

**IMPACT OF ETHNIC CLEANSING ON HUMAN CAPITAL  
FORMATION: EMPIRICAL EVIDENCE FROM BOSNIA-  
HERZEGOVINA**

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A thesis submitted in partial fulfilment of the requirements of Staffordshire University  
for the degree of Doctor of Philosophy

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## **Declaration**

I hereby declare that this thesis is my own work and that, to the best of my knowledge, it does not contain material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgement has been made in the text.

Sarajevo, 15.02.2011.

Nermin Oruc

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# Table of contents

Acknowledgments _____	ii
List of tables _____	vii
List of figures _____	viii
Abstract _____	ix
Preface _____	xi

## 1. Introduction

Introduction _____	2
1.1. Forced migration and population transfer _____	3
1.2. Ethnic cleansing _____	5
1.3. Brain drain in the context of ethnic cleansing _____	10
1.4. Aims of the thesis _____	13
1.5. Structure of the thesis _____	15

## 2. Literature review

Introduction _____	19
2.1. Determinants of migration _____	20
2.2. Brain drain – determinants _____	25
2.3. Brain drain – consequences _____	35
2.3.1. Incentive effect: Brain drain or brain gain _____	35
2.3.2. Remittances and educational attainment _____	39
2.3.3. Return migration _____	44
Concluding remarks _____	51

### **3. A Contribution to the Economic Theory of Ethnic Cleansing**

Introduction	54
3.1. Motivation: Ethnic cleansing as a specific type of migration	57
3.2. A background: Displacement in Bosnia-Herzegovina during 1990s	60
3.3. Theoretical model of ethnic cleansing	68
3.4. Models of brain gain in the context of ethnic cleansing	79
3.4.1. Incentive effect	80
3.4.2. Remittances and educational attainment	84
3.4.3. Return migration	86
Concluding remarks	87

### **4. Empirical evidence on brain drain under ethnic cleansing**

Introduction	90
4.1. Household-level study: The case of Bosnia-Herzegovina	92
4.1.1. The model	92
4.1.2. Data	95
4.1.3. Results	106
4.2. Cross-country study	110
4.2.1. Model and data	110
4.2.2. Results	117
Concluding remarks	120

### **5. Empirical evidence on brain gain under ethnic cleansing**

Introduction	123
5.1. The incentive effect	124
5.1.1. Description of the effect	124
5.1.2. The baseline model	126
5.1.3. Data	130

5.1.4. Results	133
5.1.5. Estimation of alternative specifications	136
5.2. Remittances effect	144
5.2.1. Description of the effect	144
5.2.2. Background: Remittances and education in Bosnia-Herzegovina	148
5.2.3. Data	153
5.2.4. Empirical approach	158
5.2.5. Results	168
Concluding remarks	172
<b>6. Conclusions and policy recommendations</b>	
Introduction	175
6.1. Main conclusions	175
6.1.1. Negative impact of ethnic cleansing	177
6.1.2. Positive impact of ethnic cleansing	179
6.1.3. Possible net effect	180
6.2. Contributions of the thesis	181
6.3. Policy recommendations	182
6.4. Additional outcomes of the thesis	185
6.4.1. Lessons learnt	185
6.4.2. Limitations of the research	186
6.4.3. Directions for further analysis of the topic	187
<b>References</b>	189
<b>Appendices</b>	207

## **List of tables**

- Table 3.1. Types of households based on the receipt of remittances and migration status
- Table 4.1. Relationship between the theoretical model, data and empirical model.
- Table 4.2. Descriptive statistics of variables used in the empirical estimation
- Table 4.3. Relationship between variables and categories
- Table 4.4. Results of the logit model estimation
- Table 4.5. Results of the logit model estimation, by category
- Table 4.6. Descriptive statistics of the variables used in the macro model
- Table 4.7. Results of the estimation of the macro model
- Table 5.1. Descriptive statistics of variables
- Table 5.2. OLS estimation results of the baseline model
- Table 5.3. Estimation results of the alternative models.
- Table 5.4. Recipients of remittances by category
- Table 5.5. Recipients of remittances by decile
- Table 5.6. Official statistics about different levels of education, 2006
- Table 5.7. Summary descriptive statistics of variables
- Table 5.8. First-stage results of probit model of the Heckman's two stage procedure
- Table 5.9. Second-stage results of OLS model of the Heckman's two stage procedure
- Table 6.1. Summary overview of the differences in the effect between voluntary migration and ethnic cleansing



## **List of figures**

Figure 3.1. Flows of effects of migration on human capital formation in a home country

Figure 3.2. Brain drain and brain gain in individual type migration

Figure 3.3. Brain drain and brain gain in group type migration

Figure 3.4. The pattern of displacement during a conflict

## **Abstract**

The main aim of this thesis is to analyze the economic consequences of ethnic cleansing in the countries affected, with particular focus on Bosnia and Herzegovina. As one of the key distinguishing characteristics of ethnic cleansing is mass displacement of people, it focuses its investigation on the impact of ethnic cleansing on the stock of human capital in the country affected. Using the framework of the analysis of brain drain developed for voluntary migration, the further analysis is divided into two parts: the first part deals with the negative consequences of ethnic cleansing for human capital through emigration of highly educated (brain drain), while the second part deals with positive reverse effects of such emigration (brain gain). This should eventually allow us to estimate the net effect of migration on the stock of human capital in the country affected by ethnic cleansing.

The analysis of the brain drain caused by ethnic cleansing starts with the development of a theoretical model that explains the impact of ethnic cleansing on emigration of highly educated individuals. The model is based on the models of self-selection and amended by incorporating a “restoration” hypothesis, originally developed in this thesis. This model is then tested by two different empirical studies. In the first study, a household level data from Bosnia-Herzegovina was used in order to measure the impact of different factors affecting the household’s decision to migrate. In the second empirical study, country level data were used to measure the difference in the magnitude of brain drain between countries with different histories of conflict.

The second part of the thesis provides the empirical evidence on brain gain by using two different studies. In the first study, country level data were used to analyze the possibility of the “incentive effect” that increases the stock of human capital in the country as a result of migration. In the second study, household level data were used to analyze the effect of remittances inflows on the

increase of human capital through increased educational investments by households receiving remittances.

By providing evidence on both brain drain and brain gain effects, this thesis gives comprehensive insight into the impact of ethnic cleansing on the stock of human capital in a country. The main findings of these studies are that the negative effects are stronger, while positive effects are weaker compared to the voluntary migration. This suggests that the net effect of ethnic cleansing on human capital stock in a country is likely to be negative. In addition, the thesis offers a new theoretical model of ethnic cleansing which can also, with minor amendments, be used in the context of natural disasters induced and development induced displacement.

## Preface

Many conflicts in recent history, from Palestine to the Balkans, were characterized by mass forced displacement of people. Yet, there has not been any comprehensive analysis of the economic impact of such displacement on the countries affected. Also, the estimates of the overall costs of a particular conflict usually neglect the costs of emigration of people, despite the fact that human capital is considered as a key factor of economic growth by economists. In the analysis of the brain drain, migration theory to date has not distinguished between different types of migration based on the predominant motives for migration. However, the major migratory movements in history have been the result of forced displacement of people, based on race, religion or ethnicity. Once forced to move from their homes, these people have a particular incentive to migrate abroad. The events that cause the largest forced evictions of people from their homes are ethnic cleansing, natural disasters and some development projects. Expected climate change, as a consequence of global warming, will even increase the frequency of such events in the future. Consequently, this thesis analyzes the impact of ethnic cleansing, as a type of conflict that is characterized by mass displacement of people, in the framework of migration theory, by analyzing the impact of such displacement on the magnitude of emigration of highly educated people and the impact of such emigration on the stock of human capital in a country. This way the thesis contributes to both the theory of the cost of wars and the migration theory. It does so by emphasizing additional negative impact of conflicts through the emigration of highly educated people and analyzing migration theories of the brain drain in the specific context of forced migration.

The work on the thesis begins with identifying the distinguishing features of conflicts characterized by ethnic cleansing. All conflicts generally share the same features in terms of their economic consequences such as destruction of physical capital, decrease in economic activity, loss of direct investments, loss of income from tourism and many other identified in the costs of war

literature. Yet, the key distinguishing feature of conflicts characterized by ethnic cleansing is large displacement of people that causes depletion of human capital through emigration of highly educated people. Consequently, further work was focused on the analysis of the magnitude of depletion of human capital as a result of displacement of population.

In order to better understand the process of ethnic cleansing and its impact on the emigration of highly educated people, a number of interviews with people who experienced forced displacement in Bosnia-Herzegovina were conducted. Bosnia-Herzegovina was chosen for research as one of the most severe examples of ethnic cleansing in recent history. The interviews provided additional insight, besides my personal experience, into the process of ethnic cleansing. This was used for the development of the theoretical model of forced displacement. Based on the findings from the interviews, the model of forced migration was developed where emigration is seen as a second step, or consequence, of ethnic cleansing, whereas the first step is forced eviction. This allows us to analyze the impact of forced displacement on the depletion of human capital through emigration of the highly educated, by incorporating specific features of the ethnic cleansing into the model. The model was empirically tested by using household level data from Bosnia-Herzegovina. The results of the model have measured the extent to which different factors influence an individual's decision to migrate, once they were forcibly evicted from their homes.

The empirical study used both the data from the World Bank's Living Standard Measurement Survey (LSMS), as well as a small scale survey conducted by the author of the thesis. As the LSMS survey was conducted among people living in Bosnia-Herzegovina at the time of the survey, thus covering only non-displaced and internally displaced people, an additional survey was necessary in order to collect data about refugees from Bosnia-Herzegovina in other countries. The completion of that survey was financially supported by the WIIW, through their GDN grant. Moreover, they organized two workshops and financially supported the author's participation at the GDN 2009 conference, which gave him the opportunity to discuss preliminary results and receive

invaluable comments and suggestions that greatly contributed to further improvements of this work. Additionally, the theoretical model was presented at the GDN conference in Kuwait in 2009 and the empirical results were presented at the conference organized by the University of Leeds in 2010.

As the literature review shows, besides measuring negative consequences of brain drain, the possible positive feedback effects of such migration should not be disregarded. In order to get a comprehensive and unbiased analysis of the economic consequences of ethnic cleansing, the second stage of the thesis was devoted to the measurement of possible positive effects of emigration of highly educated people on human capital accumulation in the home country of migrants. This analysis was completed by two different empirical studies. In the first study, country level data were analyzed in order to reveal the impact of emigration on human capital accumulation in the country.

In the second study, two different household level datasets were used to analyze the impact of remittance receipt by households on their education investment decisions. The first dataset used was again the LSMS dataset, which was also used in the micro level study of the determinants of brain drain. The second dataset used here was the dataset collected by the survey organized by the author and financially supported by an Austrian Science and Research Liaison Office (ASO) grant.<sup>1</sup>

Besides work on the four different studies completed as part of this thesis, several other research projects were completed, increasing the author's knowledge of the topic, improving his research skills and experience and giving him the opportunity to discuss various issues related to the topic of the thesis with a large number of researchers and practitioners. All these were extremely helpful in the work on the thesis. First, the study on the relationship between remittances and social transfers and the possibility of the "crowding-out" effect was completed, which revealed that the predominant motive for remittances to Bosnia-Herzegovina is altruism. Also, the study on the impact of migration and remittances on poverty and inequality in Bosnia-Herzegovina was completed. The experience of this study was applied in the case of the study on the impact of

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<sup>1</sup> ASO also financially supported the organization of a dissemination workshop, where the author received comments on the first results that contributed to further improvement of this study

remittances on education completed in this thesis, by creating an individual level variable for households' expenditures on education, by decomposing total household's expenditures on all children into expenditures per each child. The variable was created in a similar manner as a variable for individual expenditures is usually created in poverty studies, by using equivalence scales. Also, this provided a solution for the appropriate specification of the model in order to capture the impact of remittances, by dividing the effect between different consumption quintiles. Additionally, the study on the impact of forced displacement on the development of urban poverty was completed.

After detailed discussion of each section of the thesis separately and deep critical investigation of the empirical results from four different studies comprised in the thesis with the thesis supervisors, as well as collection of feedbacks from a wide audience of theorists and practitioners in this field through a series of workshops and conferences, there is a sufficient level of confidence at the moment that the thesis can finally be offered for the most important review, the one by the internal and external examiners. Acknowledging that there are many opportunities for improvement that will hopefully be used in the author's future career, we can only wish this thesis to be used by policy decisions makers and by other researcher in this field with the intention of improving our understanding of ethnic cleansing, their consequences and possible solutions for preventing and minimizing the negative impact of these events in the future.

# ***Chapter 1: Introduction to the thesis***

## ***Introduction***

***1.1. Forced migration and population transfer***

***1.2. Ethnic cleansing***

***1.3. Brain drain in the context of ethnic cleansing***

***1.4. Aims of the thesis***

***1.5. Structure of the thesis***



## **Introduction**

Many conflicts in history, from ancient times to Palestine and recent wars in the Balkans, were characterized by mass forced displacement of people. “Population removal and transfer have occurred in history more often than is generally acknowledged ... Moreover, despite greater international attention and condemnation, such campaigns have only intensified in the late nineteenth and twentieth centuries” (Bell-Fialkoff, 1993: 110). Notwithstanding, there has not been any comprehensive analysis of economic impact of such displacement on countries affected. Economic analysis of the costs of conflicts, as described in a review of these studies by Lindgren (2005), have mainly focused on the direct costs of conflicts, such as reduction of production capacities and infrastructure, deaths and injuries of the workforce, as well as some indirect costs such as reduction in production, decrease in investments, capital flight, decrease in exports and imports and reduced income from tourism (Lindgren, 2005: 5). Other indirect costs, such as depletion of human capital as a result of emigration of the highly educated are usually neglected in the estimates of the overall costs of a particular conflict, despite the fact that the human capital is considered as a key factor of economic growth.

