GDN Working Paper Series

Do Social Transfers "Crowd-Out" Remittances: Evidence from Bosnia

Nermin Oruc

Working Paper No. 51

December 2011

About GDN

The **Global Development Network (GDN)** is a leading International Organization of developing and transition country researchers, policy and research institutes promoting the generation, sharing, and application to policy of multidisciplinary knowledge for the purpose of development. Founded in 1999, GDN is headquartered in New Delhi, with offices in Cairo and Washington.

This Working Paper has been prepared as part of the research which was conducted in the framework of a cooperation between The Vienna Institute for International Economic Studies (wiiw) and the Global Development Network, aiming to build research capacities in Southeast Europe, and financed by the Jubiläumsfonds of the Austrian National Bank (OeNB) and the Austrian Ministry of Finance. The views expressed in this publication are those of the author(s) alone.

Do Social Transfers "Crowd-Out" Remittances: Evidence from Bosnia

Nermin Oruc[1,2]

Abstract

This paper presents the results of estimation of the model of interaction between social transfers and remittances. Compared to previous studies, this paper estimates non-monotonic "crowding out" effect by an innovative empirical model specification. The model is then estimated by the two-stage Heckman's selection method, where the receipt of remittances is the first stage, and amount of remittances received second stage dependent variable. The findings suggest that social transfers crowd-in remittances and that the predominant motive for sending remittances to Bosnia is exchange. In addition, the results do not support the Cox (1997) hypothesis about non-monotonic transfer motives.

[1] Sarajevo School of Science and Technology, Bistrik 7, 71000 Sarajevo, Bosnia and Herzegovina. nermin.oruc@ssst.edu.ba

[2] CEDAR – Center for Economic Development and Research, Bolnicka 23, 71000 Sarajevo, Bosnia and Herzegovina. oruc@cedar.ba

1. Introduction

Bosnia-Herzegovina has recently gone through very dramatic periods of conflict and displacement. During the period of war in Bosnia, about 5% of population were killed, and more than a half of its population was displaced. Half of them, or 25% of total population were displaced internally, while another 25% of total population decided to flee from the country (Ibreljic *et al.*, 2006). Even today, it is estimated that every ninth Bosnian lives abroad (Koser and Van Hear, 2002). As a consequence, Bosnia is the sixth leading country in terms of receiving remittances as a percentage of GDP (around 23%, World Bank Global Economic Prospects, 2006). About 18% of Bosnian population are below poverty line, while another 30% are just above it (UNDP, 2006). The official unemployment rate is above 40%[1]. During the war, more than 400.000 housing units (1/3 of total housing units in the country) were destroyed. Moreover, the war has created new vulnerable groups in need of social transfers, such as disabled and/or unemployed war veterans and families of killed soldiers. All the above significantly increased the number of individuals in the need of some form of social transfers. This is particularly burdensome for a post-war transition country with relatively limited fiscal revenues.

The overall social transfers in Bosnia-Herzegovina amount to about 13% of its GDP (World Bank, 2006), majority of which goes to pensions and health care services. But also, large proportion of these transfers goes to non-insurance based benefits. They include veterans-related benefits, child care allowance and social assistance. Veteran-related benefits are non-means tested, implying their limited impact on poverty reduction. A household, regardless of its income status, can be eligible for several transfers, based on different criteria. The main purpose of social transfers should be to reduce inequality and poverty. But, the evidence is mixed. Some social transfers, such as pensions or unemployment insurance, are designed in such a way that increases inequality, as these transfers are linked to the amount of contributory wage, resulting in larger percentage of benefits transferred to high income families (Feldstein, 1974, Browning and Browning, 1994, Perry *et al.*, 2006). Besides that, studies from different countries reveal large ineffectiveness of social transfers in poverty and inequality reduction due to inappropriate eligibility criteria and poor targeting. As reported in World Bank (2009), pre-transfer poverty

[1] Though, more realistic estimated, based on the Labour Force Survey, say that this rate is actually 29%. The difference between the official and survey-based unemployment rates is due to the large informal employment.

level in Bosnia-Herzegovina is 19.2, while after transfers it is reduced to 18.6%, meaning that transfers contribute to the reduction of poverty by only 6 percentage points.

According to the World Bank (2006), Bosnia-Herzegovina is the sixth leading country in terms of receiving remittances as a share of GDP. They amount to around 2 billion EUR, which is 20% of Bosnian GDP. Moreover, remittances represent the most significant inflow to BiH, as they are six times larger than FDI and three times than ODA to this country. The data from the Living in BiH 2004 survey show that approximately 11% of households in Bosnia-Herzegovina receive remittances. The average value of remittances received is about 95 KM per month. The impact of remittances on poverty and inequality has been heavily investigated so far (Milanovic, 1987; Stark, Taylor and Yitzhaki, 1988; Prasad and Sardana, 1989; Adams, 1992; Russell, 1992; Taylor and Wyatt, 1996; Taylor 1999; World Bank 2006; Brown and Markova, 2006; Jimenez, 2007; Giannetti et al, 2009), but the available empirical evidence does not provide clear-cut answer about its sign. On one side, there is evidence supporting the idea that remittances are usually sent to richer families, who are more able to bear the costs of migration, thus increasing inequality. On the other side, several studies support the hypothesis that migrants are selected from lower tail of income distribution, thus remittances sent to these families decrease inequality. There were no analyses of the use of remittances in Bosnia, but the sporadic evidence suggests that vast majority of remittances are being used for consumption.

Before analysis of the overall effects of social transfers and/or remittances on poverty and inequality in a country with widespread receipts of both types of transfers, possible interaction between them should be taken into account. The link between the receipt of the social and private transfers is known as the "crowding out" effect. Depending on the motives for sending remittances, the amount received by families may change once they begin receiving the social transfers. The sign of this effect is purely empirical question, as two competing hypotheses are in place. According to the first, remittances are driven by altruistic motives by senders, thus any increase in social transfers received by a household will decrease amount of remittances received. In contrary, remittances are exchange driven, so they will increase as a result of increase of social transfers. Accordingly, the sign of the "crowding out" effect also reveals predominant motive for sending remittances.

