Nermin Oruć

Self-Selection in Conflict-Induced Migration:
Micro Evidence from Bosnia

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Global Development Network Southeast Europe

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Nermin Oruc

Department of Economics

Sarajevo School of Science and Technology

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Nermin Oruc[1]

Abstract

This paper aims at contributing to the analysis of brain drain by focusing on countries in conflict. Here, experiences of migrants from Bosnia have been collected in order to identify specific determinants and patterns of migration in the conflict settings. Then, these observations were used to develop a theoretical model of conflict-induced migration, which identify possible mechanism of self-selection of migrants. Finally, a micro-level analysis of determinants of conflict-induced migration from Bosnia has been conducted, in order to provide empirical evidence for the theoretical model. The analysis was based on the World Bank's BiH LSMS 2001 household survey data. The main aim of this study was to identify possible self-selection mechanism of conflict-induced migration and its impact on the migration rates of highly skilled individuals. The empirical evidence supports the theoretical prediction of a mechanism of self-election present in the conflict-induced migration setting.

Key words: migration, conflict, brain drain, self-selection, relative deprivation, multinomial logit

1. Introduction

Two different trends affect increased interest of economists in the analysis of brain drain. First is increased popularity of new growth theories which give higher importance to the human capital, as a key engine of economic growth of a country. Second is migration from developing to developed countries which accelerated in recent years, with a trend of increased proportion of highly skilled migrants. The migration of highly skilled individuals from less developed countries, which already lack human capital, to more developed countries, where this capital is already

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[1] SSST, Bistrik 7, 71000 Sarajevo, Bosnia. nermin.oruc@ssst.edu.ba.

abundant, becomes one of the key obstacles for faster pace of the catch-up process of developing countries with developed countries. "There is a strong consensus that deficiency in human capital is a major cause of poor countries remaining poor" (Stark *et al.*, 1998).

Besides these two trends, there is a third trend that motivated the analysis presented in this paper. Along with economic type of emigration, recent years have witnessed increased number of conflicts which were characterized by mass forced resettlement of people, both internally and internationally. One of the particular features of recent conflicts in Balkans has been mass resettlement of population[2], typically called "ethnic cleansing"[3]. In order to understand the total consequences of conflicts, in the light of human capital based growth theories, we need to analyse the magnitude and consequences of the brain drain on the post-war economic recovery of a country. First, micro-level analysis needs to show whether individuals of different skills respond differently to the new set of push factors, which are in the case of conflicts not only economic, but also include risk factors. This analysis would identify possible self-selection mechanism of conflict-induced migration. Second, identified magnitude of brain drain from countries in conflict needs to be used to analyse consequences of such change in the human capital stock on the economic growth in countries in conflict, which may be of different kind compared to the consequences of brain drain from countries which did not experience a conflict, as conflict-induced brain drain is usually accompanied with large destruction of physical capital.

Empirical studies of costs of conflicts have not measured the costs of emigration of highly skilled individual directly in quantifiable terms. This was mainly due to the lack of data on migration by skill level from countries in conflict. But, it may be argued that taking these costs into consideration in measuring total costs of a conflict

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[2] For example, during the 44-moths war in Bosnia, around 50% of population has been displaced, almost a half of that internally, whereas 27% of population has emigrated accross the border.

[3] Ethnic cleansing could be defined as a war strategy to artificially create a territory with majority of population of a warring party's ethnic group by mass forced resettlement of population of all other ethnic groups.

is extremely important, because these costs cause additional costs of lost output in post-conflict period. Human capital is considered as the most important determinant of economic growth. Countries which suffered large destruction of physical capital, plus losses of male labour force and skilled individuals, will face a painful period of post-war reconstruction and development. The pace of this development will depend on the resources available, or the proportion of highly skilled individuals remained in the country. Thus, it may be argued that loss of highly skilled, through a process of emigration known as "brain drain", will negatively affect post-conflict economic recovery of a country.

The literature on determinants of brain drain has mainly focused on the cases of "non-conflict-induced" migration, where economic factors predominantly influence individual behaviour. In the case of brain drain, these studies develop models of self-selection mechanisms, explaining different impact of economic factors on migration decision of individuals with different skills (Borjas, 1987; Chiquiar and Hanson, 2002). There were also several studies on the determinants of conflict-induced migration (see, for example, Ibanez and Kirchoff, 2001; Kondylis, 2008), but with no focus on brain drain and identification of the self-selection mechanism of this type of migration. Therefore, there is a need for studies which would shed more light on the process of conflict-induced brain drain, in order to improve our understanding of determinants and consequences of brain drain, as well as of consequences of conflicts.

This paper focuses on a specific type of forced migration, which can be described as a conflict-induced migration, but which is one particular feature of more or less extensive forced eviction. The term "forced eviction", as defined in Leckie (1994), involves "coercive forcing of people from their homes and communities against their will and nearly always without their free and informed consent". This type of involuntary resettlement is common for many ethnic conflicts. It has characterised conflict in Bosnia during 1990s as well. So, the term "forced eviction" is being used in this study in order to distinguish "no choice" type of resettlement from other types of

forced migration which, although involving risk factors that force individuals to leave their homes, still might give certain degree of freedom to individuals to choose whether to stay or leave. This definition is not limited to the cases of conflict-induced migration, but also natural disasters and development induced displacements, which no rarely include such relocation of people without their consent. Thus, the findings of this study, if not to all, may be applicable to at least some the cases of conflict-induced migration, the ones characterised by forced evictions. And, certain findings may be useful for other types of forced displacement as well.

This study seeks to address specific determinants that influence conflict-induced migration flows and their composition by education level, as their observable skills, different then voluntary migration. Better understanding of the process of conflict-induced migration and factors that influence the magnitude of the brain drain as a consequence of a conflict, should be useful for estimating potential beneficial effect of this movement of tertiary educated individuals on a source country's economy, through remittances, human capital formation and network effect.

The paper is divided into the following sections. The next section presents the literature review. The third section introduces a reader into a specific case of conflict-induced migration from Bosnia, during the 1992-1995 war, providing brief descriptive analysis of the data, and presents the results of semi-structured interviews conducted, which give additional insight into the specific features of this case. The theoretical model of conflict-induced migration is developed and presented in the fourth section. Section five tests the model presented in the previous section using the combined World Bank's LSMS BiH 2001 and a Bosnian refugees' survey data, while the final section presents the conclusions.