Alternatively, in the analysis of the brain drain, migration theory so far does not distinguish between different types of migration based on the predominant motives for migration. Yet, major migratory movements in history were a result of forced displacement of people, based on race, religion or ethnicity. Once forced to leave homes, these people are in a position to have particular incentive to migrate abroad. The events that cause the largest forced evictions of people from their properties are ethnic cleansing, natural disasters and some development projects. Expected climate change will even increase the frequency of such events in the future. Consequently, this thesis analyzes the impact of ethnic cleansing, as a type of conflict that is characterized by mass displacement of people, in the framework of migration theory, by assessing the impact of such

displacement on the magnitude of emigration of highly educated people and the impact of such emigration on the stock of human capital in a country. This way the thesis gives its contribution to both the theory of costs of wars and migration theory. It does so by emphasizing additional negative impact of conflicts through the emigration of highly educated people and analyzing migration theories of the brain drain in the specific context of forced migration.

There is no an agreed definition in the literature for the migration from countries affected by events such as ethnic conflict or natural disaster, which produce mass displacement of people. This chapter will initially set the stage for the analysis of the impact of these events on the formation of human capital by defining this type of migration and explaining its distinguishing features. This clarification of terms and definitions can be considered as a first original contribution of this thesis. The second part of the chapter presents the possible negative effects and positive feedback effects, on human capital of such events. This approach is used as an introduction to and the justification for the structure of the thesis, described in the final part of this chapter and all the empirical work to be undertaken. The original contribution of the theoretical model developed as well as of the empirical work undertaken in this thesis is explained in each section and emphasized in a separate section of Chapter 6.

## **1.1. Forced migration and population transfer**

Events that cause mass displacement of people, such as conflicts or natural disasters, are not new (Bell-Fialkoff, 1993: 111), but are gaining on importance due to the increased frequency of occurrence of migrant inflows resulting from such events around the globe.<sup>2</sup> Consequently, the

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<sup>2</sup> UNHCR reports around 19.2 million people of concern to the UNHCR in 2005 (UNHCR, 2006). These people are mainly displaced due to the conflicts or natural disasters. Natural disasters in particular are requiring attention as it is expected that the climate change will be the leading factor influencing migration in the near future. For example, Myers (2005) estimated that about 200 million people will have to be displaced from their current places of living by 2050. (This is most widely cited estimate. But other authors go even to up to 1 billion in their estimates of the number of displaced people as a consequence of climate change by 2050.)

migration literature starts devoting attention to this type of migration. However, so far the migration as a result of large scale displacement of people has not been properly defined in the migration literature. The term “forced migration” is quite loosely used by migration literature, media, politicians and other sources and it is used to describe any migration that is not completely voluntary and that involves factors other than economic in the migration decision. Different terms are used to distinguish between different types of forced migration based on the factors influencing forced migration. Moreover, the terms such as conflict-induced, natural disasters-induced and development-induced migration have been used. However, none of these terms is entirely appropriate when describing forced mass displacement of people as a result of events such as ethnic cleansing or natural disasters. Different authors (for example, van Hear, 1998; Turton, 2003), when discussing different definitions of types of forced migration, have not taken into account two other important distinguishing features of forced migration, namely the magnitude of migration<sup>3</sup> and the influence of “no choice” displacement<sup>4</sup> on subsequent migration. According to Stark (2004a: 325):

“Refugee flows differ from standard migration (henceforth migration) in two important respects: the flow of refugees is typically a group movement – a large number of people move simultaneously – as opposed to a sequenced movement of individuals; and refugee flows are overwhelmingly from distinctly poor economies”.

Continuous migration flows (either voluntary or forced) are primarily a result of factors influencing an individual’s (or a household’s) decision to change their place of living. So, if the term “conflict-induced migration” for ethnic conflicts is used, it would not completely represent this

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<sup>3</sup> “It is clear that refugee flows can deprive countries of a significant proportion of their population. Thus an estimated one in seven Afghans, one in ten Bosnians, one in eleven Eritreans and one in thirteen Burundians currently lived outside their country as refugees in 2001-2002.” (Koser and Van Hear, 2002, p.2)

<sup>4</sup> Leckie (1994) used the term “forced evictions” to describe displacement of people where they were not given any options to stay, thus their displacement was not results of decision making process based on the evaluation of push and pull factors. This term will be applied in this thesis as well.

type of migration, as it encompasses not only ethnic cleansing, but also other types of conflict-induced migration which is not necessarily large in magnitude and characterized by forced evictions.

Accordingly, as the two key features of displacement are the focus of this thesis, the most appropriate term that will be used to describe this type of displacement is “population transfer”.<sup>5</sup> Population transfer can be defined as a forced mass displacement of individuals based on their ethnic origin or place of living, which includes ethnic cleansing, forcible removal of indigenous tribes, man-made disasters and natural disasters induced migration. However, mass migration can be voluntary as well, so this definition of population transfer is applied in this thesis when it refers specifically to the forced mass displacement of people. Within this broader type of mass forced migration, several sub-types of migration are distinguishable, such as ethnic cleansing, natural disasters-induced displacement and development-induced displacement. As this thesis aims to provide a contribution to both the theory of economic costs of conflict and the theory of forced migration, its focus is on the ethnic cleansing. However, as all the above mentioned types of forced migration (ethnic cleansing, natural disasters-induced displacement and development-induced displacement) share certain common characteristics, such as mass displacement, forced evictions and non-random targeting of migrants, the findings from this thesis may be also used for further analysis of other types of forced migration.

## **1.2. Ethnic cleansing**

The origin and the exact meaning of the term “ethnic cleansing” are not completely clear. Yet, they are strongly associated with the countries of ex-Yugoslavia, particularly with Bosnia-Herzegovina. Although the term “ethnic cleansing” was used by mass media in Serbia during 1980s

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<sup>5</sup> Still, some authors use this term as a synonym for forced migration.

to describe activities, mainly non-violent, pursued by Kosovo Albanian towards Serb minority in Kosovo, its wide use and the current meaning was developed during the war in Bosnia-Herzegovina (Petrovic, 1994: 343), in order to describe violent mass removal of population and other activities pursued by Serb forces (from Serbia and Serb minority in Bosnia-Herzegovina) against Bosniaks and Bosnian Croats. Later, the term was also used to describe violent activities by Serb forces in Croatia and Kosovo.

As described in the report by the UN Commission of Experts (1994: 33) ethnic cleansing in Bosnia-Herzegovina has been carried out by means of activities such as mass murders, torture, rape, forcible removal, displacement and deportation of civilian population, deliberate military attacks on civilians, and destruction of property. The report also emphasized that "... the manner in which these acts were carried out, the length of time over which they took place and the areas in which they occurred combine to reveal a purpose, systematicity and some planning and coordination from higher authorities" (UN Commission of Experts, 1994: 35). This led the Commission to conclude that ethnic cleansing is "a purposeful policy designed by one ethnic or religious group to remove by violent and terror-inspiring means the civilian population of another ethnic or religious group from certain geographic areas" (UN Commission of Experts, 1994: 33).

In the same report, the Commission provided their definition of the ethnic cleansing. According to their view, ethnic cleansing "means rendering an area ethnically homogenous by using force or intimidation to remove persons of given groups from the area" (Commission of Experts, 1993: 33). Later, other authors provided their definitions of ethnic cleansing. Today, the term is usually described as "the expulsion of an 'undesirable' population from a given territory due to religious or ethnic discrimination, political, strategic or ideological considerations, or a combination of these" (Bell-Fialkoff, 1993: 110).

Many authors (Bell-Fialkoff, 1993; Blum *et al.* 2007) highlight that the characteristics of the ethnic cleansing are actually such that it is closer to genocide. "At one end it is virtually

indistinguishable from forced emigration and population exchange while at the other it merges with deportation and genocide” (Bell-Fialkoff, 1993: 110). Indeed, the term was promoted by the armed forces of the Federal Republic of Yugoslavia during the genocide conducted against non-Serb population of Bosnia-Herzegovina during its aggression on Bosnia-Herzegovina in the period 1992-1995. The term was soon widely accepted by the politicians in Western Europe and United States in order to help them justify their non-involvement policy.

Although the term “ethnic cleansing” is relatively new, the events that according to the current definition can be described by this term go back to the ancient times. In a most comprehensive historical overview of ethnic cleaning, Bell-Fialkoff (1993: 111), reported that as the first example of ethnic cleansing can be considered forced deportation of people carried out by Assyrian ruler Tiglath-Pileser III in the eight century BC. Other authors (Mann, 2004; Blum *et al.* 2007) provided overviews of the twentieth century events that can fall into the category of ethnic cleansing. According to these overviews, the history of ethnic cleansing started with violent removal of Armenian population from the Turkish Empire in 1915, and continued with activities during and after the World War II, including the Holocaust as well as expulsion of German population from many countries in the Central and Eastern Europe, or expulsion of Arab population during the creation of the state of Israel. At the end of the twentieth century, the events that can be described by the term “ethnic cleansing” occurred in Rwanda and countries of ex-Yugoslavia.

This type of displacement is described as a mass forced displacement of people that targets individuals with certain characteristics from an affected area non-randomly. Although the causes of such displacement are similar to the ones of conflict-induced displacement, they are not the same. Ethnic cleansing can take place even if there is no conflict as such (for example, displacement of Tibetans and Uyghurs in China, Softestad 1990: 2). Moreover, in the case of conflict-induced displacement, individuals are taking into consideration increased risk due to the conflict and making decision whether to migrate or not. However, in the case of ethnic cleansing, individuals are forced

to migrate and are not given any option to stay at their place of living. As a result, it is more appropriate to place ethnic cleansing within population transfer, defined in this thesis as a broader type of migration, rather than within conflict-induced migration.

The main distinguishing features of this type of migration are that it selects individuals within a country non-randomly, on the basis of their ethnic origin and that the first move of these migrants from their homes is usually not associated with any migration decision making process. This is another reason why current migration theories cannot fully explain this process. The first move, the forced eviction, usually takes place within a country. Only after these individuals have been displaced, they are in a position to decide whether to remain within a country as internally displaced, or to move abroad. The analysis of the ethnic cleansing-induced migration as a two-stage process, consisting of forced eviction as a first stage and migration as a second, is an original approach of this thesis. On the basis of this distinction, an original theoretical model of ethnic cleansing is developed in this thesis.

The term “forced eviction”, as defined in Leckie (1994: 131), involves “coercive forcing of people from their homes and communities against their will and nearly always without their free and informed consent”. Thus, the term “forced eviction” is being used in this thesis in order to distinguish the “no choice” type of displacement<sup>6</sup> 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 (Oruc, 2009). In the second stage, those who were forcibly evicted face a decision whether to remain within a country or to migrate abroad. The magnitude of international migration and skill composition of these migrants will determine the extent of the negative impact of population transfer on the stock of human capital in a country.

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<sup>6</sup> Not only ethnic cleansing is characterized by the “no choice” forced eviction, but also man-made disasters and natural disasters induced migration. For this reason, it is believed that the theory and evidence provided in this thesis is partially applicable in the case of these types of population transfer as well.

According to Finkelstein (2003), before World War Two, the transfer of population was seen as a necessary means to end ethnic conflict. However, after the holocaust, as well as the expulsion of Germans from Central and Eastern Europe after the war, these activities were considered as crimes against humanity.<sup>7</sup> Ethnic cleansing during the wars in Balkans in 1990s was a war strategy to artificially create a territory with a majority of the population of a warring party's ethnic group by mass forced resettlement of population of all other ethnic groups (Oruc, 2009). Charges by the International Criminal Tribunal for the Former Yugoslavia (ICTY) against the Bosnian Serbs ethnic group's political and military leaders include in many cases ethnic cleansing as one of the crimes they committed. Ethnic cleansing in Bosnia-Herzegovina was particularly extensive, as the majority of municipalities was "cleansed" (meaning that all individuals of other ethnic groups were forced to flee their homes), which caused displacement of about 50% of total population of Bosnia-Herzegovina. Half of the displaced, or about 1.2 million people, then decided to emigrate abroad (Ibreljic *et al.*, 2006). For this reason, Bosnia-Herzegovina was chosen as an appropriate country where the largest part of the household level empirical evidence for the thesis will be collected from.

Although the main aim of ethnic cleansing is "to eliminate a population from the "homeland" in order to create a more secure, ethnically homogeneous state" (Bell-Fialkoff, 1993: 110), which does not necessarily imply their removal across the state's international borders,<sup>8</sup> mass displacement of people from their homes usually causes significant emigration to other countries. Some of these emigrants are highly educated, which increases brain drain from the country. There have already been a few studies analysing the determinants of emigration of people as a result of mass displacement (Melander and Oberg, 2004; Moore and Shellman, 2007) but there has not been

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<sup>7</sup> In the Article 6 of the Nuremberg Trial's Charter of the International Military Tribunal, crimes against humanity are defined as "murder, extermination, enslavement, deportation and other inhumane acts committed against any civilian population, before or during the war; or persecutions on political, racial or religious grounds in execution of or in connection with any crime within the jurisdiction of the Tribunal, whether or not in violation of the domestic law of the country where perpetrated" (taken from Nizic, 1993: 394).

<sup>8</sup> This can be seen from the figures in the previous paragraph, which show that only a half of the displaced people emigrated abroad, while other half remained with the borders of Bosnia-Herzegovina.



any studies to date that have analysed this phenomenon by taking into account skill composition of emigrants and thus providing evidence on the magnitude of brain drain as a consequence of ethnic cleansing.

### **1.3. Brain drain in the context of ethnic cleansing**

Countries suffering serious destruction of physical capital as a result of conflicts and natural disasters tend to face slower pace of development and a widening gap with developed countries. Lindgren (2005) has pointed out that conflicts may be considered as major sources of poverty and underdevelopment and incur significant losses to a country's current economic activity, as well as a decline in the capital stock which affect the subsequent economic growth of that country. Direct costs of conflict include destruction of physical capital, deaths, serious injuries of the workforce and higher military expenditures. Also, there are indirect costs of a conflict which need to be accounted for, such as increased economic uncertainty, capital flight, decrease in exports, lost foreign direct investments and revenue from tourism, higher inflation and emigration of highly educated individuals. The emigration of highly educated has a particularly detrimental effect on subsequent economic growth in situations such as conflicts or natural disasters, as it is usually combined with the destruction of physical capital.