This study is the first known attempt to investigate the presence of the "crowding out" effect in Bosnia. The definition of social transfers to be analysed in this study is reduced to the

non-contribution based social transfers, such as veteran-related benefits and child allowance. The reason for this is that contribution based benefits, such as unemployment benefits and pensions, cannot be considered as an exogenous source of income as non-contribution based transfers. As the key objective of this study is analysis of the "crowding out" effect, then the contribution based benefits, which are received as an alternative to a wage, should not be considered as an exogenous source of income that increases overall income of recipient. In contrary, non-contribution based benefits can be considered as exogenous increase of the overall income. Both domestic and international remittances, as well as charity, will be included in the analysis, but the distinction between them will be made in order to reveal possible differences in the extent of the "crowding out" of these transfers by social transfers, as well as for the policy purposes.

In this study, we attempt to analyse different impact of social transfers on remittances assuming that the motives for remittances are non-monotonic, meaning that they may differ between different income groups of recipients. We might expect that remittances to lower income recipients may be more altruistically motivated, so they might decrease after increase of social transfers and their poverty reduction goal may not necessarily be reached. Remittances to higher income recipients may be more exchange motivated and therefore change in the same direction with social transfers. In such relations, social transfers would increase poverty and inequality among households, particularly when the receipt of remittances by non-poor is matched with ineffective social transfers' policies. There is evidence supporting these ideas, but most studies were based on the analysis of cross-sectional data, which does not assure appropriate capture of the dynamic effect. Therefore, it is necessary to test these ideas by using panel datasets.

The paper is structured as follows. The next section presents review of the literature on the relationship between the social transfer and remittances. The section three briefly informs about the characteristics of social security system and inflows of remittances to Bosnia. In the section four, the theoretical model of non-monotonic "crowding-out" effect and the new specification of an empirical model controlling for such an effect are presented. Also, method and data used for its estimation are described. Section five presents results of the model estimation. Finally, section five concludes and explains policy implication of the results of this study.

2. Literature on the "crowding-out" effect

As the amount of remittances inflows increased significantly in recent years[2], the cash transfers, public and private, their interactions and the impact on the reduction of poverty and inequality have received appropriate attention in the literature. Social transfers increase a household's income. As they are primarily targeting poorer households, they relationship with both poverty and inequality is expected to be negative, meaning that increase in these transfers should reduce both poverty and inequality in a country. The extent to which these objectives are reached depends on the effectiveness in implementation of the transfers policies, as well as responses of private to public transfers.

In a country such as Bosnia-Herzegovina, which receives a large amount of remittances, the effectiveness of the social transfer programmes in reduction of poverty and inequality in the country does not depend on the design and implementation of these programmes only, but also on the response of the remittances to the receipt of these transfers. This response is usually named *transfers derivative* (Gibson et al., 2006). The direction of this response is determined by the motives for sending remittances. They can be motivated by altruism[3] (Becker, 1974) or exchange (Bernheim *et al.*, 1985). If the motives for these transfers are based on altruism, increase in a recipient's income as a result of public transfers will decrease amount of private transfers. This is interpreted as crowding-out of private by public transfers (Cox, 1987). In the presence of the crowding-out effect, the positive effects of social transfers can be neutralized by the response of remittances, as the intended outcome of support to vulnerable groups will be at least partially transferred to senders of remittances (Altonji *et al.*, 1997). The opposite effect is possible when remittances are based on the exchange motive and increase as a result of increase in social transfers, which means that public transfers crowd-in private ones (Cox, 1987, 1990; Altonji *et al.*, 2000; Taylor *et al.*, 2001). If private transfers are predominantly motivated by

[2] The World Bank (2008) estimated the amount of international remittances to the developing world in 2005 to be US $191 billion.

[3] Becker's altrustic motives for transfers are based on the idea of interdependent preferences. According to this, parents have preferenes regarding their children's consumption. With such preferences, their utility does not depend only on their own consumption, but also on the consumption of others. This is in line with the migration theories that explain migration decision motivated by the diversification of risk to the family income. Thus, migrants will increase their remittances to the family memebrs left behind once their income is negatively affected by adverse conditions in a country, for example. The family income risk sharing strategy results in the same response of remittances to the changes in income as the hypothesis of altrusticaly motivated remittances would predict.

exchange, where transfer is made as a payment for provision of certain services by recipient to a donor, then the sign of relationship between these two is not completely clear, but most authors argue that it is positive. Their explanation is that the rise in income of provider of services through the receipt of social transfers increases the "price" of such services, implying increase in receipt of remittances. Moreover, if remittances are motivated by self-interested intention of sender to increase their inheritance claims, then increase in income of recipients increase potentially inherited wealth and, consequently, transfers of remittances. Therefore, the sign of the relationship between social transfers and remittances is purely empirical question. This study is the first known attempt to estimate this relationship in Bosnia-Herzegovina, which will give additional insight into the possible causes of the reported large ineffectiveness of social transfers (World Bank, 2009), but also reveal the predominant motive for sending remittances to this country.

Most of the empirical studies so far have failed to find strong crowding-out effect. For example, one of the first studies by Cox and Jakubson (1995) found that a one dollar increase in public transfers in the US would reduce private transfers by no more than a 12 cent. Altonji *et al*. (1997) estimated that a dollar decrease in a child's will increase parents' transfers to a child by only 13 cents. Still, a possibility of non-monotonic relationship between public and private transfers was recognized recently, which might be one of the explanations of the failures of previous studies (Albarran and Attanasio, 2002). Increase in income may cause the motives of transfers to change, thus causing the sign of the relationship between public and private transfers to be different at different levels of recipient's income (Cox *et al.*, 1997). Thus linear models would be misspecified and not capable to recognize the true crowding-out effect. Another reason for this failure of previous studies is that the empirical evidence from developed countries, with a long history of public transfers which might have already replaced private transfers, might be misleading. Therefore, recent studies have focused on collecting evidence from developing countries, allowing for non-monotonic relationship between public and private transfers. Cox *et al*. (2004) investigated this possibility by a threshold model and estimated the transfer derivatives to be -0.4 for the poorest households and almost zero for richer households in Philippines. In a study of relationship between public pensions for the elderly and private transfers in South Africa, Jensen (2003) estimates that for each rand increase in public pension income, transfers made by children reduce by 0.25-0.30 rand. Gibson et al. (2006) estimated transfer derivatives in

four countries four developing countries - China, Indonesia, Papua New Guinea, and Vietnam – to be in a range between 0 and 0.08, concluding that non-monotonic crowding-out effect of public on private transfers is not important feature of transfer behaviour in developing countries.