2. Literature review

The importance of emigration of highly skilled individuals from developing countries has been recognized from the beginning of this literature. Several papers (Grubel and Scott, 1966; Berry and Soligo, 1969) discussed welfare implications to a sending country of emigration of highly skilled individuals, at a rather theoretical level and with different predictions about the sign of this impact. This interest in the skill distribution among migrants in the literature was raised particularly after the recognition of the importance of human capital for economic growth in endogenous growth models (Lucas, 1988).

The distribution of skills among population of migrants has generally been investigated in the framework of self-selection models, which offer explanation of the relationship between factors influencing emigration and skill composition of migrants. Thus, if highly skilled migrants are more responsive to specific determinants of migration in a particular migration context, it is said that migrants are positively self-selected. If the opposite is the case, and low skilled migrants are more likely to migrate in a response to specific determinants, then there is a negative self-selection of migrants.

In his seminal paper, Borjas (1987: 551) offered a model of self-selection of migrants applying the Roy (1951) model in the migration context. The Roy (1951) model is an alternative explanation of workers' labour market participation decisions. According to this model, individuals' choice of a sector in which to participate is not exogenous, but a result of income maximization strategy, where they self-select into a sector that gives them highest expected earnings. The sign of self-selection, or the distribution of skills among individuals, will depend on the variance in earnings between sectors. Borjas (1987) applied this model to migration in order to explain the skill distribution of migrants, treating countries as alternative sectors. In this two-country model, migrants make comparisons between earnings in

home and host country and those who have higher earnings in a host country are those who actually migrate. He assumes that these costs are time-equivalent and constant across all individuals. The model has ability to explain migration even if mean incomes between home and host countries are the same. In that case, individuals compare variance in the returns to skills between two countries. The sign of self-selection of migrants thus crucially depends on the wage dispersion between highly and low skilled in two countries. As richer countries have generally more equal distribution of income, the model predicts that self-selection of migrants in terms of their skills will generally have negative sign. The model has been empirically tested by comparing labour market performance of immigrants from Mexico to US, as a proxy for their unobservable skills, and found evidence of negative self-selection of Mexican immigrants in the US (Borjas, 1987).

Lack of data on migration by skills has limited the extent of empirical work on the self-selection of migrants in terms of their observable skills, *i.e.* their educational attainment. However, recent work on the collection of these data, first by Carrington and Detragiache (1998), and then by Docquier and Marfouk (2006), has opened the door to extensive work on the analysis of the determinants of brain drain. Brucker and Defoort (2006), in contrary to the prediction of the Borjas (1987) model, found evidence of positive self selection even if income inequality in a host country is higher than in a home country. McKenzie and Rapoport (2007: 24) investigated the role of migrant network in determining self-selection patterns of Mexico-US migration and found that the result of this effect in terms of self-selection depends on characteristics of the community. Thus, according to their empirical findings, migrants from communities with low migrant networks tend to be positively selected, and *vice versa*. Similar importance of migrant networks on determining the sign of self-selection was also found in Mora and Taylor (2006: 46), although it was found that this influence differs between different sectors of employment (farm versus non-farm). Orrenius and Zavodny (2001), in the analysis of self-selection of Mexican migrants to the USA, found that improvement in economic conditions on

both countries decrease, while more strict immigration policies increase the skill level of migrants. In the context of conflict-induced migration, findings from this study would suggest that a conflict, commonly worsening economic conditions in a source country should increase the skill level of migrants, while relaxed immigration policies towards refugees by host countries should decrease it. But, empirical studies using data about migrants from conflict areas are required for testing these assumptions.

Most studies on self-selection have focused on the economic determinants of migration, and have not taken into account non-economic determinants and how they can affect the selection process. Still, Chiswick (2000: 12) states: "favorable self-selectivity for labor market success would be expected to be less intense among those for whom migration is based primarily on factors other than their own labor market success". Moreover, according to Ibanez and Velez (2003), "unlike results in traditional migration models, better educated household are less willing to displace; probably better off households are able to adopt protective measures or have more accurate information regarding the opportunities in reception sites and prefer not to displace".

The main contribution of this paper is that it develop a model in which additional specific factors of conflict-induced migration, besides the risk factor, are introduced. As it has been generally accepted that economic factors of migration in the case of conflict do not disappear, although their influence on migration decision may diminish (Van Hear, 1998; Chiswick, 2000), the model proposed in this paper accounts for these factors and their change during a conflict. This has been done in the framework of Stark and Taylor (1991) relative deprivation model. This model is useful for analysis of the determinants of conflict-induced migration in a way it accounts for community characteristics and individuals' perceptions of their position in such a setting.

The relative deprivation hypothesis, introduced by Stark and Taylor (1991), states that individuals evaluate migration decisions not only on the basis of absolute,

but also of relative income differences within a community. The further below the average income in a community the individual earns, the more prone to migrate in order to improve their relative income position in a community she is. In the context of conflict-induced migration, this hypothesis is important as it helps explain the role of change in both absolute income and relative deprivation caused by a conflict, which acts as a self-selection mechanism of conflict-induced migration. Compared to the self-selection models of voluntary migration (Borjas, 1987), where migration is a one-stage process which is expected to bring increase in expected wage to the migrant, in the model proposed in this thesis the migration is modelled in two stages. Conflict-induced migrants are assumed to be the ones who do not have an incentive to migrate before the conflict. As a conflict occurs, their expected wage in a home country changes. This is the first stage of migration process. In the second stage, individuals compare their expected wage in the case of no conflict, the expected wage as a conflict occurs, and the expected wage if they migrate. The larger the difference in expected wages between situations with and without a conflict, the stronger the incentive is to individuals to migrate. This is what is called a "restoration hypothesis" in this paper. The self-selection mechanism in this context is the fact that the difference between expected wages in situations with and without a conflict is larger for individuals with higher observable skills. Once a conflict occurs, individuals from conflict-affected areas are very often forced to displace to other areas. They suffer significant welfare losses. Others, in non-affected areas, are also affected by decrease in economic activity in a country. The more skilled individuals are, either displaced or non-displaced, the more significant the income losses are. Besides absolute income, their relative position compared to a reference group is worsened. It might be expected that the highly skilled have stronger incentive to leave refugee camps and restore their pre-conflict level of income and welfare, and relative position in a community.

3. Bosnia during 1990s: Displacement issues

Conflict in Bosnia[4] has begun in April 1992, and finished in December 1995, by US backed negotiations in Dayton, Ohio. This war has become characterized by mass resettlement of people, as a result of the main goal of some warring parties to "ethnically clean" a territory they control. As a consequence of this, about half of the population was resettled during the war, where approximately 25% was displaced internally, and the other 25% migrated abroad (MHRR, 2005). The result was almost total division of population along ethnic lines, although the vast majority of Bosnian municipalities were mixed (with just a few municipalities having more than 80% of ethnic majority) before the conflict (BiH Census 1991)[5].