The importance of highly educated individuals for economic growth of developing countries and the detrimental impact that emigration of the highly educated may have on a country's potential growth has become very topical after the introduction of the endogenous growth theories, which emphasize the impact of human capital on the economic growth of a country. Koser and Van Hear (2002: 1) have pointed out that, in contrast to voluntary emigration, "there has been little serious thought about the implications for countries of origin of involuntary migration" and as the main reason for it stressed the lack of data. Fortunately, a recent project conducted by the World Bank

(Docquier and Marfouk, 2004) where a large data set on brain drain from more than 190 countries has been collected, gives an opportunity to fill this gap by providing data on the emigration rates from these countries disaggregated by skill composition of migrants. This dataset will be used for two different empirical studies in this thesis. First, in Chapter 3, for the analysis of the determinants of brain drain from countries that experienced conflict and second in Chapter 4, for the analysis of consequences of such a brain drain for human capital formation in a country.

The term “brain drain” was coined in 1950s by the British Royal Society to describe emigration of scientists from the United Kingdom and other countries of Europe to the United States. The term remains in use to refer to emigration of highly educated individuals from developing to developed countries. Difference remains over the definition of the term “highly skilled”. Some analysis uses this term to refer to emigration of individuals with skills, both observable and unobservable, which are higher than average skills in a home<sup>9</sup> country. Empirically, this may cause the problem, particularly if the analysis is based on a home country and potential migrants. Although higher skills may be identified through their results at the destination, it may be extremely difficult in case of potential migrants. For this reason, most researcher use this term to describe emigration of individuals with tertiary education level, as such data on emigrants is much easier to collect. Accordingly, the term “highly skilled” and “highly educated” in this thesis will be used as synonyms and will refer to the individuals with tertiary education.

The brain drain represents a decrease in the stock of human capital and a decrease in fiscal contributions to a country’s budget. However, it may also have various positive effects for a home country. First, educated migrants send remittances back home, which contributes to human capital formation through their positive impact on households’ income and subsequently on their education investments. In particular, diaspora has a range of other positive effects on a country’s economic

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<sup>9</sup> There are different alternative terminologies for distinguishing between countries of individual’s emigration and immigration, such as “home” and “host”, “source” and “destination”, *etc.* In this thesis, terms “home” and “host” are adopted to distinguish between countries, because return migration will be discussed here and it is expected to make distinction more clear as, for example, return migration is migration from “host” to “home” countries.

development through facilitation of trade, FDI, tourism and other relations between their home and host countries. Also, return migration represents an important channel of transfer of financial and human capital, cultural and other assets from host to home country. This thesis is primarily interested in the effects of emigration of highly educated individuals on human capital formation in a home country and focuses on three channels which directly affect human capital formation, namely, (1) the impact of remittances on educational attainment in a home country; (2) the impact of migration prospects on investments in education; (3) the impact of the return of highly educated individuals (“brain circulation”) on the stock of human capital. These positive effects on the stock of human capital in a home country are known collectively as “brain gain”.

Although the process of migration resulting from ethnic cleansing differs from the voluntary migration, as explained later in the description of the theoretical model presented in Chapter 3, there is no clear argument why different positive feedback effects of such migration should be expected.<sup>10</sup> Only, the magnitude of such effects might be different for ethnic cleansing. This is purely an empirical question and requires comprehensive analysis of the migration data in order to identify these differences. To the best of author’s knowledge, there were no previous empirical studies that collected the data specific for ethnic cleansing and compared them with the data for voluntary migration, in order to provide empirical evidence of possible differences in the magnitude of these effects. Hence, this thesis can be considered as a first study contributing to the analysis of this phenomenon. The data collected will be both household level data, which will be collected from Bosnia-Herzegovina (as one of the most striking examples of ethnic cleansing) and country level data, which will distinguish between countries with different conflict history.

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<sup>10</sup> For example, there is no clear reason why remittances sent by forced migrants, *ceteris paribus*, would have different impact on educational attainment than remittances sent by voluntary migrants. But, the total amount of remittances inflows can differ, as forced migration is usually larger in magnitude than voluntary migration.

#### **1.4. Aims of the thesis**

This thesis aims to provide an original contribution to the economic analysis of ethnic cleansing and its impact on the development of home countries. There are many possible channels through which population transfer can affect economic development of a country. However, encompassing all of them is beyond the scope of this thesis. Hence, there is a focus on only one, namely the impact on the stock of human capital. The choice of this channel is driven by the three features. First, there is the increasing prevalence of the endogenous growth theories, which stress the importance of human capital for the economic growth of a country. Second, there is the notion that the depletion of human capital stock in a country affected by conflict or natural disasters is mainly neglected in measuring costs of these events (Lindgren, 2005). Finally, the analysis of ethnic cleansing has been recognized by the terms of this thesis as a gap in the current migration literature, which is generally focused on individual, regular migration. There has not previously been an attempt to develop a theoretical model that explains the process of migration of a non-random group affected by population transfer and to provide evidence on the economic consequences of such events for home countries. As the proportion of forced migrants in the total world population of migrants is increasing and as the expected global environmental changes predict that population transfer will be the most important type of migration in the future, it is timely to provide a contribution to the theory of migration and fill the gap identified. This thesis is an attempt to redress the balance in a systemic way.

The extent to which the ethnic conflict will reduce human capital stock in a country through the brain drain will depend on the mechanism determining the skill composition of emigrants. The “self-selection” mechanism of migration was developed and explained by Stark and Taylor (1991). The mechanism explains the interaction of factors shaping migration decision and response of individuals with different skills to these factors, which affects the skill distribution of migrants. If

the outcome of interaction of these factors is that more emigrants are highly than low skilled, then it is noted that self-selection is positive, otherwise it is negative. As explained previously, ethnic cleansing involves different migration decision making process and different factors affecting such decision. Accordingly, this thesis will attempt to develop a model to explain the self-selection mechanism in the context of ethnic cleansing, using Bosnia-Herzegovina as prime example.

There are several reasons that call for a separate analysis of the self-selection of forced emigrants. First, there is a risk factor introduced in the migration decision. Individuals with different personal characteristics may have different attitudes to risk, thus making different migration decisions. Second, individuals with different levels of education may have different levels of economic motivation for migration in the new context brought by the ethnic cleansing. For example, the opportunity costs of remaining in a country where the economy is negatively affected by events causing ethnic cleansing should be higher for highly skilled individuals. Third, factors that cause non-randomness in selection of individuals into forced displacement may be also related to skills of individuals. As reported by many witnesses of these events and according to the evidence collected in Gratz (2007), individuals with tertiary education were under attacks at the dawn of conflict. This outcome is due to their political activities to some extent, but also as a goal of the conflict, to inflict more severe damages on the other side in the conflict.<sup>11</sup> All this motivates development of a separate self-selection model of forced migrants, as well as empirical analysis of displacement due to the ethnic cleansing. The specific factors that may influence displacement decisions by individuals from conflict areas may affect skill composition of migrants, or the magnitude of “brain drain”, which subsequently influences the sign of net effects of this migration.

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<sup>11</sup> In the recent literature, such activity during ethnic cleansing is termed “elitocide” (Gratz, 2007).

## 1.5. Structure of the thesis

This thesis aims to provide empirical evidence on the both negative and positive consequences of ethnic cleansing, in order to gain an insight into the possible net effect of such displacement on human capital formation in a home country. Hence, the empirical work in this thesis is divided into two parts. In the first part, the negative impact of ethnic cleansing is analysed by testing the model of self-selection of migrants from a country affected by ethnic cleansing, *i.e.* estimating the magnitude of brain drain. In the second part, positive impact will be analysed by testing models of positive feedback effects of brain drain on human capital formation, through the incentive effect and receipt of remittances.

In detail, the first part of the study starts with an original model of ethnic cleansing developed in this thesis. This model should help the understanding of the process and factors that influence the magnitude of brain drain from countries that experienced ethnic cleansing. Then, this first part of the study provides empirical evidence of the extent of the brain drain and consists of two studies. Initially, this is a micro-level study of determinants of emigration from conflict areas, which aims at the identification of possible self-selection mechanism of this type of emigration. The empirical model of the determinants of migration as a result of ethnic cleansing is based on the previously developed theoretical model. A subsequent study is a macro-level study that estimates possible differences in migration rates and test possible differences in the strength of the self-selection mechanism between countries with different conflict history. Improved understanding of the process of ethnic cleansing 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 individuals with tertiary education on a home country's economy. Beine *et al.* (2006a) report the evidence of different impact of "brain drain" for a home country depending on its magnitude. They argue that certain conditions, such as low level of brain drain and high level of

human capital stock should be met in a country in order to expect net positive effects of “brain drain”. Therefore, prior to the analysis of economic consequences of ethnic cleansing, the characteristics of the process that influence proportions of highly educated individuals in a population of forced emigrants should be explained. This would contribute to further analysis of consequences of conflict-induced migration and the sign of conflict-induced brain drain, depending on its magnitude from countries experiencing a conflict. Both these studies are the first empirical contributions to the theoretical model of ethnic cleansing and to the analysis of the determinants of brain drain resulting from ethnic cleansing.

The second part of the thesis involves two empirical studies that are conducted in order to provide evidence on the positive effects of ethnic cleansing on human capital formation in a home country. There are three main channels through which ethnic cleansing can influence human capital formation: the “incentive effect” of migration, where emigration induces increased investments in education, which increases the prospects for migration; effect of remittances on the relaxation of liquidity constraint for educational investments by remittance receiving household and the impact of return migration of highly educated on the stock of human capital. In this thesis, only two of these channels are empirically tested because the empirical analysis of the impact of return migration is challenging, primarily because of difficulties in collecting the relevant data. One of the two empirical studies in the second part of the thesis is a cross-country study on the impact of the migration prospects on tertiary education enrolment, based on the incentive effect hypothesis developed by Beine *et al.* (2001). Although it follows the Beine *et al.* (2001) approach to a large extent, its originality is in the fact that it includes a dummy variable for countries which experienced conflict. The empirical evidence on the incentive effect in countries experiencing conflict is the first known evidence of this type. The other empirical study is a household level study of the impact of the receipt of remittances on education investments by a household, based on the idea that remittances are expected to relax liquidity constraint households face, thus increasing

their investments in the education of their children. Also, this empirical study relies largely on previous work on this topic by other authors, but it collects evidence from a country that experienced ethnic cleansing, compares two different datasets (one collected by the World Bank and another collected by the author of this thesis) and uses innovative econometric technique in estimating the relationship between remittances and educational attainment.

The next chapter presents a review of the relevant literature since this thesis is primarily concerned with bridging the gap in the literature on brain drain and the literature on the consequences of conflicts. This includes a detailed review of literature on both conflicts and migration, while migration literature includes both voluntary and forced migration literature, as well as both literature on determinants and literature on consequences of migration.



## ***Chapter 2: Literature review***

### ***Introduction***

#### ***2.1. Determinants of migration***

#### ***2.2. Brain drain - determinants***

#### ***2.3. Brain drain – consequences***

##### ***2.3.1. Incentive effect: Brain drain or brain gain***

##### ***2.3.2. Remittances and educational attainment***

##### ***2.3.3. Return migration***

### ***Concluding remarks***

## **Introduction**

A distinctive strand of economics literature on ethnic cleansing does not exist and for the purpose of this thesis, the theoretical discussions and empirical work will largely rely on the literature on voluntary migration. However, the specific characteristics of the ethnic cleansing shall be acknowledged and the theories of voluntary migration will be used to the extent to which they can be applied in the cases of ethnic cleansing.

Historically, the migration literature has been developed from the analysis of determinants of migration to determinants of emigration of highly educated and from the analysis of consequences of immigration to the analysis of consequences of emigration. Initial migration literature has recognized the importance of movement of human capital, where its impact on host countries has always been seen as positive, while for home countries as negative. The negative impact has been mainly limited to fiscal effects of emigration of educated individuals from countries where education was highly subsidized. These considerations resulted in the policy proposals such as taxing educated immigrants and sending the money back to their home countries (known as “Bhagwati tax”). Several studies (Grubel and Scott, 1966; Berry and Soligo, 1969) also discussed welfare implications for a sending country’s remaining population of emigration of highly educated individuals.

Along with the development of endogenous growth models (Lucas, 1998; Mankiw, Romer and Weil, 1992), which extend Solow's (1956) model of economic growth with accumulation of human capital, migration literature has tended to focus on the emigration of highly educated and its impact on the stock of human capital in a sending country, as a key factor of economic growth of these countries. Emigration of the highly educated individuals, as those who possess above average level of human capital, clearly represents the depletion of human capital stock in a sending country and negatively affects its potential for economic growth. Conversely, the new economic theories of

brain drain, which emerged in the last years of the previous century, argue that this emigration of highly educated, at the end, do not necessarily always results in the depletion of human capital stock in a home country, as the brain drain might induce increased human capital accumulation in that country.

The purpose of this literature review is to provide a critical assessment of different theories of migration, particularly the models which attempt to explain determinants or consequences of brain drain, in the light of their usefulness in the analysis of ethnic cleansing and its impact on human capital formation in a home country. This means that, in the case of determinants of brain drain, the focus of this review is on theories that explain skill composition of migrants, whereas for the consequences of brain drain the main interest is in theories that explain its impact on human capital formation in a home country. Most of the contents of this chapter present a critical review of the literature on migration, dividing it into two sections. In the next section, the review of literature on determinants of migration and brain drain is presented, with particular reference to models of self-selection and empirical evidence from countries that experienced ethnic cleansing. In the second section, the literature on the consequences of brain drain is reviewed, with focus on three channels of the impact of brain drain on human capital formation in a sending country. For each of these three channels, namely the incentive effect, remittances effect and return migration effect, a separate critical review of the literature and main models is presented and evaluated for the purpose of study of consequences of ethnic cleansing for human capital formation in a home county, along with a review of previous empirical evidence on the impact of these three channels.