3. A background: Social transfers and remittances in Bosnia-Herzegovina

The period of transition of Bosnia-Herzegovina from planned to market economy, which started in early 1990s, was combined with the period of destructive war, which had severe impact on poverty and inequality in the country. During the period of war in Bosnia, about 5% of population were killed, and more than a half of its population was displaced. Half of them, or 25% of total population were displaced internally, while another 25% of total population decided to flee from the country (Ibreljic et al., 2006). The GDP of Bosnia-Herzegovina in 1993 fell to 10% of its 1991 level. Even today, the 1991 level has not been reached yet. The official unemployment rate is above 40%. During the war, more than 400.000 housing units (1/3 of total housing units in the country) were destroyed. Moreover, the war has created new vulnerable groups in need of social transfers, such as disabled and/or unemployed war veterans and families of killed soldiers. All the above significantly increased the number of individuals in the need of some form of social transfers.

Although Bosnia-Herzegovina has recorded considerable growth rates of its GDP, which had positive impact on the reduction of poverty in the country, still about 18% of Bosnian population are below poverty line, while another 30% are just above it (UNDP, 2006).

3.1. Social security system in Bosnia-Herzegovina

The social security system in Bosnia-Herzegovina is consisted of: unemployment insurance; health insurance; pension insurance; child protection; and war-veterans protection. The system is based on the schemes of contributory social insurance financed through mandatory contributions by employers and employees, and schemes of social assistance funded from the budgets of governments from different levels. The system is extremely fragmented, being comprised of 13 almost completely independent systems with very low degree of coordination between them, which results in large inefficiencies of each of these systems. Contributory social insurance schemes are established at the entity level, while social assistance schemes are, besides

being financed from the entity level budgets, also financed from budgets of lower government levels, such as cantons or municipalities (EC, 2008). This fragmentation causes large territorial discrepancies in coverage, availability and accessibility of social protection and assistance, as well as in the level of the quality of services.

As already mentioned, Bosnia-Herzegovina experienced very destructive war, which resulted in displacement of about a half of total country's population, destruction of almost 60% of all housing units (MHRR, 2005), about 200.000 killed, 100.000 war invalids, and 90.000 families of killed soldiers. In addition, slow post-war recovery and transition into the market economy caused very high levels of unemployment. These figures explain while the social assistance system is designed to deal with the burdens of war. It is mainly category based, without clear focus on most vulnerable groups. As a result, majority of people below the poverty line are not covered by social assistance (EC, 2008).

The fragmented and inefficient system of social assistance in Bosnia-Herzegovina, not capable to identify people in state of social need, causes inequality in access to resources between different groups and territories. For example, people with the same level of disabilities are treated differently, depending on whether they are civilian or war invalids. Also, different lower level governments have large differences in the budget available for these purposes and provide different amounts of money for the same target group, increasing territorial inequality. It is not surprising that such a social system has negligible impact on poverty reduction as well.

Bosnia-Herzegovina spends about 4% of its GDP on non-insurance social transfers and is one of the leading countries[4] in the CEE region (Lindert *et al.*, 2008). This is significantly above the OECD countries average of 1.6%. Out of these transfers, about three quarters go to veterans-related benefits. Veteran-related benefits include Military Invalids' Benefits, Survivor Dependents' Benefits, Demobilized Soldiers' Benefits, and Medal Holders' Allowance. All these are non-means tested, or rights based, benefits. Out of total transfers to these categories, around 90% goes to military invalids and survivor dependents. Civilian benefits are Non-War Invalids' Benefits, Civilian Victims of War Benefits, which are rights based, plus Social Assistance and Child Protection Allowance, which are means tested. Around 20% of total population reported to receive at least one of these benefits. They contribute to total consumption of all households by 11%.

[4] Only Croatia spends slightly larger proportion of its GDP on these transfers.

Veteran–related benefits are most regressive, as about 75% of these benefits are received by non-poor 27%, and 75% of all these benefits go to those in the richest quintile, opposed to the 15% going to those in the poorest quintile. Only 18% of these transfers are received by those in the poorest quintile[5] of the population.

Civilian benefits are somewhat better targeted, as 26% of Child Protection Allowance and 30% of Social Assistance Benefits reach those in the poorest quintile. In such a situation, it is not surprising that these benefits have very limited impact on poverty reduction. According to the BiH Household Budget Survey from 2007, it was estimated that poverty headcount ratio is 19.2% without, and 18% with transfers, meaning that transfers reduce poverty by only 6%.

The findings of the World Bank (2009) study suggest these transfers are largely ineffective, due to several reasons. First, fragmented political system, where social security policies are determined at the entity level and implemented at the canton and municipality level. The lack of coordination of policies, eligibility criteria and information about beneficiaries further contributes to the inefficiency of such system. Second, different regions experienced conflict and destruction of different severity, which increased inequality across regions. The social transfers policies implemented at lower level without transfers between regions do not contribute to reduction of inequality in different regions and have limited effectiveness. Third, due to the all above and the category approach applied to selection of beneficiaries, where some household are excluded and other receive transfers from several different programs, high under-coverage and leakage rates are present. The World Bank (2003), using the LSMS data, reported that only 4% of poor population is covered by some form of social assistance, whereas 75% of beneficiaries are not poor. The current ineffectiveness of social transfers and their sustainability in the long term require urgent reform of this sector. In that context, it is important to understand possible impacts of these transfers on the receipt of remittances and their ultimate impact on reduction poverty and inequality, once their correlation is taken into account.

3.2. Migration and remittances in Bosnia-Herzegovina

During the period of war in Bosnia, about 5% of population were killed, and more than a half of its population was displaced. Half of them, or 25% of total population were displaced internally, while another 25% of total population decided to flee from the country (Ibreljic et al.,

[5] Here, qiuntiles are based on consumption ranking.

2006). Even today, it is estimated that every ninth Bosnian lives abroad (Koser and Van Hear, 2002). The return of refugees was significant in the three years following the war (1996-1999), mainly as a result of repatriation process6. After that, return process was dramatically reduced. In total, around 447.000 people were estimated to be returned from abroad until 20077 (UNHCR, 2008). In case of internally displaced people, the estiate is that around 578.000 of them returned to their pre-war place of living until 2007 (UNHCR, 2008). Another report, from 2005 (Ibreljic et al., 2006) estimated that "330,000 Bosnian refugees were still in need of a permanent home… [and] …as many as 836,000 people were still displaced from their homes - 490,000 in the FBiH; 346,000 in Republika Srpska".