There is a wide debate among academics and migration researchers about the actual choices forced migrants face (Turton, 2003; Ibanez and Velez, 2003). It can be argued that in some situations, such as "ethnic cleansing" activities during a conflict, displacement of population by a government as a consequence of large developmental projects, or displacement due to natural disasters, households are literally forcedly evicted from their houses without having a choice to stay[6]. Therefore, it is a question whether this movement should be taken into account in modelling the decision process of forced emigrants. But, forced emigration is not always, or is mainly not, as simple as moving from point A to point B, but is rather a sequential process of searching for a new home. These other choices could be modelled.

First, two different types of municipalities are distinguished in which households could find themselves at the beginning of the war. Combination of the

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[4] There are different views of opposing parties in Bosnia about the type of this conflict. For those fighting on the government's side (mainly Bosnians), it was aggression by Serbia (international conflict) and for separatists (mainly Serbs) it was a civil war. The International Crime Tribunal for ex-Yugoslavia (ICTY), in several of its statements and verdicts, declared it was a civil conflict with international features.

[5] www.bhas.ba

[6] Although, in the case of natural disaster and development induced displacement, there is no selection element, *i.e.* they are indiscriminate events.

type of municipality and households' characteristics has strongly influenced displacement decisions made at this point of time in the war, based on their probability of threat, or forced eviction. The first type of municipalities, which can be called type A municipalities, are those in which households have not faced a direct threat, since the municipality has been controlled by authorities of the same ethnic group as the household. The level of indirect threat to households has been different, dependent on the proximity of the place to the fighting zones. But, the threat has been random. Type B municipalities were those in which households of an ethnic origin different from a group controlling the municipality have faced direct threat and were forcedly evicted from their houses. These people usually did not have a choice to stay, and also were generally not allowed to take any valuables with them. This type of displacement mainly took place in the first few months of the war. This type of displacement has been non-random, but dependent on the combination of household's characteristics and control of a municipality by a specific ethnic group. It is accepted that there were some households which were living in type B municipality, but decided not to leave; in spite of the risk such decision has carried. But, these were occasional cases, and it is expected that creating a variable by combining available data on ethnic origin and type of a local government in a municipality will capture the vast majority of cases. This variable should capture the effect of first "no-choice" displacement, or "forced eviction", and take into account loss of physical capital and other characteristics of the new situation which may affect further displacement decisions made by these households.

In addition, there have been takeovers of some municipalities by an opposing ethnic group. Since other ethnic groups have already been evicted, as explained above, this takeover usually implied eviction of the total population of the municipality, just at different points of time.

Although some households crossed the border immediately after being forced to leave these municipalities, the common pattern was that households leaving these places were displaced to the nearest municipality controlled by authorities of their

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ethnic group first. From that new destination, households were then making further displacement decisions.

There has been certain displacement observed from A type municipalities. Beside households displaced from B type municipalities, some households decided to leave their homes for different reasons, ranging from reasons predominantly motivated by security to reasons predominantly motivated by economic opportunities.

Different types of displacement in Bosnia may be presented in the following diagram in the form of a decision tree, where the oval shapes represent different possible locations of origin or destination, squares possible decisions to be made, and diamonds different conditions affecting the decision.

Figure 1. The pattern of displacement during the conflict in Bosnia
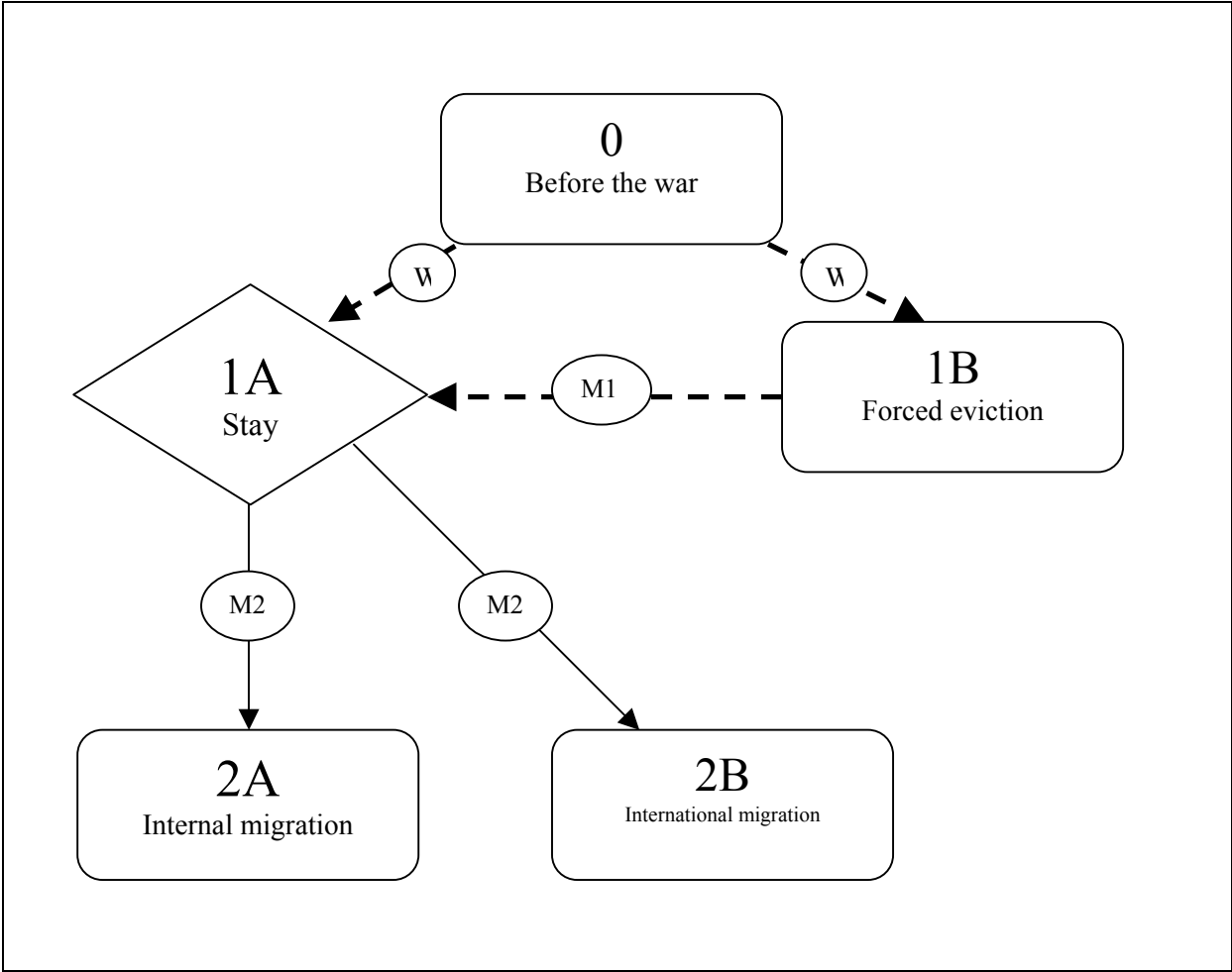
Source: Author