## **2.1. Determinants of migration**

Theories of voluntary migration are usually divided into two broad groups (Massey *et al.*, 1993; and Schoorl, 1995). Firstly, the theories which attempt to explain the initiation of migration

and secondly theories which attempt to explain the continuation of migration. In the first group, four different types of theories are distinguished: Neoclassical theory; bifurcated labour theory; New Economics of Labour Migration (NELM) theory; and World Systems theory. According to the first theory, the Neoclassical economic theory, the main motive for migration is wage difference between regions or countries. The migration decision is made by an individual, thus the total migration flows are simply the sum of individual income maximization decisions. The seminal model that analysed rural-urban migration has been developed by Todaro in 1969, extending and formalizing ideas from various authors that followed Lewis (1954). Todaro's model assumes that the main determinant of the decision of rural worker to migrate is expected wage differential. Although this theory is intuitively logical and supported by the evidence of migration flows from developing to developed countries, it falls short of explaining all migration flows. In particular, it does not have such usefulness in empirical analysis of determinants of forced migration as it does not account for possibility of other factors influencing migration besides wage differentials.

There have been several attempts to extend this model by redesigning the wage differential incentive. For example, the relative deprivation model by Stark and Taylor (1989) argues that not only absolute wage differentials, but also the relative position of an individual (or household) in the community in terms of income affects migration decisions in a sense that individuals who are "relatively deprived" (have income which is low relative to the average local community income) have a stronger incentive to migrate. This extension is useful for the analysis of the ethnic cleansing, as the key idea behind the model of ethnic cleansing, which will be presented in the next chapter, is that the change in both absolute and relative income of individual, resulting from ethnic cleansing, can be considered as one of the key factors explaining emigration decision of individuals displaced by a ethnic cleansing. As this theory is particularly relevant for this thesis, it will be discussed further in the following section of this chapter, on determinants of brain drain.

The bifurcated labour theory explains migration flows from developing to developed countries by the dual nature of labour market in developed countries, divided into capital-intensive and labour-intensive sectors. The main driving force of migration is demand for labour from developing countries by the labour-intensive sector in developed countries. This demand might be due to various reasons, such as general labour shortages, need for workers willing to take positions at the bottom of job hierarchy and labour shortages in the labour intensive sector. As the focus of this theory is the characteristics of labour market in migrants receiving countries, *i.e.* pull factors of migration, it is not well suited for forced migration, where push factors play much more important role.

The New Economics of Labour Migration theories (NELM), on the other hand, put the decision making process in a wider context of a household, rather than an individual (Stark and Bloom, 1985; Stark, 1991). Mincer (1978: 750) was the first to argue that migration decision studies are made at the family rather than the individual level, because it is the net family gain rather than net personal gain that drives migration of households. Mincer presented a model of migration based on the maximization of family, instead of individual, utility. Applying this reasoning, the NELM theory explains migration through the risk minimization motive of households. The decision is made at the level of a household, which attempts to diversify risk to a household's income among household members through the migration strategy. Market failures and underdeveloped credit markets are found to be the main push factors of emigration from developing countries. The problem with this approach in the context of forced migration is that it cannot explain how a household can diversify the risk of being endangered between household members. Still, it stresses an important feature of migration decision process that is particularly emphasized in the context of forced migration. It is the level of decision making, which is not necessarily individual, as predicted by previous theories, but is a family or household level.

World Systems theory goes further than NELM and puts the migration into the context of global interaction between societies. This theory explains migration by the impact of results of these interactions such as, for example, international trade which might increase economic inequalities between countries (Wallerstein, 1983; Amankwaa, 1995). This approach is seen as having potential for explaining forced migration. As these theories see the migration incentives created through complex interactions between societies, they further link these incentives with the political situation in a country and migration policies. For instance, the interaction between societies may cause increased inequality within a developing country, which is correlated with the level of violence in that country (Wallerstein, 1983). Moreover, it influences immigration policies of developing countries, which, in general, relax the restriction from countries affected by a conflict or natural disaster. Therefore, political situations in both home and host countries, as well as interaction between them, are recognized by these theories as factors shaping migration flows, which is of particular relevance in the context of forced migration.

Theories explaining the perpetuation of migration attempt to examine why migration flows might persist over time, even if the impact of factors causing initial migration has been reduced. These theories are, in Massey *et al.* (1993) and Schoorl (1995) grouped into three different types of theories: Network Theory, Institutional Theory; and Migration System Theory. All attempt to explain the continuity in the migration process, thus being less relevant for the ethnic cleansing. Ethnic cleansing usually occurs within a limited period of time and can be seen as an event, rather than a continuous process, such as voluntary migration. Thus, it requires development of specific models explaining initiation of this type of migration, but there is no clear argument why we should expect differences in the continuation of migration after initial voluntary or forced migration. Moreover, these theories are useful in explaining destination choices of migrants, but it will not be in the focus of the empirical analysis in this thesis.

Network Theory explains continuation of migration through social capital acquired by potential migrants through migration of their family members and friends. Migration implies the creation of migrant networks where subsequent migration from a particular country is improved by activities of these networks which reduce migration costs and increase returns to migration at the destination (through increased probability of employment and higher income).

Institutional Theory argues that the initial migration flow increases activities and effectiveness of institutions, both formal and informal, between two countries which facilitate subsequent migration. Besides institutions created by networks of migrants, these also include institutions that support immigrants and asylum seekers in host countries. These institutions are rather more developed for support of asylum seekers, thus it is expected that the role of institutions might be more important for perpetuation of migration after initial forced than after voluntary migration. However, these theories do not explain how institutions may increase initial migration. Regardless, in the context of ethnic cleansing, these theories might be helpful in understanding how institutions such as UNHCR facilitate initial emigration from vulnerable regions when, in attempt to save lives, they actually increase negative impact on the economy of a country through brain drain.

Migration Systems Theory argues that the flows between countries are not primarily determined by geographic proximity, but political and economic ties between countries. Countries can be part of one or more systems. Systems are stable, but not fixed, as social and economic fluctuations and events such as political upheavals may affect membership of a particular country in the system. So, the causality is not picked up by these theories. Countries may be within a particular migration system due to the colonial past or common language, but the large number of migrants in a host country may also influence creation of a system. This may explain how, for example, majority of forced migrants flow to developed countries with which a home countries shares colonial history or a language, but are not useful in explaining initiation of migration.

## 2.2. Brain drain – determinants

The importance of emigration of highly educated individuals from developing countries has been recognized since the early literature on the brain drain. Several studies (Grubel and Scott, 1966; Berry and Soligo, 1969) discussed welfare implications to a sending country of emigration of highly educated 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).

Based on the work of Sjaastad (1962), Neoclassical theories see the migration process as an attempt of individuals to increase returns to their human capital. Migrants evaluate expected benefits, such as discounted earnings and non-monetary returns, against expected costs of migration, including both travel costs and non-monetary opportunity and psychological costs and make migration decision only if total benefits from migration are larger than total migration costs. The model predicts that younger and/or more educated individuals migrate more, thus being useful in explaining skill distribution of migrants.

The distribution of skills among population of migrants has generally been investigated in the framework of self-selection models,<sup>12</sup> which offer explanation of the relationship between factors influencing emigration and skill composition of migrants. Hence, if highly educated 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 educated migrants are more likely to migrate in a response to specific determinants, then there is a negative self-selection of migrants.

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<sup>12</sup> The following description of the self-selection model is based on author's previous work (Oruc, 2009).



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, which can be denoted as home and host country, 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. Both home and host country earnings can be decomposed into a mean wage and a premium to individuals' skills and abilities, so earnings a potential migrants faces in a home country may be expressed as:

$$w_0 = \mu_0 + \varepsilon_0 \tag{2.1}$$

and their earnings to a host country, if they migrate, as:

$$w_1 = \mu_1 + \varepsilon_1 \tag{2.2}$$

where  $w$  are earnings in a country,  $\mu$  mean income in a country and  $\varepsilon$  de-measured values of workers skills in a particular country, which might be considered as individual's "returns to skills". Subscripts 0 and 1 denote home and host country, respectively. The  $\varepsilon$ 's are assumed to be normally distributed with zero mean, variance  $\sigma^2$  and correlation coefficient  $\varphi$ .

An individual chooses to migrate if:

$$(\mu_1 - \mu_0 - \pi) + (\varepsilon_1 - \varepsilon_0) > 0 \quad (2.3)$$

where  $\pi$  are the costs of emigration. Borjas assumes that these costs are time-equivalent and constant across all individuals. Equation (2.3) is simply showing the difference between Equations (2.2) and (2.1) minus costs of emigration. It shows that an individual chooses to migrate whenever the difference in mean incomes, but also in returns to skills, between two countries is larger than the costs of migration.

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 educated in the two countries. The more equal the wage dispersion, or income distribution, is in a home country and/or the more unequal is income distribution in a host country, then migrants will be positively self-selected with regards to their education level and vice versa. As richer countries have generally more equal distribution of income, the model predicts that self-selection of migrants by their education level 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). For the purpose of the analysis of ethnic cleansing, this model is important in terms of emphasizing the role of wage dispersion between high and low educated. Evidence suggests that events causing ethnic cleansing, such as conflict or natural disaster, reduces this wage dispersion and inequality<sup>13</sup> based on individual education levels. The

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<sup>13</sup> One of the victims of the Haiti earthquake in January 2010, Fritz Mevs, said to Euronews that people there call this event “the most democratic event that ever happened in the history of Haiti ... The earthquake does not choose good neighbourhood, bad neighbourhood, rich neighbourhood” (Euronews: Rebuilding Haiti after the quake. 25.01.2010).

model would then predict positive self-selection into migration after forced displacement due to a conflict or natural disaster taking place.

The model has several shortcomings (Pedersen *et al.*, 2004: 5). First, it does not take into account any out-of-pocket migration costs. It may be expected that these costs, such as switching costs, are lower for the highly educated, which may increase positive selectivity of migrants even when differences in income distribution between two countries is more favourable for low educated workers. Second, the model assumes perfect ability of potential migrant to observe mean incomes and returns to skills in two countries. Yet, in reality, the problem of imperfect information exists and is already acknowledged by migration literature as one of the factors explaining return migration. For the purpose of the analysis of self-selection of forced migrants, this model is a good starting point. However, it has to be augmented by factors other than the individual's wage which operate in the ethnic cleansing settings, in order to explain the self-selection mechanism of this type of migration.

Several other papers have tested the empirical validity of the migration model proposed by Borjas (1987). The main problem with these empirical findings is that they are not consistent with their concept of skills. Borjas (1987) considered unobservable skills as a source of differences in income which acts as a self-selection mechanism, finding support for predictions of his models on the negative self-selection. On the other side, Chiquiar and Hanson (2002) considered observable skills or education levels of migrants from Mexico as a source of differences in income and found positive self-selection. They used data from the Mexico and US population censuses to examine structure of migrants from Mexico to the United States and relationship between education levels and economic performance of these migrants compared to their counterparts in Mexico. These two empirical findings do not necessarily need to be contradictory. It may be possible that migrants are positively self-selected in terms of their education, but among the highly educated population, those

with lower unobserved skills actually migrate. So, the distinction between two different sets of empirical studies needs to be made clear.

Dostie and Leger (2006) built a model in which individuals are selected, in part, on potential earnings, *i.e.* where earnings across different locations are a function of both observable and unobservable characteristics. Stark and Taylor (1991) investigated the differences in the role of incentives between absolute income and relative deprivation in migration of households, accounting for continuities in some and discontinuities in other labour markets. McKenzie and Rapoport (2007a) investigated the impact of migration networks on migration incentives at different skills in Mexico-US migration and its impact on the self-selection of these migrants.

A 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 possibility of extensive work on the analysis of the determinants of brain drain. Brucker and Defoort (2006), 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 education level of migrants. In the context of ethnic cleansing, findings from

this study would suggest that an event causing ethnic cleansing, such as a conflict or natural disaster, commonly worsening economic conditions and reducing skills based wage dispersion in a home country should increase the skill level of migrants, while relaxed immigration policies towards refugees by host countries should decrease it. Still, empirical studies using data about migrants from areas affected by a conflict or natural disaster are required for testing these assumptions.

All previous 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: “favourable self-selectivity for labour market success would be expected to be less intense among those for whom migration is based primarily on factors other than their own labour market success”. Moreover, according to Ibanez and Velez (2003), “unlike results in traditional migration models, better educated households 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”. These two quotes are acceptable, but only when related to forced migration by individuals. Once a mass forced migration - or ethnic cleansing - takes place, these assumptions will not hold as individuals do not have choice of staying on the basis of their risk assessment, but are forcibly evicted from their homes.

The main contribution of this thesis is that it recognized a gap in the literature on forced migration and introduces a new model which attempts to explain migration of individuals from countries affected by ethnic cleansing, incorporating additional factors and two stages into the models of voluntary 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. Migrants in the case of ethnic cleansing are assumed to be the ones who do not have an

economic incentive to migrate before the ethnic cleansing occurred. As the migration literature (Van Hear, 1998; Chiswick, 2000) generally accepts that economic factors of migration in the case of conflict or natural disaster do not disappear, although their influence on migration decision may be reduced, the model proposed in this thesis accounts for these factors and their change during such an event. Once an event has occurred, the expected wage of potential migrants in a home country changed. This is the first stage of the migration process. In the second stage, individuals compare their expected wage in the case of no ethnic cleansing, the expected wage once it occurred and the expected wage if they migrate. The larger the difference in expected wages between situations with and without a conflict or ethnic cleansing, the stronger the incentive is for individuals to migrate.<sup>14</sup> The self-selection mechanism in this context is the fact that the difference between expected wages in situations with and without an ethnic cleansing event is larger for individuals with higher observable skills. Once an event occurs, individuals from affected areas are very often forced to displace to other areas. They suffer significant welfare losses. Others, from non-affected areas or who were not forced to move to other areas,<sup>15</sup> are also affected by decrease in economic activity in a country. The more educated 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 also worsened. It might be expected that the highly educated have stronger incentive to leave refugee camps and restore their pre-event level of income and welfare and relative position in a community.