As a consequence of large forced migration outflows during the war period in 1990s, Bosnia is the sixth leading country in terms of receiving remittances as a percentage of GDP (around 23%, World Bank Global Economic Prospects, 2006). Annual inflows of international remittances, through a banking system only, are around 2.4 billion KM (BiH Central Bank, 2008). But, the World Network of Bosnian Diaspora estimates these inflows to be at least 6 billion, as majority of these remittances are sent as cash transfers through informal channels. These remittances inflows are significant source of income for a large proportion of BiH population. Moreover, they are six times larger than FDI and three times than ODA to this country. The data from the Living in BiH 2004 survey show that approximately 11% of households in Bosnia-Herzegovina receive remittances. The average value of remittances received is about 95 KM per month. There were no analyses of the use of remittances in Bosnia, but the sporadic evidence suggests that vast majority of remittances are being used for consumption. In one of a few studies on remittances in Bosnia, Oruc (2009) found that the remittances receipt has positive, but relatively small impact on the educational attainment of children from receiving households.

[6] Bosnian refugees did not have status of refugees in the Western European countries, but "temporary protection" status, which gave the right to these countries to repatriate Bosnian refugees back to Bosnia-Herzegovina immediately after the cessation of hostilities there.

[7] It has to be noted here that not all of these refugees returned to their pre-war place of living, but to another part of the country, which created a new vulnerable category: "returned refugees – internally displaced".

4. Modelling the "crowding out" effect

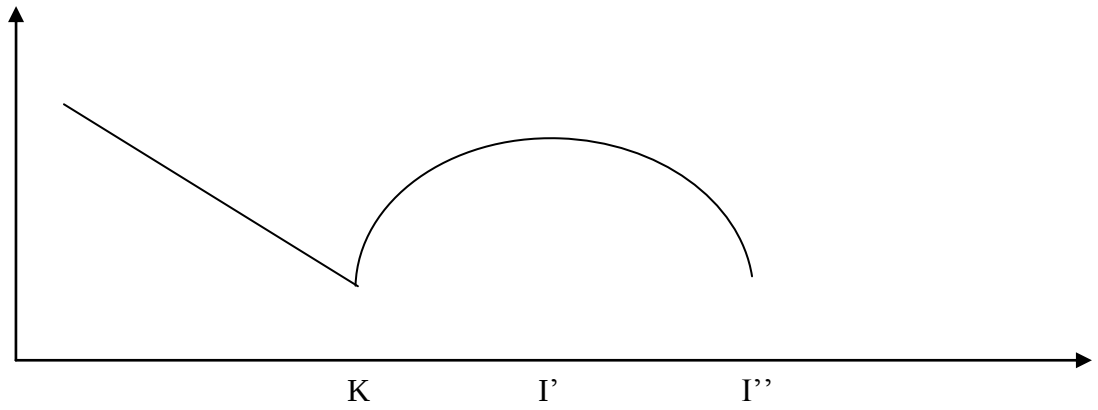
4.1. Non-monotonic motives for remittances

As presented in the literature review, there are two competing hypotheses about the motives for remittances in place, which determine the direction of the "crowding out" effect. According to the first, remittances are driven by altruistic motives by senders (Becker, 1974), thus any increase in social transfers received by a household will decrease amount of remittances received. This is interpreted as crowding-out of private by public transfers (Cox, 1987). In contrary to this, other authors argue that the remittances are exchange driven, so they will increase as a result of increase of social transfers (Bernheim *et al.*, 1985). If this effect is predominant, then the public transfers are said to "crowd-in" private ones (Cox, 1987, 1990; Altonji *et al.*, 2000; Taylor *et al.*, 2001). Accordingly, the sign of the impact of social transfers on remittances also reveals predominant motive for sending remittances.

The main purpose of the empirical analysis in this study is to analyse possible crowding-out effect of social transfers on remittances, both domestic and international, in order to find evidence on the sign of relationship between receipts of social transfers and remittances. The findings would reveal possible predominant motives for remitting by Bosnians, both in Bosnia-Herzegovina and abroad, as well as possible negative consequences of the crowding-out effect on the effectiveness of social transfers policies, by transfer of benefits from recipients to senders of remittances. The key difference of this study compared to previous ones is that it uses a new approach to the problems of non-monotonic motives for sending remittances. The need to test for possible shift in transfer motive by a sender once recipient's income reaches certain threshold is based on the hypothesis that motives for remittances can be different at different levels of income. According to this idea, remittances sent to poor are primarily altruistically motivated, while those sent to non-poor are more exchange driven. This relationship can be described by the figure below. In one of the earliest works on this issue Cox (1997) hypothesized that the relationship between social transfers and remittances should be negative at low levels of income, then starting to increase at some threshold level (K), such as poverty line, as motives for sending remittances switch from altruism to exchange. But, as the income increases, exchange motive causes remittances first to increase (up to recipient's income level depicted by I' in figure 1) and then to decrease and eventually cease (at income level depicted by I''), making the relationship

between social transfer and remittances to be negative in the first part and have an inverse U shape in the second.

Figure 1. Non-monotonic relationship between remittances and social transfers



Source: Cox *et al.*, 2004

The figure above suggests that appropriate specification of the empirical model that will capture such a relationship needs to be nonlinear, as well as to account for non-monotonic motives by specifying a point where the break occurs (K). Moreover, the break at which remittances receipts cease (I'' in figure 1) needs to be identified. In terms of model specifications with alternative dependent variables, it should be notes that Cox *et al.* (2004) suggest the above relationship for amount of remittances received, but not necessarily for likelihood of remittances receipt, which means that the above presented theoretical discussion of non-monotonic and non-linear effect of social transfers on remittances should be only controlled for in models where dependent variable is amount of transfers.

4.2. Empirical specification and estimation methods

Early empirical studies (Lucas and Stark, 1985) used OLS method. As a large proportion of migrants do not receive remittances, it was found that such a method produces biased and inconsistent estimates. Therefore, two alternatives were used in subsequent studies. The first is one stage Tobit model, where the receipt of remittances and the amount received is modelled together, and the another one is two stage Heckman's model, where the receipt of remittances is

modelled in the first stage and estimated by probit method, while the amount received is modelled in the second stage and estimated by the OLS, which is corrected for potential sample bias (for example, Hoddinott, 1992; Cox et al., 1998, 2004). The main problem of the second approach is the identification problem: the decision which variables should be included in the first stage and which in the second stage regression (Amuedo-Dorantes and Pozo, 2006; Albarran and Attanasio, 2002) argue that the main problem with majority of studies of the crowding out effect suffer from an important endogeneity problem, as social transfers are typically targeted towards households that are in particular need of transfers. But, Bosnia-Herzegovina is an interesting case in that respect, as it is an exemption from this rule since, as we saw above, most of the transfers are targeting non-poor. Also, some studies (for example, Cox *et al.*, 2004) suggest the possibility of reverse causality between the receipt of remittances and pre-transfer income, as remittances may affect individuals' incentives to work. But, studies that controlled for this possibility did not find any significant change in the results.