In the above figure, blocks represent the place of living of a household, a diamond a position at which they make displacement choice, broken arrows for exogenous change and full arrows for endogenous change in the utility and place of living. Arrows labelled by W represent changes in the utility and place of living due to war, and those labelled by M these change due to the migration. The above figure presents the pattern of displacement in Bosnia, as described in the presentation of the results of semi-structural interviews, as well as the idea of two-stage process of conflict-induced migration, which is the main contribution of the theoretical model developed below. The first block is a pre-war position of households, in terms of their utility and place of living. As a war occurs, people move from 0 to 1 (move presented by two broken arrows denoted by W from the block 0 to two blocks at the lower level of figure). The position of these households and the degree of change in the utility at the outset of the war differs depending on whether they found themselves in a more "friendly" environment, a municipality controlled by their ethnic group (block 1A) or more "hostile" environment, municipality controlled by another ethnic group (block 1B). Those from a "hostile" environment (B type municipality) were forced to displace to the nearest municipality controlled by their ethnic group. After these displacements (broken arrow denoted by M1), households are making decision whether to stay in this (pre-war or new) municipality (diamond 1A), to displace elsewhere within the country (block 2A), or to migrate abroad (block 2B).

The above analysis provides several interesting insights into the displacement patterns in Bosnia and Herzegovina. First, the experience of conflict is not standard across the country. Second, there has not been an optional choice involved in all types of displacement, *i.e.* we observe cases of "forced eviction" (M1). When placed literally into buses or given a deadline of a few hours to leave the town with well founded threat of being killed, households are not facing any optional choice. So, this decision should not be included into the model, since there is actually no element of choice in the decision made by a household. However, in the second stage, when

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households face a choice to stay in the home country as internally displaced or to seek refuge abroad, there is a decision process at work. Third, forced eviction has been non-random, meaning that households with specific characteristics were more likely to face displacement of "non-optional choice" type. After the forced eviction, the threat has been random. And finally, due to forced evictions, displaced households (ones from B type municipalities) have suffered more significant welfare losses than households from A type municipalities.

Accordingly, there are two types of conflict-induced migrants: those who decide to flee from their homes, in order to reduce the risk and/or for economic motives; and those who, once forced to leave their homes, decide whether to displace internally or internationally. Migrants of the first type are making a decision which is more "stay or go" decision, On the other hand, second type migrants, once displaced from their original place of living, are making a decision which is more a destination choice decision, since their "stay" decision is a choice of a first displacement destination.

The households who have been forcedly evicted from B type to A type municipalities (arrow M1 in Figure 1), not being able to transfer any physical capital, have suffered significant utility losses due to displacement. This may be an additional factor of displacement, as people may have a motivation to restore losses suffered during displacement. If tertiary educated individuals incurred greater welfare losses of emigration as a result of war (and having been forced to move), they may be more prone to emigrate in order to restore those losses. This would be a selection mechanism of conflict-induced displacement.

Households which emigrate from a conflict are not only looking for opportunities abroad, but also for restoring pre-war economic and emotional well-being. Consequently, the decision to emigrate will also depend on the difference between the current and pre-war economic situation of a household. If a household's living standard has been a function of observable characteristics, such as their age,

education level, place of living, this may be used to capture the differences in welfare losses of displacement between households.

4. Theoretical model

This model to a good extent follows the procedure used in the Stark and Taylor (1991) model, where they developed their relative deprivation hypothesis. Some of the steps of mathematical transformation were applied in the same way as in their model, in order to make these two comparable, to point out the main features of the new model and to show how it differs from voluntary migration models, such as the one presented in the Stark and Taylor (1991). The main difference in this sense is that the model proposed in this paper is presented as a two-stage process. In the first stage, households' utility is exogenously affected by conflict (change from 0 to 1A in the Figure 1). In the second stage, households' utility is changed as a result of their endogenous migration decision (change from 1A to either 2A or 2B in the Figure 1). This model is augmented by incorporating additional factors of forced migration from the model of Kirchhoff and Ibanez (2001). The most important feature of the proposed model is a new hypothesis based on the findings of descriptive analysis of conflict-induced migration from Bosnia, a "restoration hypothesis", which is incorporated into the model.

The **relative deprivation hypothesis** states that households evaluate migration decisions not only on the basis of absolute, but also of relative income differences within a community. The further below the average community income the household earns, the more prone to migrate in order to improve their relative income position in a community it is. Under the assumption of a continuous income distribution within a range $(x, x + \Delta x)$, the relative deprivation function of a household is presented by the following equation:

$$RD_i = \int_{y_i}^{y_h} g[1 - F(x)]dx \qquad\qquad\qquad (1)$$

Here, RD_i denotes the relative deprivation of household i, y_i income of household i, y_h the highest income in the reference group, $F(x)$ the cumulative distribution of income in a reference group, and $1 - F(x)$ the percentage of households whose income is higher than x. The equation in logarithmic form represents household i's relative deprivation as a function (g) of cumulative income of other households in a reference group whose income is higher than that of i.

The **"restoration hypothesis"** is based on the observation that conflicts affect households' utility in terms of the increase in risk and decrease in income. The conflict works as a shock to the economy of a country and results in decrease in economic activity, increase of prices, fall of real wages, *etc.* which causes decrease in the value of the income element of a household's utility function. As presented in the Figure 1, some households may experience additional decrease of both absolute income and relative position within a community (which affects their relative deprivation) through the losses of site-specific capital due to forced eviction and displacement (change from 1B to 1A). These additional losses are not random, since only households of specific characteristics were facing forced displacement. Based on this hypothesis, it may be expected that all households experience certain welfare losses due to conflict and that those which experience more significant losses, both absolute and relative, are more prone to migrate in order to restore pre-conflict level of utility. It could be also expected that households which were richer before the war will suffer higher absolute losses due to the war. Also, regarding the relative deprivation, it could be expected that richer households are worse-off in terms of change in relative deprivation, while poorer households may be even better-off in terms of change in relative deprivation, as a result of negative impact of a conflict on overall welfare.