Stark and Taylor (1991) argue that, besides absolute income considerations, relative position of a household within community also determines migration decision. Their relative deprivation model is chosen as a framework in which the model of migration as a result of ethnic cleansing will be presented in the following section. This model is appropriate as it accounts for community

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<sup>14</sup> The hypothesis that predicts increased propensity to migrate by individuals more affected by ethnic cleansing is called “restoration hypothesis” and explained in detail in Chapter 3.

<sup>15</sup> For example, the ones who in the case of ethnic cleansing lived in areas controlled by their ethnic group, so were not evicted.

characteristics and individuals' perceptions of their position in such a setting, as well as the fact that individuals compare their well-being not only to the well-being of others, but also their own in the previous point in time.

The relative deprivation hypothesis was originally developed by Stouffer *et al.* (1949) in order to explain a series of unexpected relationships found in an analysis of satisfaction of US soldiers. They found that African American soldiers stationed in Southern USA were more satisfied than African American soldiers stationed in Northern USA. The authors' explanation was expressed through the relative deprivation hypothesis. According to this hypothesis, individuals react to objective circumstances on the basis of their subjective comparisons. Thus, African Americans in the South, who compare their position to that of other African Americans there, which is generally worse than in the North, may be more satisfied with their position than those who compare their situation with the situation of other African Americans in the North. This means that individuals' valuation of its income will depend on the income distribution in the reference group and its position within that group. So, the more individuals in the reference group have larger income than an individual  $i$ , the individual  $i$  will be more deprived. Important contribution to the understanding and application of the idea of relative deprivation in the context of ethnic cleansing is provided by Runciman (1966: 10). He explained relative deprivation of an individual as a situation when four conditions are met: 1) an individual does not have X, 2) he sees other, including himself in the previous point of time as having X, 3) he wants X and 4) obtaining X is seen as feasible. The feeling of deprivation is explained through 1) and 3), where we can see that deprivation is individual's disutility of not having X. The relativity of the concept arises from 2) and 4), as individuals level of deprivation depend on the income of a reference group to which individual compares her income. Hence, individual's level of deprivation will be a function of the proportion of individuals in a reference group who have income above individual's income and the mean

income of the group.<sup>16</sup> When applied to migration, the relative deprivation hypothesis states that individuals evaluate migration decisions not only on the basis of absolute, but also of relative income differences within a community. Individuals compare their income with income of a reference group and feel deprived of not having more than they have. This hypothesis predicts migration of more relatively deprived individuals, as well as migration from more to less unequal societies.

In the context of ethnic cleansing, the second part of the condition 2) stating that individuals also compare their current to previous position becomes particularly relevant. This detail of Runciman's description of relative deprivation was mainly neglected in the previous literature on voluntary migration based on the relative deprivation hypothesis. The condition 2) states that individuals do not only compare their position relative to reference group, but also relative to its previous position. This outcome means that decrease in individual's absolute income and relative deprivation as a consequence of an event such as conflict or natural disaster may increase person's relative deprivation of not having it *any more*. This, another type of deprivation of an individual relative to its previous income level, is a function of the change in absolute and relative income of individual as a consequence of such an event. It may be expected that the more severely affected by an ethnic cleansing individual is, the more relatively deprived and thus more prone to restore its previous well-being she will be. Consequently, migration decision of individuals during ethnic cleansing is not only affected by individual's deprivation relative to a reference group, but also relative to her or his previous position.

As identified above, the relative deprivation theory is helpful in the context of this thesis, as it allows taking into account not only the current absolute income and relative deprivation levels in modelling migration decision of forced migrants, but also the role of change in both absolute income and relative deprivation caused by an ethnic cleansing event. It is expected that this change

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<sup>16</sup> More detailed technical explanation of the relative deprivation as well as derivation of its function is provided in Chapter 3.



in absolute income and relative deprivation acts as a self-selection mechanism of ethnic cleansing. The higher pre-conflict income of an individual, the more she is affected by ethnic cleansing in terms of her relative position during conflict compared to pre-conflict period, hence more likely to migrate. As income is in positive correlation with education, it may be expected that ethnic conflict increases brain drain from areas affected. However, this assumption needs to be tested empirically. The results of empirical test of this assumption are presented in Chapter 4.

So far, there have been several attempts to develop specific models for forced migration (for example, Kirchoff and Ibanez, 2001 or Schaeffer, 2005). The main characteristic of these models was that they introduced a factor of risk into the model developed for voluntary migration, without attempting to incorporate all the characteristics of the process of forced migration. Also, there has been a number of empirical studies on the determinants of forced displacement, both at micro (Ibanez and Velez, 2003; Czaika and Kis-Katos, 2007) and macro level (Davenport *et al.*, 2003; Melander & Oberg, 2004; Moore & Shellman, 2006), but without accounting for the education level of migrants and consequently without evidence on the self-selection mechanism in the context of forced migration. Therefore, this thesis can be considered as a first study that provides evidence on the determinants of brain drain from countries in conflict.

### **2.3. Brain drain – consequences**

Emigration of highly educated individuals has for a long time been seen as having unidirectional impact on human capital formation, *i.e.* emigration of highly educated represents depletion of human capital in a sending country. Based on this view, the first models of the impact of emigration of highly educated individuals (Miyagiwa, 1991, Haque and Kim, 1995) emphasized negative impact of this type of emigration on economic growth of a country. Recent studies (Mountford, 1997; Stark *et al.*, 1997, 1998; Vidal, 1998; Beine *et al.*, 2001, 2006a, 2008) however,

argue that the relationship between emigration and human capital formation in a home country is actually bi-directional. Emigration of highly educated individuals causes depletion of human capital in a home country.<sup>17</sup> However, the emigration might also have a positive impact on human capital formation in a home country. The prospect of emigration and possibly higher wages after migration increase incentives to individuals to invest in their human capital.<sup>18</sup> As not all of these individuals will migrate, the stock of human capital may even be higher after emigration of highly educated than before. Besides this, there are other channels of positive impact of emigration of highly educated individuals on human capital formation in a sending country, such as remittances and return migration. Therefore, the sign of the net effect of the relationship between emigration of highly educated individuals and human capital formation cannot be determined *a priori*.

### **2.3.1. Incentive effect: Brain drain or Brain gain**

A traditional argument of migration literature (for example, Bhagwati, 1972; Bhagwati and Hamada, 1974) is that migration lowers growth in the home country once the highly educated workers emigrate. Mountford (1997) argued that brain drain may actually enhance growth in the home country. He developed a model with human capital as a crucial factor of transitional growth. The decisions of households to acquire education determine the amount of human capital in a given period. As the prospect of higher wages through emigration can stimulate households to acquire more education, it can increase the amount of human capital even beyond the amount lost through emigration.

A recent wave of theoretical contributions (Mountford, 1997; Stark *et al.*, 1998; Vidal, 1998; Beine *et al.*, 2001, 2006a; Stark and Wang, 2002) argues that migration of highly educated can, through expected higher wages abroad, produce more human capital *ex-ante* than the *ex-post* loss.

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<sup>17</sup> This is called “drain effect” in Beine *et al.* (2001).

<sup>18</sup> Beine *et al.* (2001) call this “brain effect”.

This argument was in all these papers presented by probabilistic migration models in which the observable achievement of a given educational requirement, rather than unobservable individuals' ability, determines the probability of migration. All the models are based on reasonable assumptions of higher return to education abroad and higher probability of emigration for more educated workers. Consequently, migration prospects increase the expected return to human capital and increase educational investment in the home country. Since more people opt for education, and not all of them migrate, this creates the possibility of the net increase of human capital, or net brain gain, for the home country.

The model of "brain gain", explaining the incentive effect, has been presented in Beine *et al.* (2006a). The main argument of this model is that individuals, once migration becomes an option, include potential income gains of further education not only in home country, but also in the case of migration. As individuals migrate to countries with larger income, the expected returns to education are larger if there is a possibility of migration; hence the incentive for education increases. The size of this influence is positively related to migration probability and difference in returns to skills between two countries. This suggests that poorer countries with higher rates of emigration of highly educated are expected to have stronger migration-induced incentive for education. The model is based on a set of restrictive assumptions, such as that there is no unskilled migration, migrants are risk-neutral and probability is exogenous and determined by a home country.

Schiff (2005) doubted some of the arguments of the brain gain model presented above and offered a different model of brain gain showing that this effect is much lower once some of the assumptions of the above model are relaxed. For example, once the possibility of emigration by unskilled individuals is introduced, the education incentive effect becomes the difference between the skilled and the unskilled migration premium. Second, the probability of migration is not set by home, but by host countries and is based on numbers of emigrants rather than the proportion of highly educated; therefore it is endogenous. Once an education incentive is present and individuals

opt for education, which increases the number of the highly educated, the probability of migration decreases for all individuals. This assumption is important for the analysis of ethnic cleansing, but in a slightly different manner than presented in Schiff (2005). The model of the incentive effect in the context of ethnic cleansing will be explained in detail in Chapter 3.

In an early version of the model of brain gain, Beine *et al.* (2006a) assumed that migration probability is constant, in order to simplify presentation of the main idea. Schiff (2005) relaxes this assumption and shows that, once probability of emigration decreases with increase in the stock of human capital, brain gain decreases in each subsequent period, which eventually leads to a zero additional schooling as a result of migration incentive in a steady state. However, he assumes constant level of brain drain. In the context of ethnic cleansing, mass emigration of highly educated individuals in one period causes brain drain to be higher than in other periods. This will increase the probability of emigration in subsequent periods by individuals remaining in the country and potentially increased brain gain effect. But, as brain drain has been larger in previous period, a positive net effect could be expected only after several subsequent periods.

Data limitations with regards to the emigration rates by education level kept this discussion at a rather theoretical level for a long period. The first data set on emigration rates by education levels for 50 countries has been created by Carrington and Detragiache (1998). Using these data, Beine *et al.* (2001) estimated the model of brain gain and found positive and significant impact of emigration prospects on human capital accumulation in sending countries, especially for countries with low initial GDP per capita levels. Beine *et al.* (2006a) used counterfactual simulations to estimate the net effect of the emigration of highly educated people for each country and region. The results suggest that only under certain conditions, such as low levels of human capital (below 5%) and low migration rates of highly educated individuals (below 20%), the positive net effect of such emigration on the stock of human capital in a home country can be expected.

More recently, Beine *et al.* (2006a) used Docquier and Marfouk (2006) data and found evidence of a positive effect of migration prospects for highly educated on *ex-ante* human capital levels in a cross-section of 127 developing countries. They found that an elasticity of human capital growth to emigration prospects for highly educated individuals is around 5. Similar results were obtained when controlling for whether their skills were acquired in the home or in the host country.

Faini (2003) estimated an equation in which educational achievements were regressed on a set of explanatory variables including emigration. The results show that, in contrary to the conclusion of Beine *et al.* (2006a), that increasing the return of tertiary education increases the incentive to acquire secondary education. The results did not find an evidence for relationship between migration probability for individuals with secondary education and secondary educational achievements in the home country. Moreover, increased migration probability for workers with a tertiary education has a negative impact on tertiary enrolment in the home country.

In relation to ethnic cleansing, the main drawback of the model is measuring the probability of migration by the stock of emigrants. If ethnic cleansing occurs, the stock of emigrants will rapidly increase in a short period of time. But, this will not necessarily increase immigration quotas for that country by developed countries, which is something that potential highly educated migrants remaining within a home country should be aware of. This outcome will cause the probability of emigration from a country affected by ethnic cleansing, if measured by a stock of highly educated emigrants, to be much larger in subsequent periods than it actually is and will potentially increase estimated brain gain effect as a result of increased migration incentives. For that reason, it would be relevant to measure the incentive effect on a subset of countries which were affected by ethnic cleansing.

As a conclusion, even the evidence from Beine *et al.* (2006a) on the incentive effect has shown that a positive outcome is possible only under very restrictive assumption and only for countries with specific combination of income levels and emigration rates. Thus, the overall impact

of the emigration of highly educated individuals on a human capital stock in a home country is not very likely to be positive. The remaining question to be answered is whether the brain drain is even more negative in the case of ethnic cleansing, due to its specific features presented above that may decrease potential positive influences.

### **2.3.2. Remittances and educational attainment**

As remittances are becoming the most important source of foreign capital for developing countries,<sup>19</sup> the issue of its effects at both micro and macro level has received attention from researchers in migration studies. The literature on remittances has recently redirected its traditional focus on the motivation for remitting to the analysis of their use. There are numerous studies which analysed the impact of remittances on different aspects of a remittance receiving economy. One of the first studies was the Funkhouser's (1992) study of impact of remittances on labour supply of remittance receiving households, which found that remittances increased self-employment among men and reduced labour supply by women in Nicaragua. Chami *et al.* (2005) provide an evidence of negative effect of remittances on growth and productivity. However, recent Docquier and Rapoport's (2006) study has found evidence of positive impact of remittances on productivity and growth, by solving liquidity constraint and financing productive investments. An interesting paper has been published recently by Dimova and Wolff (2009) who used a longitudinal data from LSMS household surveys from Bosnia-Herzegovina in order to test the relationship between remittances and chain migration and found evidence of increased migration among remittances receiving households.