In this study, the second approach was chosen as more appropriate. In the empirical analysis then, the main research question is to be tested by estimation of two different models. The first model of the relationship between social transfers and remittances would test the direction of the crowding-out effect of the receipt of social transfers on the receipt of remittances. It would be estimated by probit. Second model would use amount of social transfers and amount of remittances received, both per capita, and would be estimated by Heckman's two-stage method, where the results from the first model will be used as the first stage of Heckman's procedure for calculation of the Inverse Mills ratio. This approach is similar to a number of previous studies on the "crowding-out" effect (for example, Altonji et al., (2000); Cox et al., 2004; Menezes, 2006). Estimation of two models with different dependent variable, one for receipt and another for amount of remittances received, allows us to gain insight into the effect of social transfers on both the incidence and volume of remittances. The new in this approach is the new solution for the identification problem, which is also a new approach to controlling for the hypothesized differences in the motives for remittances at different level of income. Thus, in the second part of the empirical analysis, these previously used models would be augmented by additional variables, in order to test for hypothesized non-monotonic crowding-out effect between households with different income levels.

One of the key problems with the Heckman's procedure is the problem of identification; which variables should be included in the first stage and which in the second stage model. As suggested by Wooldridge (2003: 562), all variables from the second stage model should be also included in the first stage model, because their exclusion leads to inconsistent estimation if they are incorrectly excluded, while their inclusion is not very costly. Nevertheless, there should be at least one variable that is included only in the first stage model, basically an instrument, in order to correctly calculate Inverse Mills ratio; otherwise it is difficult to distinguish between sample selection and misspecified functional form. The choice of such a variable is not straightforward, as anything that affects incidence of remittances is likely to affect the amount as well. We could expect that some of the household's demographic variables that influence incidence of transfers, such as household size, number of children, education or marital status of household's head, do not necessarily affect the amount received.

In order to control for hypothesized non-monotonic relationship between social transfers and remittances, two different solution regarding appropriate empirical specifications will be used in the second stage of Heckman's procedure[8]. The first one is specification of the model where interaction variable between poverty (a dummy variable for non-poor households) and social transfers, as well as its squared value, controlling for non-linear shape of the relationship, will be used. It is based on the assumption made in previous studies (*e.g.* Cox, 1987) that the motives for remittances are primarily altruistic if sent to poor households, so we could expect the break point K in the Figure 1 to be at the poverty line. In the second model specification, a set of dummy variables for income deciles and their interactions with variable on social transfers will be introduced. Dummy variables should control for the likelihood of receipts of remittances for different income deciles, while the interaction variables will reveal possible direction and magnitude of the "crowding out" effect between different deciles. In this specification, we should expect that we have negative effect of social transfers on amount of remittances received by households at lower income deciles, positive effect at the middle of income distribution, and again negative effect for top deciles. The second specification has advantage over the first one, as it is not necessary to make assumption about the break point.

[8] As explained above, amount of remittances received, but not necessarily the likelihood of receipt, is expected to have non-monotonic and nonlinear relationship with the amount of social transfers received.

The model to be estimated in the first part of empirical analysis is presented by following equation:

$$Y = \beta_0 + \beta_1 HINCPC + \beta_2 TST + \beta_3 HH + u_i \quad (1)$$

where:

Y – dependent variable, expressed as a dummy variable taking value of 1 if a household receives remittances, 0 otherwise,

HINCPC – a variable on pre-transfer income, which is average income of household in KM, per capita,

TST – average amount of monthly social transfers received by household in KM, per capita,

HH - set of household's demographic characteristics which are hypothesized to influence receipt and amount of remittances, including household head's gender (***fhh***) which takes value of 1 if household's head is female, age (***age***), education level (***primedu, secedu, tertedu***) where *primedu* takes value of 1 if household head has primary education and so on, household size (***hhsize***), number of children in the household (***numkids***), marital status (***marital***) which takes value of 1 if a household head is married, and employment status (***empl***) which takes value of 1 if household head is employed.

In the second stage, two different model specifications will be used to control for non-monotonic and nonlinear effect of social transfers on the amount of remittances received by households. The first model to be estimated is:

$$Y = \beta_0 + \beta_1 HINCPC + \beta_2 TST + \beta_3 HH + \beta_4 NP + \beta_5 TSTNP + \beta_6 TSTNPSQ + u_i \quad (1)$$

where:

Y – dependent variable, expressed as amount of monthly remittances received by household, per capita (amount divided by household size),

HINCPC, TST and HH – as above,

NP – a dummy variable taking value of 1 if a person is not poor, 0 otherwise,

TSTNP – interaction variable between variables TST and NP. This variable tests the hypothesis of non-monotonic motives for sending remittances, based on the poverty status of a household,

TSTNPSQ – squared value of TSTNP, in order to test nonlinear effect of social trasners on remittances among the non-poor,

u_i – error term.

In this case, as we have interaction term between poverty status of a household and amount of social transfers received, the coefficient of the original TST variable now measures the effect of amount of transfers received on remittances among poor households.

The second model is:

$$Y = \beta_0 + \beta_1 HINCPC + \beta_2 TST + \beta_3 HH + \beta_4 DEC + \beta_5 TSTDEC + u_i \qquad (1)$$

where:

Y, HINCPC, TST, and HH– as above,

DEC – a set of nine dummy variables indicating to which income decile household belongs, first (lowest) decile being the benchmark category,

TSTDEC – interaction variable between variables TST and DEC, which should control for the both nonlinear and non-monotonic effect of social transfers and remittances, based on income distribution.

u_i – error term.

4.3. Data

The dataset used for the purpose of empirical analysis in this study is the "Living in BiH" survey conducted by Statistical Agency of Bosnia-Herzegovina. This survey based on the World Bank's LSMS survey conducted in 2001. Then, the Statistical Agency of Bosnia-Herzegovina conducted three waves of "Living in BiH" survey in 2002, 2003 and 2004. For this analysis, survey from 2004 was chosen because it contains the most comprehensive set of information necessary for this analysis. Besides that, certain time invariant data, such as ethnicity of individual, were imputed from the 2001 dataset. The original sample of this survey was 3.004 households, but once the observations with the most important information, such as age, income, receipt of remittances and social transfers were excluded, the final dataset with all the necessary information was 2541 households. The descriptive statistics of the variables included in the model is presented in the table below.