In a simple framework, which applies to both voluntary and conflict-induced migration, a household will decide to migrate if:

$$U_{id} > U_{i0} \qquad\qquad (2)$$

where U_{id} denotes utility of a household i after displacement, and U_{i0} its utility with no displacement. But, if the two hypotheses presented above, first relative deprivation hypothesis developed by Stark and Taylor (1991) and restoration hypothesis proposed here, are incorporated into the model, it may generate different predictions.

If it is assumed that the migration decision is influenced by absolute and relative income, as well as by security considerations, then:

$$U_{ij} = U(Y_{ij}, RD_{ij}, S_{ij}) \qquad\qquad (3)$$

where U denotes utility, Y income, RD relative deprivation, S level of security, subscript i the individual observation (which is a household in this case), and subscript j the displacement decision, $j=0, 1, 2$, where 0 is the pre-war situation, 1 is a situation during-the-war and before displacement, and 2 is case of migration. Also, $\delta U_{ij} / \delta Y_{ij} > 0$, $\delta U_{ij} / \delta RD_{ij} < 0$ and $\delta U_{ij} / \delta S_{ij} > 0$. Here, S ranges between 0 and 1, where 0 is a case of forced eviction (from 1B to 1A in the Figure 1), and 1 is a case of pure voluntary migration (from 1A to 2A or 2B).

At this point, it is assumed that $U_{i0} > U_{i2} > U_{i1}$, where U_{i0} denotes household's utility before occurrence of conflict, U_{i1} its new utility, after the start of conflict and U_{i2} utility after migration. This assumption excludes the possibility of "bogus refugees"[7]. In this model, additional factors induce migration of households which would otherwise not migrate.

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[7] „Bogus refugees" are defined as individuals who intend to migrate voluntarily and, in the case of a conflict, are using the current political situation in a country in order to claim their rights for refugee status in a destination country.

The net utility loss from war (affecting all households in a country) and non-optional choice displacement (affecting a selected group of households) is then:

$$\Delta U_1 = U(Y_1, RD_1, S_1) - U(Y_0, RD_0, S_0) \qquad (4)$$

This is the first stage of the conflict-induced migration process. In order to include RD into the model and make the necessary mathematical operations, we need to transform equation (1) from a definite integral into linear form. Following Stark and Taylor (1991), the first-order Taylor-series transformation of the equation (1) around Y_0 is used[8]. After this transformation, Y_1 is expressed as $Y_0 + w_1$, and RD_1 is expressed as $RD_0 + RD'_0 w_1$, where $w_1 = Y_1 - Y_0$ is the household's income loss from conflict, and RD' a derivative of RD with respect to Y. Also, S_1 can be now expressed as $S_0 + r_1$, where r_1 is the household's loss of security, or increase in risk as a result of conflict. When substituting these into equation (4), the utility can be expressed as a function of Y_0, RD_0, S_0, w_1 and r_1. It is assumed here that $w_1 > 0$, or $Y_1 < Y_0$. There may be some exceptions, but it is expected that majority of households will be worse-off in terms of income after the occurrence of the conflict (it changes from 0 to 1A in the Figure 1). Also, it may be assumed that relative deprivation decreases, because of decline in the average income, which may have a positive impact on migration of the tertiary educated, because their "positive" relative deprivation actually decreases ($\Delta RD < 0$). Finally, it is assume that $r_1 < 0$, or $S_1 > S_0$, which means that risk increases with occurrence of a conflict.

$$\Delta U_1 = U(Y_0 + w_1, RD_0 + RD_0'w_1, S_0 + r_1) - U(Y_0, RD_0, S_0) = \phi(Y_0, RD_0, S_0, w_1, r_1)$$

$$(5)$$

where RD_0' is the change in relative deprivation with respect to Y, or maybe we could say "loss of positive relative" as a result of small decrease in income.

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[8] This transformation will hold only in cases of small changes in Y. This assumption is necessary for making Taylor's transformation. Unfortunately, this might affect precision of estimation of the impact of large decrease in income on the migration decision.

This means that change in utility from U_0 to U_1, as a consequence of a conflict (and, in some cases, displacement) is a function of initial income, initial relative deprivation and loss of absolute income and security during a conflict (and displacement). Here, it is expected that $\Delta U_1 < 0$.

The net utility gain from migration, after the "shock", or utility loss, is then:

$$\Delta U_2 = U(Y_2, RD_2, S_2) - U(Y_1, RD_1, S_1) = U(Y_1 + w_2, RD_1 + RD_1'w_2, S_1 + r_2) - U(Y_1, RD_1, S_1)$$
$$= U(Y_0 + w_1 + w_2, RD_0 + RD_0'w_1 + RD_1'w_2, S_0 + r_1 + r_2) - U(Y_0 + w_1, RD_0 + RD_0'w_1, S_0 + r_1)$$
$$= \theta(Y_0, RD_0, RD_1, S_0, w_1, w_2, r_1, r_2)$$

$$(6)$$

As a consequence, the migration decision in a conflict setting, when incorporating the effect of relative deprivation and relative loss of utility during conflict (and, in some cases, also forced displacement) depends on: the initial income level (Y_0); initial relative deprivation (RD_0) and relative deprivation after the forced eviction (RD_1); initial level of security (S_0), income loss of displacement (w_1) and income gain of migration (w_2),; as well as risk increase as a consequence of a conflict (r_1) and risk decrease as a result of migration (r_2). It is assumed here that at least one of the following inequalities holds:

$Y_2 > Y_1$, or

$RD_2 > RD_1$, or $\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ (7)

$S_2 > S_1$

which means that a household migrates in order to increase its utility from either increase in absolute income, or in relative income, or in security.

Any variable that increases the value of gain in income as a result of migration (w_2) should have a twofold impact on a household's incentive to migrate. First, it increases the absolute income. Second, it decreases relative deprivation. On the basis

of this, it may be assumed that conflicts that have severe impact on incomes on the economy (thus increasing the value of w_1) may act as self-selection mechanism for promoting emigration of tertiary educated individuals.

The theoretical model presented above, compared to the model of Stark and Taylor (1991), incorporates the risk factor and takes into account the two-stage process of conflict-induced migration. Therefore, it may be considered as a more appropriate model to be used in the context of forced migration. Compared to Kirchhoff and Ibanez (2001) model, this model along with the risk factor incorporates two hypotheses that are considered important factors influencing forced migration decision process, namely relative deprivation of Stark and Taylor (1991) and a new "restoration" hypothesis proposed in this paper. Such a model may be considered as designed to match specific features of conflict-induced migration better than previous models. As certain other types of migration share the same features of migration process with conflict-induced migration captured here, such as multi-stage process and an influence of a "restoration" motive, this model may be also used for other types of displacement characterised by a non-randomly targeting shock that changes utility of households and influences their displacement decisions.