Besides studies evaluating the impact of remittances on investment in physical assets, there is increasing number of studies which analyse impact of remittances on investments in human

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<sup>19</sup> The World Bank reports that total remittances flows have surpassed development assistance and foreign direct investments in the 1990 and are still the largest flows of foreign capital in the world.

capital. These studies argue that remittances positively influence households' educational investment decisions through the relaxation of liquidity constraint and reducing children's labour participation (e.g. Moser, 1996). Developing countries are characterised by less efficient credit markets than developed countries (Paulson and Townsend, 2000). Imperfect or even missing credit markets increase liquidity constraints of households in developing countries as they do not have access to long-term loans. Furthermore, as schooling implies a reduction in current income, this puts even more pressure on households' financial constraints for investment in education. Also, education investments have high income elasticity. Hence, they are forced to have children work in order to cover consumption and also to invest less in children's education forgoing potentially profitable investment opportunities (Woodruff and Zeneto, 2001; Mude *et al.*, 2007). In this context, remittances as an additional source of household income help alleviate liquidity constraints (Hanson and Woodruff, 2003; Cox and Ureta, 2003; Docquier and Rapoport, 2005; McKenzie and Rapoport, 2006; Miluka and Dabalén, 2007; Amuedo-Dorantes *et al.*, 2008). This, in turn, induces investment in children's education leading to a positive relationship between remittances and children's educational attainment and a negative relationship between remittances and child labour supply. However, if household budget constraints are not binding, remittances should not have any significant impact on education expenditures (Miluka and Dabalén, 2007).

Still, as remittances are inseparable from the overall migration characteristics of a household, they need to be analysed in a broader context of migration and its impact on the education of children in these households. So, the income effect of remittances is not the only effect. The remittances are sent by migrant parents. Even the income effect is not necessarily a simple addition to a household's income, but the net of remittances and foregone earnings of a migrant member if she/he would have stayed in the country. Thus, the relaxation of liquidity constraints is different if a household with no migrants is receiving remittances, compared to households receiving remittances from an absent household member. Besides that, Miluka and

Dabalén (2007) and Amuedo-Dorantes *et al.* (2008) point out the possibility of the substitution effect. According to them, households with migrant networks may have a higher probability of emigration. If these households expect higher earnings abroad, they face a higher opportunity cost of schooling due to the effect of forgone earnings. Thus, they may decide to emigrate and hence invest less or not to invest at all in education in the home country. Consequently, migration becomes a competing strategy with education increasing the opportunity cost of education in home countries. Therefore, potential migrants may decide not to invest in further education due to prospects for future emigration. Furthermore, the effect might be immediate if children are old enough to emigrate.

Another important effect that has to be taken into account is the disruption effect. A set of studies argue that emigration usually implies parental absence, which may have a disruptive effect on children's educational achievement (Hanson and Woodruff, 2003; Docquier and Rapoport, 2005; McKenzie and Rapoport, 2006; Minuka and Dabalén, 2007; Amuedo-Dorantes *et al.*, 2008). In households with migrant heads children face increased non-financial costs of education due to the reduction in adult role models, the missing educational input of parents in school work and supervision and higher responsibilities in terms of family business. Consequently, children from migrant households may have a lower probability of remaining in school, even if financial resources are available for education investment, reducing the optimal unconstrained education level (McKenzie and Rapoport, 2006). According to the above, analysis of the impact of remittances on educational investments of remittances receiving households needs to disentangle the impact of different migration-related characteristics of a household.

Empirical evidence (*e.g.* Cox-Edwards and Ureta, 2003) on the relationship between remittances and educational attainment was, until recently, simply relating remittances receipt to educational attainment of children and assigned any effect found to the remittances. Only recently, studies attempt to control for parental absence effects, besides the effect of relaxation of liquidity



constraint, thus disentangling between income and disruptive effects (*e.g.* Amuedo-Dorantes and Pozo, 2006). The evidence of the impact of remittances on educational attainment of children is mixed and depends on the approach used. Cox-Edwards and Ureta (2003) have related receipt of remittances to school drop-out hazard rates and found negative relationship between these two variables. Lopez Cordova (2005) have investigated the impact of remittances in Mexico and provided evidence of their positive impact on school attendance, as well as on illiteracy and mortality rates of children. Acosta (2006) has investigated the effect of remittances receipts on educational investment decisions of households in El Salvador and found that remittances have a positive effect on school participation of both male and female children, while it negatively affects labour supply by female children only. This result raises the important concern of taking into account the gender of children when measuring the strength of the impact of remittances on education. Amuedo-Dorantes and Pozo (2006) found no significant impact of remittances on education in the Dominican Republic, while accounting for the impact of migration of parents, finding that the negative disruptive effect of parent's migration is strong and particularly affects male children. They further discussed the differential impact of remittances on educational attainment of children by their age. According to their findings, remittance receipt has a far more significant impact on the educational attainment of female compared to male children. On the other hand, a recent study by Cuecuecha (2008) provided evidence of a positive impact of remittances on educational attainment in Mexico, but also found an evidence of different impact by gender of children. Grigorian and Melkonyan (2008), within the framework of an overlapping generations model, have reported evidence on Armenian remittance receiving households, which spend less on education than remittance non-receiving households. Leon *et al.* (2007) have investigated the impact of remittances on human capital formation in Ecuador and found a positive effect of remittance receipt on school enrolment and reduction of child labour.

Acosta (2006: 42) has controlled for sample selection endogeneity problems and found that the estimated results on the impact of remittances on educational attainment of children are less significant, although still positive, compared to previous studies. When controlling for the gender of children, Acosta (2006: 40) found a much stronger impact of remittances on the school enrolment of girls, while this effect on boys is relatively weak.

Other studies (Kandel and Kao, 2001; Hanson and Woodruff, 2003) have analysed the relationship between household migration and education of family member left behind, where remittances were considered as a factor exerting a positive influence. Hanson and Woodruff (2003) analysed the relationship between migration of a family member and a child education and concluded that a positive relationship between these two is driven by remittances. Yang (2004) found evidence between currency appreciation and children's schooling in the origin country, again explaining the positive relationship between these two by the remittances factor. McKenzie and Rapoport (2006) found a negative impact of migration of a parent on the educational attainment of children. Malone (2007) controlled for the gender of a household head and found evidence that female household heads who receive remittances from a male migrant are those who are the most likely to invest in the education of children.

In terms of the relationship between remittances and brain drain, it might be argued that the positive impact of remittances on educational attainment of children in remittances receiving households contributes to mitigation of the negative impact of the brain drain, along with the migration incentives and return migration effects. Still, what needs to be taken into consideration here is that the amount of remittances sent back home does not necessarily increase with the magnitude of brain drain; rather the opposite might be the case (Faini, 2006).

Motivation for a micro-level study of the impact of remittances on educational attainment in a country affected by ethnic cleansing is motivated by the interest in analysis of the influence of specific features of forced migration on the relationship between remittances and human capital

formation in a home country. It is expected that the context in which remittance receiving households are making human capital investment decisions, influence the extent of these decision. Moreover, empirical evidence suggests that forced migrants generally migrate as a family, thus remittances are sent to relatives, rather than to family members from a migrant parent and are driven by purely altruistic motives. This implies that the human capital investment might not necessarily be a part of a household's strategy of diversification of the wage variability and intra-household income allocation. This might limit the extent of positive impact of remittances on educational attainment of children in a remittances receiving household. Alternatively, receipt of remittances by relatives instead of family members might limit the negative impact of parental absence and thus increase positive impact of remittances on education attainment of children in from remittances receiving households in affected countries. Therefore, as the theoretical prediction about the overall impact of remittances on human capital formation in a home country affected by a conflict or natural disaster is inconclusive, empirical tests of these predictions are necessary for better understanding of these relationships in the ethnic cleansing setting.

### **2.3.3. Return migration**

Analysis of return migration in the context of the analysis of the net effect of emigration of highly educated individuals on human capital stock in a home country is important for several reasons. Once departed, highly educated emigrants may decide to return. Low educated emigrants may acquire useful skills while abroad and bring them back to the home country. Also, all migrants may bring back both financial and non-financial<sup>20</sup> instruments that should positively affect the educational attainment of their children. For the first type of impact, the "brain return", it is important to understand not only the magnitude of the brain drain but also the skills acquisition

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<sup>20</sup> It is expected that returnees bring back "social remittances", or increased awareness of the importance of education, which should result in increased educational investments.

during the period of stay in a host country. Moreover, appropriate understanding of the magnitude of this impact, the self-selection mechanism of return migration, needs to be developed and understood.

As presented by Cassarino (2004: 255), theoretical approaches to return migration, attempting to explain its magnitude and dynamics, could be divided into five different types: Neoclassical approach; New Economics of Labour Migration (NELM); structuralism; transnationalism; and Social Network Theory (SNT). For the purpose of this thesis, the theories will now be explained through focusing on the predictions they make about the self-selection mechanism and human capital formation of returnees, as well as through referring to applicability of these different approaches in the specific context of ethnic cleansing.

The first approach, based on the Neoclassical economics theory (Borjas and Bratsberg, 1996; Cohen and Haberfeld, 2001), describes return migration as a result of failure in achieving the objectives that caused the initial migration. This negative self-selection hypothesis does not allow for a significant brain gain effect. However, it may exist if the accumulation of human capital abroad is introduced. The second approach (Dustmann *et al.*, 2008), is also based on migration as a strategy of maximization of outcomes in the labour market, but has a completely different explanation of return migration. According to their view, return migration is considered as a part of the migration process and a natural outcome of the individual's consideration of the costs and benefits of acquiring human capital in different places. New Economics of Labour Migration, assuming that returnees are those whose return is the end of a process of successful migration, predicts positive selection of migrants in their unobservable skills, but not necessarily in observable skills. These migrants planned return, so their skills are expected to match local needs.

The third approach, structuralism, argues that return should not only be analysed from the perspective of individual migration experience, but also taking into account the context of return, *i.e.* social and institutional factors in the home country. In the context of ethnic cleansing, this

theory acknowledges the importance of contextual factors in a home country for the return of migrants. It assumes that, although migrants should be positively selected, their ability to successfully employ their human capital is limited, due to opposition of local groups and interests to the returnees and their initiatives towards innovations and changes (Cassarino, 2004: 258).

Transnationalism and Social Network theory are similar in terms of their explanation of the return process and motives for return. They emphasize the role of ties that migrants develop between their home and host countries. Their main difference is in terms of their explanations of the context and motives by which these ties are developed. According to transnationalism, the ties migrants develop between their home and the host country is based on their ethnicity, whereas Social Network theory explains these ties through economic and social commonalities and interests. In contrary to NELM and structuralism, these two theories do not see the return migration as a natural end of the migration process, but rather as a part of continuous circular system of migration. So, the return migration of “successful” migrants is not necessarily the end of migration process, as argued by the previous approaches, but part of a process of maximization of benefits of acquired human capital. In that sense, these explanations of return migration predict a positive impact of return migration on the human capital formation in a home country. Migrants are expected to acquire more human capital than others and, what is even more important, to acquire skills that match local needs more that others would do.

Dustmann and Weiss (2007: 250) argued that return migration, which occurs despite persistent wage differences between host and home country, may be explained by three motives that induce migrants to return. First is the returnees’ preference for consumption in a home country. Second is lower purchasing power in a home country. Third, which is of particular interest for us in the context of this study, is human capital accumulated in a host country through learning by doing, which should have a positive impact on the wages of returnees at home.

The empirical literature on self-selection of returnees and the impact of return migration on human capital formation is not conclusive. In recent years, there have been an increasing number of studies that, based on different assumptions, provided evidence which supports one or other of the previously described theoretical approaches and their predictions on the human capital formation effect of return migration. Borjas and Bratsberg (1996: 175) developed a model of return migration which predicts the sign of selection strongly influenced by the selection of migration in the first place and with the opposite sign. According to them, if migrants were initially positively selected towards migration, then returned migrants tend to be negatively selected and vice versa. In a study of Tongans and Samoans in Australia, Ahlburg and Brown (1998: 148) have found little evidence that migrants with intention to return acquire significantly more physical and human capital. The study was based on a survey among migrants still living in Australia, where respondents were asked whether they intend to return ever or not. Response rate to this question has been very high, but only 7% of respondents answered the question if it will happen in one or 5 years. This suggests that most migrants did not have a clear return plan at the time of the survey. Therefore, reliability of the data and comparability between the two groups, migrants “with intention” to return and those with no intention, is questionable. Dustmann (1996: 234) reported that more than a half of migrants who initially expressed their intention to return from Germany did not enact that intention over the subsequent nine years. So, the appropriate analysis should focus either on returnees or compare capital acquisition by those with a clear time plan of return and those with the return date not set yet.

Besides the impact of return intention on human capital accumulation abroad, several studies have investigated its impact on other aspects of the behaviour of potential returnees. The return probability of immigrants is found to have a positive impact on their savings behaviour (Galor and Stark, 2000: 467). If return migration does not materialize, these higher savings may result either in increased income differentials between immigrants and the native-born population or in increased

amounts of remittances sent home. Conversely, the impact of return probability on human capital formation seems to be negative (Dustmann, 1999; Cortes, 2004). Recently, several studies (Dustmann, 2003, 2007) have investigated the intergenerational impact of return migration probability on human capital formation. Dustmann (2003: 829) has found a negative correlation between the number of children of an immigrant and her/his return intentions. This relationship was explained by altruistic motives towards migrants' offsprings and their future welfare. Dustmann (2007), in a study conducted among immigrants in Germany, found a negative correlation between fathers' return migration intentions and their investments in sons' education.

Another set of studies used the revealed behaviour of returnees by collecting data on their post-return educational and other investment decisions. Ilahi (1999) has provided evidence of a positive relationship between migration experience, including accumulated savings and human capital and occupational choice of returnees to Pakistan, after controlling for possible endogeneity of migrants' savings and the choices available to returnees to different areas. McCormick and Wahba (2001) provided evidence on the impact of overseas savings and duration of stay on the probability that a returnee will engage in entrepreneurial investments, particularly for literate returnees, concluding that skill acquisition abroad may matter more than just savings.

Cohen and Haberfeld (2001), comparing income levels of migrants from Israel to the United States who emigrated in 1970s and returned to Israel to those who migrated at the same time and remained in the US, found a difference in their incomes, concluding that there is a negative self-selection of these migrants. The study restricted the sample of migrants on those with relatively short migration experience, thus this result might be biased. Also, when migrants are compared in terms of observable skills only, or their educational level, they tend to be positively selected.