Table 1. Descriptive statistics of the variables

Variable description	Variable name	Obs	Mean	Std. Dev.
Household characteristics				
Number of children in a household	hnoc	2479	2.448	1.382
Ethnicity of the household's head (1 if ethnic Serb)	serb	2808	0.436	0.496
Ethnicity of the household's head (1 if ethnic Croat)	croat	2808	0.087	0.282
Urbanity of place of living of the household's head (1 if rural)	rural	2719	0.344	0.475
Urbanity of place of living of the household's head (1 if urban area other than capital city)	otherurb	2719	0.424	0.494
Education level of the household's head (1 if completed primary school)	primedu	2541	0.225	0.418
Education level of the household's head (1 if completed secondary school)	secedu	2541	0.465	0.499
Education level of the household's head (1 if has university degree)	tertedu	2541	0.104	0.306
Age of the household's head	age	2842	52.574	17.812
Entity in which individual lives (1 if Republika Srpska)	rs	2842	0.464	0.499
Gender of the household's head (1 if female)	fhh	2842	0.261	0.439
Marital status of the household's head (1 if married)	marital_s	2839	0.051	0.220
Hosehold's size	hhsize	2840	3.063	1.590
Household's consumption per capita	gall	2842	3,256.534	1,978.847
1 if a household did not migrate during the war	stayer	2826	0.562	0.496
Income variables				
Household's average monthly pre-transfer income	hmsal	2842	339.278	517.442
Poverty status of a household (1 if poor)	pooreu	2840	0.122	0.327
Poverty status of a household (1 if not poor)	nopoor	2842	0.878	0.328
Transfer variables				
Amount of monthly domestic remittances received by a household	hbhrema	2842	12.160	39.922
Amount of monthly international remittances received by a household	harema	2842	21.589	81.013
1 if household received domestic remittances	hbhremr	2842	0.214	0.410
1 if household received international remittances	haremr	2842	0.190	0.392
1 if household received pension	hpensionr	2842	0.396	0.489
Hoousehold's average monthly pension received	hpensiona	2842	87.977	148.912
1 if household received any social transfers other than pensions	hostr	2842	0.073	0.260
Amount of monthly social transfers other than pensions	hosta	2842	2.866	15.330
1 if household received any social transfers, includion than pensions	htstr	2842	0.449	0.497
Amount of monthly social transfers, including pensions	htsta	2842	90.843	148.960
1 if household received remittances (domestic + international)	hremr	2842	0.336	0.472
Amount of monthly remittances (domestic + international) received by a household	hrema	2842	33.749	90.120

The cross-tabulation of receivers of remittances and social transfers is presented in the table below.

Table 2. Proportions of household according to receipt of social and remittances

	Does not receive remittances	Receives remittances	Total
Does not receive social transfers	38.49	16.64	55.14
Receives social transfers	27.93	16.92	48.85
Total	66.43	33.56	100.0

Source: Own calculations

As we can see from the table above, the data from the Living in BiH 2004 survey show that the percentage of households receiving both social transfers and remittances is quite large, as almost 17% of individuals receive both social transfers and remittances. This means that a possibility for large crowding out effect of social transfers on remittances exists.

5. Results

The results of the two models are presented in the Table 6 below. The column "Model 1" presents the results of the probit estimation of the model of the determinants of receipt of remittances, which is the first stage of the Heckman's approach, whereas the columns "Model 2" and "Model 3" present the results of the Heckman's second stage estimation of the two specifications of the model of determinants of amount of remittances, as described above.

Table 3. Estimated coefficients of the alternative models

Variable description	*Variable name*	*Model 1*	*Model 2*	*Model 3*
Household characteristics				
Age of household's head	*hhage*	*-0.022* (0.012)*	*10.389 (13.576)*	*8.604 (12.827)*
Hhage squared	*hhagesq*	*0.000** (0.000)*	*-0.112 (0.122)*	*-0.059 (0.116)*
Number of children in a household	*numkids*	*0.207*** (0.050)*	*3.173 (42.833)*	*60.154 (41.525)*
Urbanity of place of living of the household's head (1 if rural)	*rural*	*0.105* (0.058)*		
Employment status of household's head (1 if employee)	*employee*	*-0.414*** (0.085)*		

Employment status of household's head (1 if self-employed)	*selfemp*	*-0.389*** (0.095)*		
Gender of the household's head (1 if female)	*fhh*	*0.178*** (0.067)*	*-70.749 (84.179)*	*-130.089* (80.117)*
Variable description	*Variable name*	*Model 1*	*Model 2*	*Model 3*
Household's size	*hhsize*	*-0.258*** (0.035)*		
Decile 2 (1 if households belongs to income decile 2), benchmark catergory is decile 1	*d2*			*44.782 (156.114)*
Decile 3 (1 if households belongs to income decile 3)	*d3*			*161.474 (159.970)*
Decile 4 (1 if households belongs to income decile 4)	*d4*			*246.924 (165.780)*
Decile 5 (1 if households belongs to income decile 5)	*d5*			*377.087** (151.864)*
Decile 6 (1 if households belongs to income decile 6)	*d6*			*220.375 (150.496)*
Decile 7 (1 if households belongs to income decile 7)	*d7*			*396.896*** (154.127)*
Decile 8 (1 if households belongs to income decile 8)	*d8*			*465.254*** (146.823)*
Decile 9 (1 if households belongs to income decile 9)	*d9*			*785.135*** (146.535)*
Decile 10 (1 if households belongs to income decile 10)	*d10*			*950.386*** (154.033)*
Income variables				
Household's average monthly pre-transfer income per capita	*hincpc*	*-0.001*** (0.000)*	*-0.588* (0.310)*	*-0.977*** (0.300)*
Income squared	*incsq*	*0.000* (0.000)*	*0.001*** (0.000)*	*0.000** (0.000)*
Poverty status of a household (1 if not poor)	*np*		*370.983*** (116.805)*	
Transfer variables				
Amount of monthly social transfers per capita	*htsta*	*0.001*** (0.000)*	*-0.324 (0.527)*	*-0.123 (0.561)*
Interaction variable between htsta and nopoor	*tstnp*		*-0.175 (410.258)*	
Squared interaction variable between htsta and nopoor	*tstnpsq*			
Interaction term between tst and d2	*tstd2*			*-0.232 (0.879)*
Interaction term between tst and d3	*tstd3*			*0.315 (1.665)*

