Very difficult	0.110	0.184	0.134	0.117	0.134	0.112	0.132
Quite difficult	0.170	0.274	0.198	0.237	0.198	0.236	0.202
Just about getting by	0.390	0.376	0.384	0.402	0.384	0.403	0.386
Doing alright	0.282	0.147	0.245	0.209	0.243	0.227	0.241
Living comfortably	0.048	0.019	0.040	0.035	0.041	0.023	0.039
Wealth index	0.304	0.051	0.216	0.337	0.217	0.344	0.227
Number of rooms in the dwelling	2.872	2.727	2.828	2.827	2.833	2.776	2.828
Area							
Rural	0.373	0.410	0.377	0.452	0.381	0.421	0.384
Mixed	0.336	0.320	0.338	0.261	0.333	0.312	0.331
Urban	0.291	0.270	0.284	0.287	0.286	0.267	0.284
Receipt of remittances	0.074	0.104	0.074	0.169	0.000	1.000	0.083
Number of observations	7067	3060	9186	941	9284	843	10127

Source : LSMS BIH 2002-2004.

**Table 2. Propensity score analysis of emigration intention**  
**A. Probit estimates of receipt of remittances**

Variables		Receipt of remittances	
Constant		-0.988***	(8.79)
Female		-0.124***	(3.11)
Age (ref: 15-19)	20-24	-0.043	(0.67)
	25-29	-0.010	(0.15)
	30-34	0.006	(0.10)
	35-39	-0.094	(1.38)
	40-45	0.007	(0.12)
Marital status (ref: married)	Divorced/widowed	0.182**	(2.25)
	Single	-0.194***	(4.15)
Number of persons in the household		-0.080***	(5.88)
Education (ref: no education)	Primary school	0.073	(0.87)
	Secondary school	0.033	(0.39)
	Junior college/University	-0.028	(0.22)
Excellent self-reported health		-0.040	(0.95)
Has a job		-0.138***	(2.72)
Unemployed		0.157***	(3.26)
Area (ref: rural)	Mixed	0.093**	(2.02)
	Urban	-0.004	(0.09)
Number of observations		10127	
Log likelihood		-2832.3	

**B. The impact of remittances on emigration intention**

Outcome	Treated	Control	Difference	
Preferences for moving abroad				
Unmatched effect	0.376	0.295	0.081***	(4.88)
Causal effect	0.376	0.299	0.077***	(4.45)
Possible migration to a foreign country in the coming year				
Unmatched effect	0.189	0.084	0.104***	(10.04)
Causal effect	0.189	0.082	0.106***	(7.69)

Source : LSMS BIH 2002-2004.

Note: Estimates of the training selection are from Probit models. The training equations also include a set of sectoral dummies and regional dummies. Absolute value of t statistics are in parentheses, significance levels being respectively 1% (\*\*\*), 5% (\*\*) and 10% (\*).

**Table 3. Random and fixed effects estimates of emigration intention**

Variables	Preferences for moving abroad				Possible migrate to a foreign country in the coming year			
	(1A)		(1B)		(2A)		(2B)	
	Random effects		Fixed effects		Random effects		Fixed effects	
Constant	-0.600***	(4.34)			-2.302***	(11.47)		
Female	0.056	(1.24)			0.109**	(1.98)		
Age	0.140**	(2.40)	0.122	(0.89)	0.084	(1.18)	0.045	(0.24)
(ref: 15-19)								
25-29	0.106*	(1.71)	0.052	(0.32)	0.132*	(1.70)	0.270	(1.21)
30-34	0.035	(0.55)	0.195	(1.22)	0.073	(0.88)	0.119	(0.47)
35-39	-0.212***	(3.17)	-0.197	(1.12)	-0.074	(0.80)	0.152	(0.50)
40-45	-0.407***	(6.50)	-0.370	(1.53)	-0.281***	(3.21)	0.122	(0.28)
Marital status								
Divorced/widowed	0.008	(0.08)	0.808**	(2.31)	0.031	(0.22)	0.575	(1.00)
(ref: married)								
Single	0.189***	(3.82)	0.503**	(2.29)	0.395***	(6.33)	0.574*	(1.79)
Number of persons in the household	-0.013	(0.86)	0.097	(1.45)	-0.057***	(2.98)	-0.095	(0.99)
Education								
Primary school	0.303***	(2.98)			0.395***	(2.61)		
(ref: no education)								
Secondary school	0.297***	(2.90)			0.427***	(2.82)		
Junior college/University	0.289**	(1.96)			0.493**	(2.48)		
Excellent self-reported health	0.027	(0.69)	-0.002	(0.02)	0.219***	(4.36)	0.023	(0.20)
Has a job	0.004	(0.08)	-0.104	(0.74)	-0.007	(0.11)	-0.126	(0.61)
Unemployed	0.218***	(4.40)	-0.022	(0.18)	0.221***	(3.49)	0.050	(0.28)
Financial situation								
Quite difficult	-0.035	(0.62)	0.090	(0.79)	0.135*	(1.67)	0.112	(0.59)
(ref: very difficult)								
Just about getting by	-0.395***	(7.18)	-0.360***	(3.12)	0.042	(0.55)	-0.072	(0.38)
Doing alright	-0.830***	(12.71)	-0.934***	(6.39)	-0.099	(1.13)	-0.097	(0.42)
Living comfortably	-1.098***	(9.10)	-1.797***	(5.98)	-0.198	(1.34)	-0.854**	(2.08)
Wealth index	0.011	(0.88)			0.028*	(1.88)		
Number of rooms in the dwelling	-0.050***	(3.15)	-0.135***	(3.31)	-0.020	(1.01)	-0.130**	(2.29)
Area								
Mixed	0.201***	(3.71)			0.189***	(2.87)		
(ref: rural)								
Urban	-0.005	(0.08)			-0.117*	(1.68)		
Receipt of remittances	0.226***	(3.64)	0.118	(0.87)	0.574***	(7.99)	0.522***	(2.96)
Number of observations	10127		4358		10127		1925	
Number of individuals	3604		1489		3604		660	
Log likelihood	-5569.6		-1521.6		-2831.8		-688.6	

Source : LSMS BIH 2002-2004.

Note : (1A) and (2A) are random effects Probit model, (2A) and (2B) are fixed effects Logit model. Absolute values of t-statistics are in parentheses and levels of significance are respectively 1% (\*\*\*), 5% (\*\*) and 10% (\*).