5. Empirical evidence

Data

Data on the education level and other individual characteristics of non-migrants and internally displaced, as well as on types of places of living before and after migration, were collected from the World Bank's Living Standard Measurement Survey (LSMS) conducted among 5,400 households in 25 municipalities in Bosnia and Herzegovina in 2001[9]. This dataset is publicly available at the web site of BiH

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[9] There are later data available, but they are not relevant in our case, since this study is primarily interested in information from 1992 that this survey provides. Also, the surveys after 2001 contain responses from 3,000

Statistical Agency[10]. The same data for refugees were collected from a survey conducted by the author.

The LSMS survey has collected responses to the questions on migration from all members of a household older than 15. However, the displacement decision has been made predominantly at the household level[11]. Therefore, it is decided to take into account only responses provided by a head of household, thus having 5,400 observations. But, in 2839 questionnaires, there has not been a response to the question on the current status of a household, thus making impossible to determine the value of the dependent variable. Also, these questionnaire were missing many other responses to the questions from the module 8 (on migration), thus making them unusable.

The dataset has several important drawbacks related to this study. First, it does not contain the information on a household's income, which makes proper empirical estimation of the theoretical model very difficult, as it is not possible to create key variables on income, relative deprivation and changes of both for each household by using exact data. This has been solved by creation of proxy variables from the data available, which is explained in details below. Second, the LSMS dataset contains information on a respondent's place of living before the war and place of living at the moment of data collection in 2001. It does not have data on intermediate destinations of displaced people. So, it is not possible to say exactly what the first choice of displacement by these households was. For this reason, observations with value 2 (permanent residence – returned internally displaced person) and 3 (permanent status – returned refugee) from the question 9 of Module 8 have been removed; 202 observations in total. For households with temporary residence, it can be said that their current status reflects their first displacement

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households, thus the 2001 survey has been chosen as preferred because of the richness of the data from 5,400 households.

[10] www.bhas.ba

[11] This is confirmed by the results of semi-structured interviews, as well. Most of the respondents have stated that they have been displaced together with other members of a household.

decision, regardless of their possible movements between first and current place of displacement.

The LSMS survey was conducted among individuals who were living in Bosnia in 2001, and thus included four sub-groups of displaced households: internally displaced; returned internally displaced; returned refugees; and returned refugees - internally displaced[12]. The survey conducted by the author (based on the LSMS) covered Bosnian refugees, in order to collect responses on migration decisions from this group as well. The survey was conducted via e-mail[13], and 465 usable responses to the questionnaire were received.

Since these two surveys were conducted at different times and primary interest of this paper is the situation in 1992, some changes to the responses were made. For example, all responses to the question on age were recalculated to obtain the respondent's age in 1992. The responses to the question from the LSMS survey on the actual age of the respondent have shown that the oldest head of a household in the sample is 20 years old. On the basis of this, it has been decided to exclude all observations from our own survey where heads of a household were younger than 20 in 1992, thus creating dataset of household which heads were also heads of household at the beginning of the war and were key decision maker in the displacement process, so their individual characteristics can be used along with a household's characteristics. This way, the required information on 2798 households were available, including both those from the LSMS and from our own survey.

Living in a municipality of type B has been used as a proxy variable for being displaced with no choice, thus suffering significant welfare losses. For own survey

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[12] Some refugees have not been able to return to the place of their pre-war living after they have been repatriated to Bosnia. Thus, their status is changed from "refugees" to "internally displaced". In order to distinguish them from internally displaced who were not leaving their country during the war, these households were put into category called "refugees-internally displaced".

[13] Here, it is necessary to acknowledge the bias of a survey based on e-mail, particularly regarding the average education, age and ethnic origin of the sample – the descriptive analysis of the data have shown that this group has more years of education, are younger and majority of them are Bosnians. But, a survey of a population currently living in more than 50 countries and all 5 continents could not have been conducted any other way. Also, these data were merged with LSMS data on returned refugees, and treated as a single "refugees" group, which reduced this bias in the subsequent regression analysis.

data, this variable has been created by combination of the data for a household's ethnic origin and the ethnic group controlling a municipality during the war. Households of the same ethnic group as the one controlling a municipality were considered as living in a municipality of type A. All other ethnic groups were considered as living in a type B municipality. If a municipality was taken over by another ethnic group during the war, then all households from such municipalities were considered as living in a type B municipality. For the LSMS data, information on the ethnicity of a household were not available, so this variable was created by combining current displacement status of a household and their pre-war and current places of living. For example, those which stated that have not changed their place of living during the war, households from non-migrants group, were considered as living in type A municipality. For the internally displaced, their responses on municipalities of living immediately before the war and at the time of being interviewed were compared and conclusion on their ethnic origin made.

Model

A model with three different choices available - to stay, to displace internally, or to migrate abroad – is analysed. Each of these decisions depends on a set of factors presented in the equation (6). These are initial income level, initial relative deprivation, relative deprivation after the displacement, and factors expected to influence both expected income losses of conflict and expected income gains of migration.

To analyse a model characterised by an unordered response dependent variable, which is a probability of making a particular migration decision, and with more than two possible migration decisions (three in our case - to stay, to displace internally, or to migrate abroad), the appropriate estimation method is multinomial logit. In a similar context, Stark and Taylor (1991) also used a multinomial logit model.

The probability that a utility maximising household will choose a particular type of displacement (either internal or international) is:

$$P(d^*) = P[U(Y_{d^*}, RD_{d^*}, S_{d^*}) > U(Y_1, RD_1, S_1), \text{and}$$
$$U(Y_{d^*}, RD_{d^*}, S_{d^*}) > U(Y_{d'}, RD_{d'}, S_{d'})]$$

(8)

Where d^* denotes migration type chosen, and d' migration type not chosen.