Interaction term between tst and d4	*tstd4*			*-0.299 (1.062)*
Interaction term between tst and d5	*tstd5*			*0.238 (1.193)*
Interaction term between tst and d6	*tstd6*			*-0.231 (2.672)*
Interaction term between tst and d7	*tstd7*			*-0.747 (1.348)*
Variable description	*Variable name*	*Model 1*	*Model 2*	*Model 3*
Interaction term between tst and d8	*tstd8*			*-0.257 (0.656)*
Interaction term between tst and d9	*tstd9*			*-0.443 (0.858)*
Interaction term between tst and d10	*tstd10*			*-0.340 (0.775)*
Inverse Mills ratio	*invmills*		*-354.885* (191.452)*	*-182.984 (183.555)*
No. of observations		*2790*	*2790*	*2790*
No. of uncensored observations			*777*	*777*
Wald chi^2			*25.76*	*107.94*

***** significant at 1% level, ** significant at 5% level, * significant at 10% level*

The coefficient of the Inverse Mills ratio is statistically significant at only 10% level of significance, and only in the Model 2. This provides weak support to the need for estimating the model by controlling for possible selection of remittance recipients by using Heckman's procedure. The coefficient of the income variable, the main factor influencing both receipt and amount received, is negative and statistically significant in all models. Moreover, squared term of the income variable is positive and statistically significant in all three models. This confirms the hypothesis of negative, but nonlinear, impact of income of recipients on both the incidence and amount of remittances received. The key demographic characteristics influencing receipt of remittances, according to the results of the models estimated, are household's size, number of children in a household, place of living, as well as age, gender and employment status of a household's head[9]. These results are in line with the previous studies. More children in a household increase both the probability of receipt of remittances and the amount received.

[9] Also, other variables that were used in previous studies, such as age of household's head, marital status and other level of urbanity and education, were included in the initial specification of the model, but were statistically largely insignificant.

Negative sign of the coefficient for household size variable need to be interpreted taking into account that the variable on number of children in also included, thus this variable probably captures number of adult members in a household, for which we can expect to reduce incidence of receipt and amount of remittances received, holding other factors constant. Employment status of household's head reduces amount of remittances received, which is what we could have expected. Female headed households are more likely to receive remittances, which is also in line with most of previous studies (*e.g.* Menezes, 2007).

The coefficient of the key variable of interest in this study, the one on social transfers, is statistically significant and positive in the model 1. This suggests that the receipt of social transfers increase likelihood of receipt of remittances, *i.e.* that remittances are primarily driven by exchange motive. The same coefficient in models 2 and 3, once interaction terms are included in the model, needs to be interpreted carefully. Inclusion of interaction variables changes the meaning of original variables in a way that it represents the omitted category from the interaction term. Therefore, the interpretation of coefficients cannot be done separately, as they indicate differences between different categories, but they need to be summed up if we want to calculate the effect of variable for particular category on the dependent variable. In that sense, we present the table with calculated coefficients for each category, one by summing up coefficients for original variable and original coefficient for each new category representing difference between original variable (omitted category) and that particular category[10].

[10] These coefficients were calculated by using *lincom* command in STATA.

Table 4. Estimated linear combinations of coefficients

No	*Category*	*Coefficient*	*Standard error*
	Model 2		
1	*Social transfers – non-poor*	*-0.149*	*1.075*
	Model 3		
2	*Social transfers – decile 2*	*0.108*	*1.305*
3	*Social transfers – decile 3*	*-0.439*	*1.927*
4	*Social transfers – decile 4*	*0.176*	*1.434*
5	*Social transfers – decile 5*	*-0.361*	*1.538*
6	*Social transfers – decile 6*	*0.107*	*2.843*
7	*Social transfers – decile 7*	*0.624*	*1.662*
8	*Social transfers – decile 8*	*0.133*	*1.170*
9	*Social transfers – decile 9*	*0.319*	*1.293*
10	*Social transfers – decile 10*	*0.217*	*1.240*

Source: Own calculations

In model 2, the benchmark category is poor household. Consequently, original coefficient for social transfers measures their effect on receipt of remittances by poor households. Coefficient for interaction term between social transfers and dummy variable for non-poor households measures the difference in the effect of social transfers on remittance receipts between poor and non-poor. The coefficient in the table 2 measures the effect of social transfers on receipt of remittances by non-poor households. The coefficients for both poor and non-poor households are statistically insignificant, which suggests that the receipt of social transfers does not affect amount of remittances received. In model 3, although controlling for differences in income status between households in more detail, we do not observe significant effect of social transfers on the amount of remittances for any income deciles, as all coefficients are statistically insignificant.

The regression diagnostics tests do not reveal any significant problem that might affect validity of the estimated results[11].

[11] Detailed regression results, as well as results of diagnostic testing, are available from author on request.

6. Conclusions

The above empirical analysis of the existence of the "crowding out" effect is the first known study on this issue for Bosnia-Herzegovina. Therefore, although there is much room for improvement, the results presented above should provide useful insight into the existence of relationship between these two types of transfers, and consequently on the extent of contribution of these transfers to reduction of poverty and inequality in the country.

The results of the econometric estimation of the models of the relationship between remittances and social transfers suggest that the predominant motive for sending remittances to Bosnia is exchange. Remittance receipts increases as social transfers increase. This means that social transfers increase likelihood of receiving remittances, but not necessarily that they "crowd-in" remittances, as the effect of social transfers on the amount of remittances is not significant. This only means that there is significant degree of "matching" between social transfers and remittances receipts, or that the same individuals receive both types of transfers. As previous studies have shown, social transfers are category based and have relatively poor targeting and negligible impact on poverty in the country. This may be result of higher "social capital" by receivers of remittances which eases their access to social transfers. So, we might possible speak about the "crowding-in" effect of remittances on social transfers here. The results of the test for possible non-monotonic pattern in the motives for remittances do not support the hypothesis that remittances to poor people are primarily altruistically motivated, while those sent to non-poor are driven by the exchange motive.

The above results have important implications from a policy perspective. In a country with large social transfers that are category based and inefficient, inflows of remittances that are not pro-poor additionally decrease efficiency of social transfers and deepen inequality between recipients and non-recipients of either private or public transfers further. Consequently, inflows of remittances cannot be considered as a remedy for inefficient social transfer, but in contrary raise the importance of proper targeting of social transfers.