In an overlapping generations model, where decisions to migrate and decision to return are made in a sequence, Mayr and Peri (2008: 24) have shown that return migration and subsequent wage increase associated with international experience may be an additional incentive for migrants

in sending countries, besides migration and wage differentials between home and host country. The incentive effect of the brain gain argument is not necessarily based on permanent migration; instead individuals invest in their human capital with the intention of temporary migration abroad and return with international experience, where both of these increase returns to their human capital investment. They argue that return migration actually contributes significantly to the brain gain argument and may turn the brain drain story into the brain gain story.

The literature on return migration, although acknowledging heterogeneity of returnees and referring occasionally to the specific features of return of forced migrants, has not yet provided a separate analysis of return of forced migrants. According to Ghosh (2000: 185), return is “largely influenced by the initial motivations for migration as well as by the duration of the stay abroad and particularly by the conditions under which return takes place”. All three factors influencing return migration mentioned in the previous statement are important to explain from the point of view of ethnic cleansing. Initial motivations for migration are obviously different among conflict-induced migrants. Most of them, as mentioned in Massey *et al.* (2005), did not have migration intention prior to the occurrence of a conflict. Therefore, the theoretical approaches of the Neoclassical and New Economics of Labour Migration (NELM) are of little use in the explanation of return migration of conflict-induced migrants.

Duration of stay affects behaviour of returned migrants. As Dustmann (1996: 225) pointed out, “investment in human capital is affected by the length of time the migrant stays in the host country”. It also affects the degree of match of these skills to either home or host country. If a migrant stays in a host country for a short period of time, it would be costly for her/him to acquire skills specific to that country. Therefore, it is more likely that a migrant will acquire skills that match the needs of a home country (Dustmann, 1996: 226). In the context of conflict-induced migration with “temporary protection” status granted, this theory predicts a positive match of skills



acquired and skills needed in a home country. Dustmann and Weiss (2007) reported significant return of migrants from the UK and that most return took place within 10 years of their stay.

Duration of stay and conditions for return are also different in the case of forced migrants. It can be clearly seen from the example of Bosnian migrants in the EU. They have been granted “temporary protection” status and were “repatriated” soon after the end of the war. If they did not have an opportunity to plan their stay abroad, it could be expected that they have not acquired as much capital, both physical and human, as voluntary migrants who have clear intentions to return and a plan of return.

The process of ethnic cleansing is characterized by mass forced displacement of individuals, which affects non-random part of population and changes well-being of individuals. This change is subsequently shaping their migration decisions. Consequently, the above presented theories explaining initiation of voluntary migration are not completely adequate for explanation of ethnic cleansing. In order to explain ethnic cleansing successfully, it is required to develop a theoretical model of ethnic cleansing, which will be based on the current theories of voluntary migration, but will incorporate all the above identified specific features of ethnic cleansing. According to the above highlighted part of the Runciman’s (1966) original quote about relative deprivation and a specific two-stage process of ethnic cleansing identified, it was recognized through this literature review that the most appropriate theoretical framework for developing a model of ethnic cleansing is relative deprivation framework developed by Stark and Taylor.

On the other hand, there is no clear argument for not using previously developed models of the impact of voluntary migration on human capital formation. Only the magnitude of some of these impacts is expected to be different. Therefore, the separate analysis of the channels through which the brain drain can influence human capital formation in a home country is required, but the use of model from the voluntary migration literature should be sufficient.

## Concluding remarks

The discussion of theoretical models of migration and their applicability in the context of ethnic cleansing suggest that the most appropriate theoretical approach to the explanation of brain drain from a country affected by ethnic cleansing is the extended Neoclassical theory with the relative deprivation hypothesis, as well as specific characteristics of ethnic cleansing, incorporated into the model. Such a model is expected to have an advantage over using models of forced migration developed previously, which did not capture specific features of ethnic cleansing.

Ibanez and Velez (2005) developed a model of forced migration, based on a model used for the analysis of voluntary migration and augmented it by accounting for risk as an additional factor of migration. They noted that, despite high levels of violence, some people choose to stay, rather than to migrate. In their explanation, they assumed that violence is “not randomly targeted“ (Ibanez and Velez, 2005: 10) and that families in their displacement decision making process consider not only violence but also other factors, such as traditional economic migration variables. This model may be useful in explaining involuntary migration of individuals from countries with high level of political instability, where these individual are facing certain probability of threat. Once it is included into the utility model of an individual and assuming that individuals prefer less risk, the model predicts increased number of involuntary migrants as the level of political instability, or risk, increases. However, in the case of ethnic cleansing, there is no probability of threat, but certainty. In the first stage of ethnic cleansing, individuals are forcibly evicted from their houses, thus the threat has been exercised. In the second stage, individuals decide whether to migrate or not based on a mix of economic and risk factors.<sup>21</sup> What this model correctly points out is that the threat is not randomly targeting individual, but in the case of political instability some are more likely to be threatened and

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<sup>21</sup> The model of determinants of brain drain as a result of ethnic cleansing will be presented in the next chapter. This model is based on models of voluntary migration, as it assumes that individuals, even those who were forcibly evicted, base their decision on economic opportunities that will increase their utility after making migration decision. But also, they are faced with a certain level of risk, which is additional determinant of their migration decision.

in the case of ethnic cleansing individuals with specific characteristics are targeted with a high level of certainty. As the revealed evictions are easier to measure than a probability of threat, it is expected that the model to be developed in the next chapter will be possible to empirically test more easily than in the case of the previous models, such as the one discussed above.

There have been several attempts to provide evidence on the relationship between the characteristics of conflict and the size of refugee flows or proportions of refugees in the total number of displaced persons, based on the analysis of cross-country data sets (Melander & Oberg, 2004; Davenport *et al.*, 2003; Moore & Shellman, 2006). However, there has not been any attempt so far to investigate the relationship between the characteristics of conflict and the magnitude of brain drain, *i.e.* the proportion of individuals with tertiary education in the total population of refugees at country level. The Docquier and Marfouk (2006) dataset allows this type of analysis, by focusing on a subset of countries which experienced conflict. The model which will be developed in the next chapter can be empirically tested at a cross-country level by using a set of variables such as Gini coefficient as a measure of relative deprivation, change in GDP per capita as a measure of the change in relative deprivation and number of internally displaced in a country as a variable capturing the extent of forced evictions during an ethnic cleansing.

# *Chapter 3: A Contribution to the Economic Theory of Ethnic Cleansing*

## *Introduction*

*3.1. Motivation: Ethnic cleansing as a specific type of migration*

*3.2. Background: Displacement in Bosnia-Herzegovina during 1990s*

*3.3. Theoretical model of ethnic cleansing*

*3.4. Models of brain gain in the context of ethnic cleansing*

*3.4.1. Incentive effect*

*3.4.2. Remittances and educational attainment*

*3.4.3. Return migration*

*Concluding remarks*

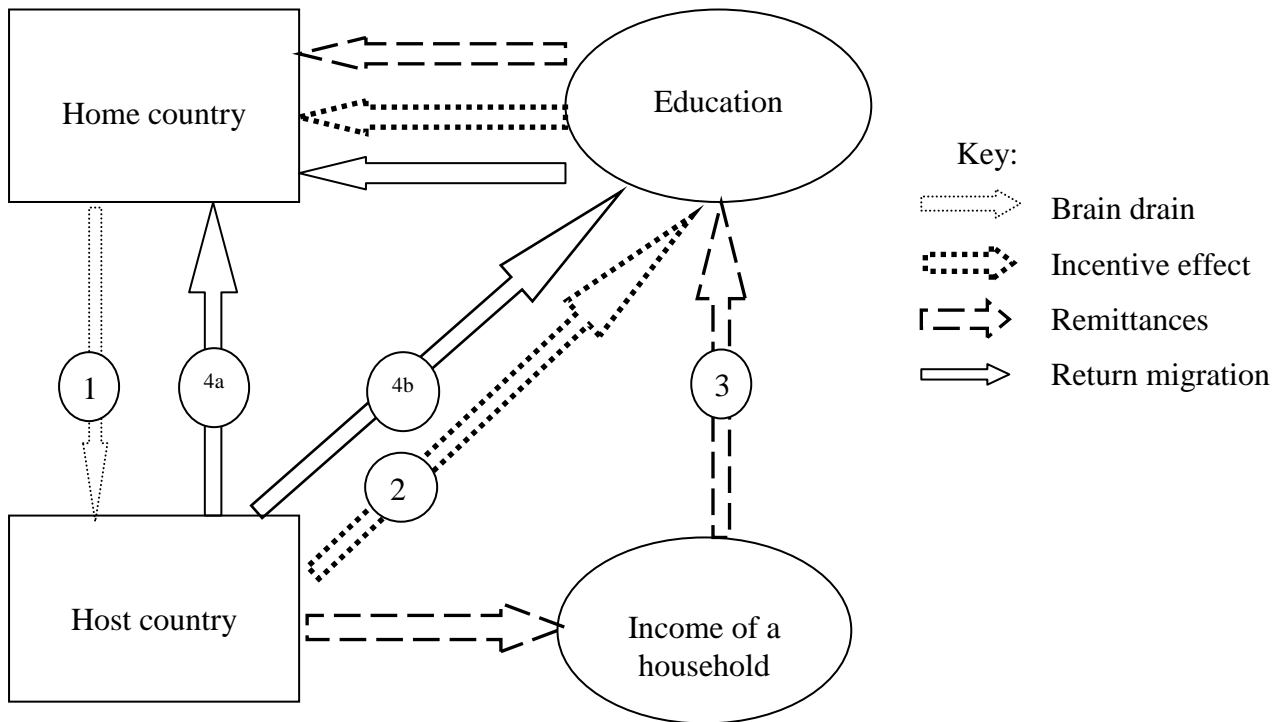
## Introduction<sup>22</sup>

The brain drain represents a decrease in the stock of human capital and decrease in fiscal contributions to a country's budget. However, it may also have various positive effects for a home country. First, skilled migrants send remittances back home, which contributes to human capital formation through positive impact on households' income and subsequently on their education investments. Moreover, diaspora has a range of other positive effects on a country's economic development, through facilitation of trade, FDI, tourism and other relations between their home and host country. Also, return migration represents an important channel of transfer of financial, human capital, cultural and other assets from host to home country. This thesis is primarily interested in the effects of emigration of highly educated individuals on human capital formation in a home country and focuses on three channels which directly affect human capital formation, as follows: (1) the impact of remittances on educational attainment in a home country; (2) the impact of migration prospects on investments in education; (3) the impact of return of highly educated individuals ("brain circulation") on a stock of human capital. These positive effects on the stock of human capital in a home country are known collectively as "brain gain". These different channels may be presented as a flowchart, in Figure 3.1.

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<sup>22</sup> The work presented in this chapter is to a large extent based on author's previous work (Oruc, 2009).

Figure 3.1. Flows of effects of migration on human capital formation in a home country



The arrows numbered above denote different types of empirical analyses<sup>23</sup> which should be pursued in the empirical work that attempts to estimate a possible net effect of forced migration (including the one that results from ethnic cleansing). The first analysis, on the negative impact of ethnic cleansing on the stock of human capital in a country (brain drain), would provide empirical evidence of a self-selection mechanism in the case of ethnic cleansing, in order to estimate magnitude of brain-drain from countries affected by such event (Arrow 1). Other three arrows present the channels of positive feedback effect of brain drain, typically called brain gain effects. The first empirical analysis of brain gain and second overall, would test the idea that migration prospects induce increased education investments by those remaining at home, thus increasing human capital stock and reducing negative effects of brain drain from a home country (Arrow 2).

<sup>23</sup> The net effect of ethnic cleansing on the stock of human capital cannot be estimated by a single model. The negative impact can be simply measured by counting the number of highly skilled emigrants. But, the determinants of such numbers should be investigated through an empirical analysis. On the other hand, positive feedback effect of ethnic cleansing on the stock of human capital via the brain drain can be only analysed indirectly, through measuring the impact of the emigration incentives and of remittances on the acquisition of education in a country. Moreover, due to the nature of relationships, some models can be tested only at micro, while others only at macro level.

The third empirical analysis and second of brain gain, investigates the positive impact of remittances on relaxation of liquidity constraint and increased educational investments by remittances receiving households (Arrow 3). Finally, the fourth analysis investigates the return migration channel and would consist of two different types of analysis. The first one (Arrow 4a) is the analysis of the self-selection of return migrants in terms of their education levels and its impact on human capital formation in a home country. Positive self-selection would mean that more highly educated migrants return and thus partly mitigate the negative impact of brain drain in the long run. The second type of analysis (Arrow 4b) would test the hypothesis that return migrants, after their migration experience, have increased awareness of the importance of education<sup>24</sup> and are more likely to invest in the education of their children upon return. Combining the results from all these empirical studies should reveal possible net effect of ethnic cleansing on the stock of human capital in a country, which would be calculated as a sum of positive effects (Arrows 2, 3 and 4) minus negative effect (Arrow 1). All these empirical analyses, except the ones on return migration, will be conducted in this thesis. Unfortunately, the analysis of return migration is beyond the scope of this thesis, as the data on return migrants cannot be easily obtained. Consequently, the final output of this thesis will not be estimation of the net effect of ethnic cleansing on the stock of human capital in a country, as one of the channels is missing, namely the one on return migration. Still, the four different empirical studies on the ethnic cleansing, where at least two of them are the first attempts to provide empirical evidence on this topic, will be a great contribution to the literature on the economic consequences of ethnic cleansing, as well as of migration and conflicts in general.

According to the characteristics of the brain gain channels, it is expected that neither forced migrants will be considerably different from voluntary migrants after migration, in terms of their remittances sending and return migration behaviour, nor that the incentive effect in such countries will operate differently. The key difference between these two types of migration with regards to

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<sup>24</sup> Or “social remittances”, as usually described in the migration literature.

the feedback effects is that their size can be different and that the structural break in the magnitude of migration flows caused by ethnic cleansing will require more time to offset the negative impact of such a brain drain on human capital formation in a country, compared to voluntary migration. Consequently, the analysis of the brain gain in the context of ethnic cleansing is primarily an empirical question.