If the utility functions in equation (8) are substituted by their Taylor-series approximations, then the resulting equation is:

$$P_{d^*} = P[\Delta U_{d^*,1} > 0 \text{ and } \Delta U_{d^*,d'} > 0]$$

(9)

where

$$\Delta U_{d^*,1} = U(Y_0 + w_1 + w_{d^*}, RD_0 + RD_0'w_1 + RD_1'w_{d^*}, S_0 + r_1 + r_{d^*})$$
$$- U(Y_0 + w_1, RD_0 + RD_0'w_1, S_0 + r_1)$$

(10)

and

$$\Delta U_{d^*,d'} = U(Y_0 + w_1 + w_{d^*}, RD_0 + RD_0'w_1 + RD_1'w_{d^*}, S_0 + r_1 + r_{d^*})$$
$$- U(Y_0 + w_1 + w_{d'}, RD_0 + RD_0'w_1 + RD_1'w_{d'}, S_0 + r_1 + r_{d'})$$

(11)

If w_d is now replaced by X, a set of variables influencing the change in income, and r_d is replaced by Z, a set of variables influencing the change in security, then the household's probability of making a migration decision of particular type (the dependent variable of the model to be estimated) is:

$$P(d^*) = \varphi(Y_0, RD_0, S_0, X, Z)$$

(12)

If a set of explanatory variables is denoted as V, then the logit equation will be:

$$P(d^*) = \frac{\exp(\beta_{d^*}V)}{1 + \sum_{d=1}^{2b} \exp(\beta_d V)} \tag{13}$$

where d^* denotes two migration types, $d^*=2a$ is internal migration and $d^*=2b$ is international migration. The reference category is no migration. Since all the probabilities have to sum up to 1, the probability for the reference category is calculated as a difference between 1 and the calculated probabilities for the different migration types, and can be presented as:

$$P(1) = \frac{1}{1 + \sum_{d=1}^{2b} \exp(\beta_d V)} \tag{14}$$

The model in linear form, which is to be estimated, is:

$$\ln \frac{p_{d^*}}{p_{d'}} = \beta_j V \tag{15}$$

The data collected do not contain the information on the income and relative deprivation of a household. Level of education and gender of a household's head are expected to capture the initial income of a household. In order to capture this effect more properly, the interactive variables between education and gender were also created. For relative deprivation, interactive variables between a household head's education and place of living (whether it was urban, mixed or rural household) were created. Place of living was considered as a proxy for a community level income. The variable on the change in income has been created on the basis of information about the household's education (as a proxy for its education) and the type of a municipality in which a household lived at the outset of war (whether it was type A or type B municipality). This should control for the influence of different degree of losses households which have been forcedly evicted suffered compared to other households, and to test the "restoration" hypothesis.

The data collected and variables created enable us to estimate the following model, with two different specifications. The main reason for two different specifications is checking the sensitivity of results of the model to different design of the education variable. If we present education (EDU) as a continuous variable, we need to make strong assumption of equal spacing between different levels of education. Although it's more straightforward to interpret single equation, we need to check for possibility of non-equal spacing[14]. In the first specification, education variable (EDU) is included into the Model 1 as a continuous variable on years of education of a household's head, while in Model 2 it is presented as a single dummy variable on the tertiary education of a household's head.

Both specifications of the model to be estimated can be presented by following equation:

$$\hat{y}_i = \beta_0 + \beta_1 FE\hat{M}D_i + \beta_2 A\hat{G}E_i + \beta_3 HHS_i + \beta_4 EDU_i + \beta_5 BMD_i + \beta_{6j} EDUF_i$$
$$+ \beta_7 EDUBMD_i + \beta_8 MIXED + \beta_9 URBAN + \beta_{10} EDUMIX_i + \beta_{11} EDUURB_i + \beta_{12} M\hat{E}D_i + \hat{u}_i$$

$$(16)$$

where:

$\hat{y}_i$ – a dependent variable to be estimated, which in a context of a multinomial logit is a probability that a household will make a particular migration decision (to migrate internationally, to displace internally, or to stay),

FEMD$_i$ – a dummy variable taking the value of 1 if a head of household is female, 0 if male,

AGE$_i$ – age of a household head, in years,

HHS – a variable for a household's size, in number of household's members,

EDU$_i$ – a variable for the education level of a head of household, which is expressed in years in the Model 1, and as a single dummy variable for tertiary education in the Model 2,

BMD$_i$ – a dummy variable taking the value 1 if a household's head was living in a type B municipality immediately before the war, 0 otherwise,

EDUF$_i$ – interactive variable between education and gender of a household's head,

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[14] The model was also estimated by including a set of indicative varibles for the highest degree achieved by the household's head. But, as only the varaib le for tertiary educaion level appeared to be statistically significant, it was chosen to estimate and report a model with a single dummy variable for tertiary education (Model 2).

EDUBMD$_i$ – an interaction variable of EDU and BMD variables,

MIXED$_i$ and URBAN$_i$ – a set of two indicative variables on different types of places of living, rural or urban, compared to rural place as a reference category

EDUMIX$_i$ and EDUURB$_i$ – a set of two indicative variables for interaction between education and type of place of living (mixed or orban, rural place of living as a reference category),

MED$_i$ – migration experience dummy variable, taking the value 1 if a head of household place of living immediately before the war is different from her/his place of birth, 0 otherwise,

u$_i$ – error term.

The base outcome in both specifications is set to be stay option, as the dataset contains most observation (more than 50%) on this option, compared to other two options.

Variables FEMD, AGE, EDU and interaction between FEMD and EDU are expected to capture the effect of initial income, while BMD variable and its interaction with EDU variables should capture the effect of different levels of change in income that affected different households. Interactive variables between EDU and two indicative variables for type of place of living (MIXED and URBAN) are the best possible proxies for relative deprivation of a household, taking into account limitations of the data available.

Positive (negative) sign of coefficient on the education variable (EDU) should suggest that more educated households are more (less) likely to emigrate abroad, which would give an answer to our question about potential selection mechanism in the process of conflict-induced migration. This finding would be further supported by the cross-country analysis of determinants of the magnitude of brain drain.

With regards to the household's size (HHS), and gender of a household's head (FEMDV), it is not quite clear what to expect *a priori*, because these variables may influence the migration decision in two different ways, affecting it in opposite direction. Household with more members and a female head may be more risk averse (particularly regarding the children) and be more prone to emigrate. But, on

the other side, larger and female headed household may be less mobile and have higher family-level costs of displacement.

Type of the municipality, related to the type of threat, whether it's the A or the B type of municipality, is determined by combination of information on a household's ethnic origin and place of living immediately before the war. The place of living immediately before the war is marked as being under control of a particular ethnic group by information gathered from different newspapers and TV stations on the history of war in Bosnia and Herzegovina at the municipality level. Then, households of the same ethnic group as the one controlling a municipality were defined as living in a type A municipality. Households from other ethnic group were characterised as living in type B municipality. If a municipality was changing ethnic group which is controlling it, due to military operations, then all households from such municipalities were defined as living in type B municipality. Obviously, this is not the perfect measure of the threat to households during the war. Some households decided to stay in their houses, in spite of the risk to their lives, and some decided to collaborate with new local government run by the different ethnic group. Still, according to the available data, it is acceptable that the suggested variable will capture the vast majority of cases, since more than 95% of households from municipalities controlled by other ethnic group were displaced during the war.