References

Adams, Richard H. Jr. and John Page (2003) **International Migration, Remittances and Poverty in Developing Countries**, World Bank Policy Research Working Paper 3179, December 2003

Adams, Richard H. Jr., Alfredo Cuecuecha and John Page (2008) **The Impact of Remittances on Poverty and Inequality in Ghana**, The World Bank Policy Research Working Paper No. 4732, September 2008

Albarran, Pedro and Orazio P. Attanasio (2002) **Do Public Transfers Crowd Out Private Transfers? Evidence from a Randomized Experiment in Mexico**, WIDER Discussion Paper No. 2002/6

Altonji, J., Hayashi, F., and Kotlikoff, L. (1997) **Parental Altruism and Inter Vivos Transfers: Theory and Evidence**, Journal of Political Economy 105(6), pp. 1121-1166.

Altonji, J.; Hayashi, F.; Kotlikoff, L. (2000) **The effects of income and wealth on time and money transfers between parents and children**, in Andrew Masson and Georges Tapinos (Ed.), Sharing the Wealth: Demographic Change and Economic Transfers between Generations, Oxford University Press

Bagsao, Liza Lorena C. (2004) **Who Helps Whom? Do the Poor Need the Government? An Analysis of Private Inter-Household Transfers As a Safety Net in the Philippines**, 9th National Convention on Statistics (NCS), EDSA Shangri-La Hotel, October 4-5, 2004

Becker, Gary S. (1974) **A Theory of Social Interactions**, Journal of Political Economy, vol. 82, no. 6

Bisogno, M. & Chong, A. (2002) **On the Determinants of Inequality in Bosnia and Herzegovina**, Economics of Transition, 10 (2), pp. 311-337

Coady, David P. and Rebecca L. Harris (2004) **Evaluating Transfer Programmes Within a General Equilibrium Framework**, The Economic Journal, 114 (October), 778–799

Cox, D.; Jimenez, E.; Eser, E. (1998) **Motives for private transfers over the life cycle: An analytical framework and evidence for Peru**, Journal of Development Economics, 55(1), 57-80.

Cox, D.; Hansen, B; Jimenez, E. (2004) **How responsive are private transfers to income? Evidence from a laissez-faire economy**, Journal of Public Economics, 88(9), 2193-2219

Cox, Donald, Emanuela Galasso and Emmanuel Jimenez (2006) **Private Transfers in a Cross Section of Developing Countries**, CRR Working Paper 2006-2

Docquier, Frédéric and Hillel Rapoport (2003) **Remittances and Inequality: A Dynamic Migration Model**, IZA Discussion paper 808

European Commission (2008) **Social Protection and Social Inclusion in Bosnia and Herzegovina**, Report to Directorate–General for Employment, Social Affairs and Equal Opportunities Unit E2

Ezemenari, Kene (1997) **The Link between Public and Private Interhousehold Transfers: Implications for the Design of Safety Net Programs in Developing Countries**, American Journal of Agricultural Economics, No. 79, pp. 666-671

Gibson, John, Susan Olivia and Scott Rozelle (2006) **How Widespread are Non-linear Crowding Out Effects? The Response of Private Transfers to Income in Four Developing Countries**, University of Waikato Working Paper in Economics 1/06

Glytsos, Nicholas T. (1993) **Measuring the Income Effects of Migrant Remittances: A Methodologgical Approach Applied to Greece**, Economic Development and Cultural Change, University of Chicago Press, vol. 42(1), pages 131-68

Gonzalez-Konig, Gabriel and Quentin Wodon (2005) **Remittances and Inequality,** Economics & Finance Working Papers EC200506, Universidad de Guanajuato

Ibreljic, Izet; Salih Kulenovic, Alma Kadusic and Sabahudin Smajic (2006) **Migration Flows in Bosnia-Herzegovina and Herzegovina after 1992**, 46th ERSA Congress, Volos, Greece

Koechlin, Valerie and Gianmarco Leon (2006) **International Remittances and Income Inequality: An Empirical Investigation**, Journal of Economic Policy Reform, Vol. 10, No. 2, 123–141

Lierl, Malte (2007) **Transfer Payments, Individual Income Composition and Inequality in Bosnia and Herzegovina**, Journal of Development and Social Transformation, Volume 3

Lipton M. (1980) **Migration from rural areas of poor countries: the impact on rural productivity and income distribution**, World Development 8, pp. 1-24

Menezes, António Gomes (2006) **Inter-Household Private Transfers and Underlying Motives: Evidence for Bulgaria**, CEEAplA Working Paper No. 02/2006

Nielsen, Mette E. and Pedro Olinto (2008) **Experimental Effect on the Crowding-Out Effect of Conditional Cash Transfers**, World Bank

Reil-Held, Anette (2004) **Crowding out or crowding in? Public and private transfers in Germany**, Sonderforschungsbereich 504 Working Paper No. 04-68

Sienaert, Alex (2007) **Migration, Remittances and Public Transfers: Evidence from South Africa**, University of Oxford – Economics Department Discussion Paper No. 351

Smajic, Senada and Sergio Ermacora (2007) **Poverty amongst Female-headed Households in Bosnia and Herzegovina – an empirical analysis**, SEE Journal 3, pp. 69-88

Stark, Oded, J. Edward Taylor and Shlomo Yitzhaki (1986) **Remittances and Inequality,** The Economic Journal, Vol. 96, No. 383. (Sep., 1986), pp. 722-740

Taylor, J. Edward, Katherine M. Donato and Shawn Malia Kanaiaupuni (2001) **Do Government Programs "Crowd In" Remittances?**, University of California

Taylor, J. Edward, Jorge Mora, Richard Adams and Alejandro Lopez-Feldman (2005) **Remittances, Inequality and Poverty: Evidence from Rural Mexico**, University of California, Davis Working Paper No. 05-003

Viet, Cuong Nguyen (2008) **Do Foreign Remittances Matter to Poverty and Inequality? Evidence from Vietnam**, Economics Bulletin, Vol. 15, No. 1 pp. 1-11

Vletter, Fion de(2007) **Migration and development in Mozambique: poverty, inequality and survival**, Development Southern Africa Vol. 24, No. 1, March

Wouterse, F. S. (2008) **Migration, Poverty and Inequality: Evidence from Burkina Faso**, IFPRI Discussion paper 00786,

World Bank (2003) **Bosnia and Herzegovina: Poverty Assessment**, Vol. I: Main Report, World Bank, Washington DC

World Bank (2006) **Bosnia and Herzegovina: Addressing Fiscal Challenges and Enhancing Growth Prospects, A Public Expenditure and Institutional Review**, Report No. 36156-BiH