A dummy variable on whether household head has changed her/his place of living between birth and 1992 (MED) has been created from responses to the question about their place of living when born and in 1992, in order to control for their migration experience. Here, we should expect a positive sign for the coefficient on this variable.

Results

The multinomial logit estimation of two different specifications of the model has been performed[15]. The estimated relative risk ratios[16] of the coefficients, and standard error in parentheses, are provided in the table below.

Table 1. Regression results of multinomial logit models

Variable name	Variable description	Model 1		Model 2	
		2A[17]	2B	2A	2B
FEMD	Gender of a household's head	1.66	1.12*	1.56***	5.98*
		(1.11)	(0.01)	(0.43)	(1.52)
AGE	Age of a household's head	0.97*	0.87*	0.98**	0.87*
		(0.01)*	(0.01)	(0.01)	(0.01)
HHS	Size of a household	1.04	1.10	1.05	1.12***
		(0.07)	(0.07)	(0.07)	(0.07)
EDU	Education of household's head	0.95*	1.53*	1.23	1.18*
		(0.04)	(0.13)	(1.23)	(1.12)
EDUF	Interaction variable between EDU and FEMD	0.99	0.84*	0.88	0.34*
		(0.05)	(0.06)	(0.46)	(0.13)
EDUBMD	Interaction variable between EDU and BMD	0.89	1.15*	0.81	1.46
		(0.08)	(0.12)	(0.07)	(1.24)
MIXED	Mixed place of living	0.01***	0.01**	0.53	0.55
		(0.00)	(0.00)	(0.29)	(0.33)
URBAN	Urban place of living	0.43	0.35	0.85	3.43*
		(0.30)	(0.36)	(0.23)	(0.99)
EDUMIX	EDU - MIXED	1.60***	1.93**	1.42	6.94
		(0.45)	(0.54)	(2.50)	(9.94)
EDUURB	EDU - URBAN	1.05	1.18**	0.59	0.67
		(0.06)	(0.10)	(0.59)	(0.62)
MED	Migration experience of a household's head	0.21*	0.15*	0.20*	0.14*
		(0.05)	(0.03)	(0.05)	(0.02)
	Number of observations	2272		2272	
	Log likelihood	-800.587		-842.84	

* significant at 1% level of significance
** significant at 5% level of significance
*** significant at 10% level of significance

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[15] Detailed regression results are available from the author at the request.

[16] Relative risk ratios are exponential values of multinomial logit model coefficients, rrr=e^coeff. This means that the values of estimated coefficients above 1 should be interpreted similar to positive values of the classical OLS coefficients, and values below 1 as negative values. If the value of a coefficient is above 1, then the likelihood of the certain outcome compared to the base outcome is higher, and if the value is below 1, it's lower.

[17] Results in columns named 2A are results from multinomial logit for the outcome „internal migration", and results in columns 2B for the outcome „international migration".

Results of Model 1, with education (EDU) presented as a continuous variable on years of education, are presented in columns 3 and 4 of the table. Results of Model 2, where education variable is presented as a single dummy variable for tertiary education, are presented in columns 5 and 6. Columns 3 and 5 of the table present the estimated coefficients for internal migration from two models, compared to base outcome 0, which is non-migration. Columns 4 and 6 part of the table present the estimated coefficients for international migration from two models, also compared to base outcome of non-migration.

Positive sign and statistical significance of the marginal effects of the household head's gender (FEMD) for decision to migrate internationally relative to decision to stay, along with its insignificance for the internal migration outcome, suggests that household with female head of household are more likely to migrate internationally than internally. This may not be (only) due to the different risk assessment and aversion towards risk by female heads of a household, but due also to the mobilization of male heads of households into the army, which may reduce their mobility. The opposite situation is with the marginal effects for the age variable (AGE), which appear negative and statistically significant in both models and for both outcomes. This can be interpreted as an indication that the age of household's head reduces mobility of the household, *i.e.* that households with older household head are more likely to stay than to migrate. Previous migration experience of a household's head surprisingly appears to be negative and significant in all models.

The positive sign of marginal effect for education (EDU), either expressed in years of education or as a dummy variable for tertiary education, in the case of international migration relative to non-migration, and negative sign for internal migration relative to non-migration, suggests the possibility of self-selection of conflict-induced migrants in terms of their observable skills. This is contrary to assumptions made by Chiswick (2000) and Ibanez and Velez (2003), and in line with Kondylis (2008) findings.

A dummy variable that captures degree of change in absolute income during the war, capturing the information whether a household has been displaced with non-optional choice, thus loosing most of its pre-war assets, appears to be statistically insignificant. Moreover, the interaction term between education and forced eviction dummy (EDUBMD) is statistically significant in the first model and for international migration only. The sign of the marginal effect for this variable is positive, as would be predicted from the theoretical model. We could say that, once being displaced, households with a more educated head are more likely to displace abroad than to stay. This supports the idea from the theoretical model developed in this study that more educated households have stronger incentive to restore their pre-war well-being[18], thus being more likely to migrate abroad.

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[18] This incentive is explained through the "restoration hypothesis" introduced by this study.

6. Conclusions

The main contribution of this study is an attempt to develop a theoretical model of conflict-induced migration, which would capture its specific features that distinguish this from other types of migration. This model has been developed from the observations on the displacement process from Bosnia gathered from semi-structured interviews, thus incorporating specific features of this case into the theoretical model. Such a model then served as a basis for empirical analysis of the data collected among Bosnian households. Although being developed to capture the specific case of displacement from Bosnia, characteristics of this case still make it more general and applicable to other cases as well. These cases include not only conflict-induced, but to a certain extent also development and natural disasters induced displacement events.

In order to analyse possible self-selection mechanism of conflict-induced displacement, within a framework of the theoretical model developed previously, this study provides micro-level analysis of determinants of migration from Bosnia, based on the household surveys. Results from this study support the idea of possible positive self-selection mechanism of conflict-induced migration, since they suggest that more educated individuals are more likely to displace internationally, instead of internally, during a conflict.

These findings suggest that conflict do not only produce increased emigration figures, but also may increase proportion of tertiary educated individuals. It needs to be taken into account in the analysis of the overall consequences of conflict, as human capital depletion will have significant negative impact on the post-conflict recovery of a country.

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