As explained earlier, the migration process is different from voluntary migration, since different factors influence the migration decision. Therefore, it is important to take into account these differences in the analysis of the brain drain part of the process (Arrow 1 in Figure 3.1). As a result, this chapter will first provide the explanation of the differences in the flows of migration between ethnic cleansing and voluntary migration and then will develop a theoretical model of ethnic cleansing, in order to capture its specific features in the subsequent empirical analysis of the brain drain from countries affected. Such empirical analysis would test the predictions of the model with relation to the magnitude of brain drain as a result of ethnic cleansing, compared to voluntary migration.

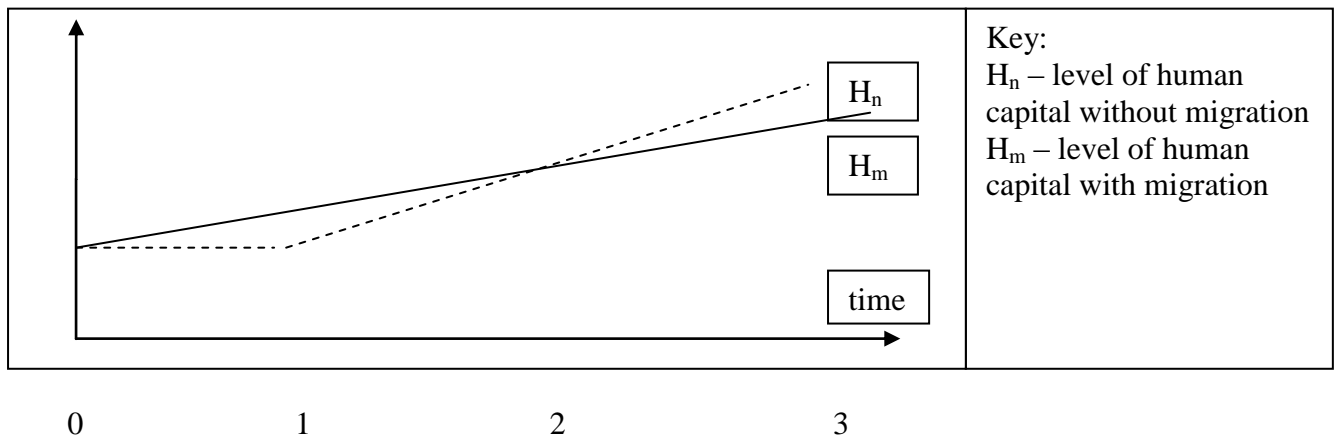
### **3.1. Motivation: Ethnic cleansing as a specific type of migration**

As presented in the previous chapter, the migration literature can be generally divided into two types based on the view about the sign of net effect that emigration of educated individuals has for the home country, or which of the two effects on the human capital stock, brain drain or brain gain, is stronger. However, the problem with both types of theories is that they do not make distinction between different types of emigration. It is already mentioned that one of the key characteristics of ethnic cleansing, which distinguishes it from other types of migration, is the magnitude of displacement. This means that it is likely to expect both different time frame necessary to allow for possible positive net effect and difference in the magnitude of positive effects of such emigration. For instance, the impact of emigration of highly educated individuals on human capital formation



through increased incentives for investments in education by those left in a home country, as it increases prospects for emigration, may be expected in case of voluntary migration. But, not necessarily in the case of ethnic cleansing, since they emigrated not primarily attracted by higher expected economic gains. Therefore a separate analysis of this type of emigration should be conducted and would bring necessary insight into this problem, by taking into account important differences between voluntary and forced migration. Possible differences in the expected net effect of migration on human capital formation in a home country, as a result of the differences in the magnitude of displacement, are described in Figure 3.2 and Figure 3.3 below. Figure 3.2 presents the effect of individual emigration on human capital formation.

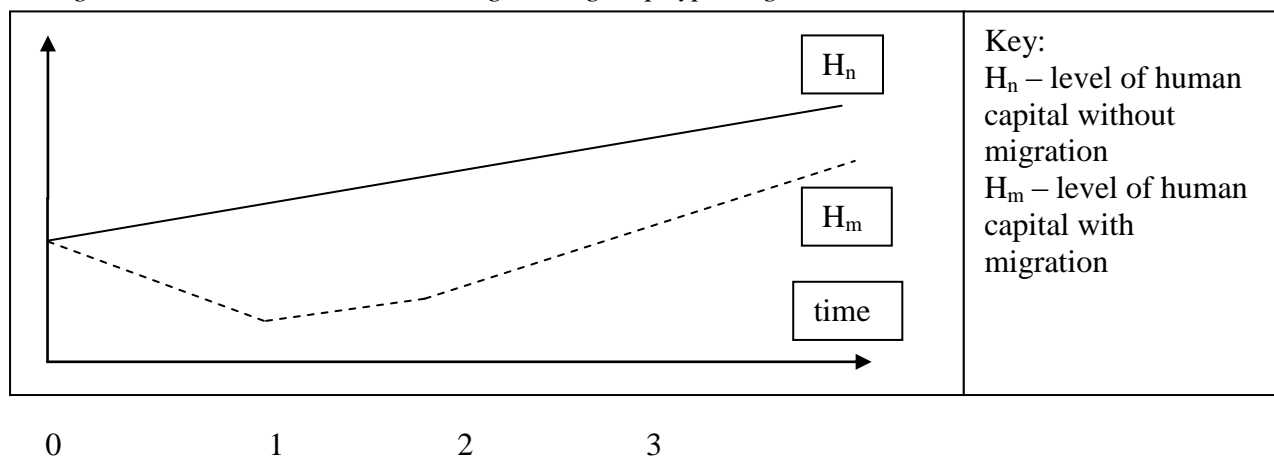
Figure 3.2. Brain drain and brain gain in individual type migration



In period 0, there is no migration. In period 1, emigration results in reduction of human capital, which is below the level of human capital without emigration, i.e. we have brain drain. After period 1, brain drain brings some positive impact on the human capital through different channels, such as incentive effect and remittances. This increases the growth rate of human capital, so in the period 2 the negative impact of brain drain has been replaced. In the period 3, we could even expect net positive impact of emigration on human capital formation. Whether this is actually observed depends on the level of positive influences, such as remittances.

The second chart presents the effect of mass emigration (such as the one that results from ethnic cleansing) on human capital formation.

Figure 3.3. Brain drain and brain gain in group type migration



The process in this case is similar as in the situation of individual migration. The only difference is that ethnic cleansing is usually associated with sharp increase in the emigration rates for a short period of time. Thus, a shock (*e.g.* ethnic conflict) in period 1 significantly reduces the stock of human capital in a country. Consequently, even if it is assumed that the channels of brain gain (incentive effect, remittances effect and return migration effect) in the case of ethnic cleansing have the same degree of positive emigration effect on human capital formation as in the case of voluntary migration, still the large decrease in the stock of human capital caused by ethnic cleansing requires a long time period of positive effects to be present until such a brain drain is offset and the positive net effect (difference between brain gain and brain drain) is observed. This is only possible if no new large depletion of the stock of human capital is observed in consecutive periods. Therefore, it should be generally observed that countries with a more volatile history will have the negative net effect of emigration.

### **3.2. Background: Displacement in Bosnia-Herzegovina during 1990s**

The above section explained how the magnitude of brain drain from ethnic cleansing may differ from brain drain in case of voluntary migration, which affects the net effect of this process. In order to understand the factors that influence the magnitude of brain drain from ethnic cleansing, the theoretical model of ethnic cleansing shall be developed and presented in this chapter. As an introduction to it and with the purpose of understanding the process of ethnic cleansing completely and all details, a small scale investigation of the ethnic cleansing in Bosnia-Herzegovina during the conflict in 1990s was conducted. This event is chosen as it may be considered as one of the most striking examples of ethnic cleansing that is representative not only of ethnic cleansing, but also of other types of migrations falling into the broad category of population transfer. The result of this investigation is expected to reveal to what extent is the model of voluntary migration suitable for the explanation of the process of ethnic cleansing and if not, how it should be extended or amended.

Before 1990s, Bosnia-Herzegovina was a federal state within Yugoslavia, a Republic with very mixed ethnic structure. According to the 1991 Census, the country's population was composed of three main ethnic groups, considered as "Constituent People" of a country: Bosniaks (43%); Bosnian Serbs (33%); and Bosnian Croats (18%).<sup>25</sup> The conflict in Bosnia-Herzegovina<sup>26</sup> began in April 1992 and finished in December 1995, by US backed negotiations in Dayton, Ohio. This war has been characterized by mass resettlement of people, as a result of the main goal of some warring parties to pursue a policy of ethnic cleansing of the territory they control and artificially create a possibility to claim control over that territory. As a consequence of such strategies, about half of the population was resettled during the war, where approximately 25% was displaced internally and the

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<sup>25</sup> This sums up to about 94% of total population. Other ethnic groups, considered as minorities, are Roma, Jews and other groups. In total there are 17 different minorities in the country.

<sup>26</sup> There are different views of opposing parties in Bosnia-Herzegovina about the type of this conflict. For those fighting on the government's side (mainly Bosniaks), 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.

other 25% emigrated abroad (MHRR, 2005). The result was almost total division of population along ethnic lines. As the above figures show, it was large scale forced displacement of people, where the displaced individuals had no choice to remain, but were forced to leave their homes. The individuals were targeted on the basis of their ethnicity. In the case of natural disasters or some development projects, individuals are also non-randomly targeted, but on the basis of their place of living. Thus, the forced displacement involves a large part (50% in the case of Bosnia-Herzegovina), but not the entire population. After displacement, individuals chose to stay within the country (half of displaced in the case of Bosnia-Herzegovina), while others chose to migrate abroad. Also, some of those who were not displaced from their houses decide to migrate. The question that the theoretical model should answer is what factors influence such different migration decisions.

In order to investigate specific features of ethnic cleansing that took place in Bosnia-Herzegovina, 12 semi-structured interviews<sup>27</sup> were conducted. Due to the different types of forced migrants from Bosnia-Herzegovina, it was decided to perform 12 interviews, 3 from each of the alternative types of displaced households: refugees; returned refugees; internally displaced; or returned internally displaced. Three major cities with highest concentration of displaced people - Sarajevo, Mostar and Banja Luka<sup>28</sup> - were chosen in the first stage of sampling. Potential interviewees were then randomly<sup>29</sup> selected from online phone directories<sup>30</sup> of three telephone services providers from these cities in the second stage. Then, each of them was asked several brief questions, related to their ethnic origin, current displacement status and willingness to take part in the interview. In each group, three households were chosen from a different ethnic group and in the whole group of 12 interviewees, half of them were female, half highly educated and half displaced

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<sup>27</sup> The questionnaire used in these semi-structured interviews is provided in Appendix 3.1.

<sup>28</sup> Here, Sarajevo has been the main displacement destination site for ethnic Bosniaks, Mostar for ethnic Croats and Banja Luka for ethnic Serbs.

<sup>29</sup> The purpose of the survey was not to collect a large number of responses, but just initial information about the magnitude of ethnic cleansing conducted by each warring party, in order to have at least some evidence on this, instead of taking a subjective position. Therefore, the representativeness of the sample was not of particular importance. At least certain degree of unbiasedness was achieved through random selection.

<sup>30</sup> In a country without Census and street address directories, this was the best possible source for selection of respondents. Thus, the possible selection bias of choosing respondents who have a phone can only be acknowledged and accepted in such circumstances.

from non-urban areas. The main objectives of semi-structured interviews were to identify differences in the motives and the patterns of displacement between internally displaced and refugees. Moreover, it provided useful information about the differences in migration decision making between individuals with different levels of education.

Nine respondents explained that they were forced to move and that they went to the closest place which they considered as a “safe haven”.<sup>31</sup> Then, they were in a position to make a decision where to move. Other three interviewees were living in a municipality which has been under the control of their ethnic group. Thus, these interviewees have not faced a direct threat to their lives. They explained that their motive for migration was primarily economic, but can also be considered as affected by the war, which reduced the options available. The choice of the final destination was influenced by the “network effect”, since two thirds of respondents, both internally displaced and refugees, stated that they had relatives or close friends living at their final destination. Interviewees were also asked several questions about the process of displacement. The set of questions in this section of the questionnaire were slightly different, as they were adjusted according to individual displacement experience. The majority of cases of displacement have taken place in a family context. Sometimes, a male household head decided to stay and fight and then joined the rest of the family after some time. Returned refugees and returned internally displaced persons were also asked questions on their return experience. The results of these interviews did not reveal any clear differences in demographic characteristics between displaced and returned displaced households, which indicates that the decision to displace and decision to return were two different decision influenced by different factors.<sup>32</sup>

In assessing the process of displacement of individuals from Bosnia-Herzegovina, as it has been found through this small scale investigation, two types of individuals can be distinguished: those who were forced to displace and those who did not, but faced indirect threats and worsened

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<sup>31</sup> A “safe haven” was any place which was controlled by a group of the same ethnicity as respondent's. In such a place, they were facing indirect threat, but at least not certainty of being killed.

<sup>32</sup> This may be used as an argument for separate analysis of these two processes, displacement and return of migrants.

economic situation. In the example of displacement from Bosnia-Herzegovina, two different types of situations in which individuals found themselves at the beginning of the war can be distinguished. The first type, which can be called type A situation, is the one in which individuals were living in a municipality controlled by authorities of the same ethnic group, thus they were not faced with forced eviction. The level of indirect threat to households has been different, depending on the proximity of the place to the fighting zones. However, the threat has been random, meaning that all individuals in one place, regardless of their ethnicity or other characteristics, were facing the same level of threat. Type B situation is the one where individuals were living in the area controlled by a group of a different ethnicity, thus being faced with forced eviction.<sup>33</sup> These people usually did not have a choice to stay and also were generally not allowed to take any valuables with them.<sup>34</sup> This type of displacement mainly took place in the first few months of the war. This type of displacement was 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 situation, 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. 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

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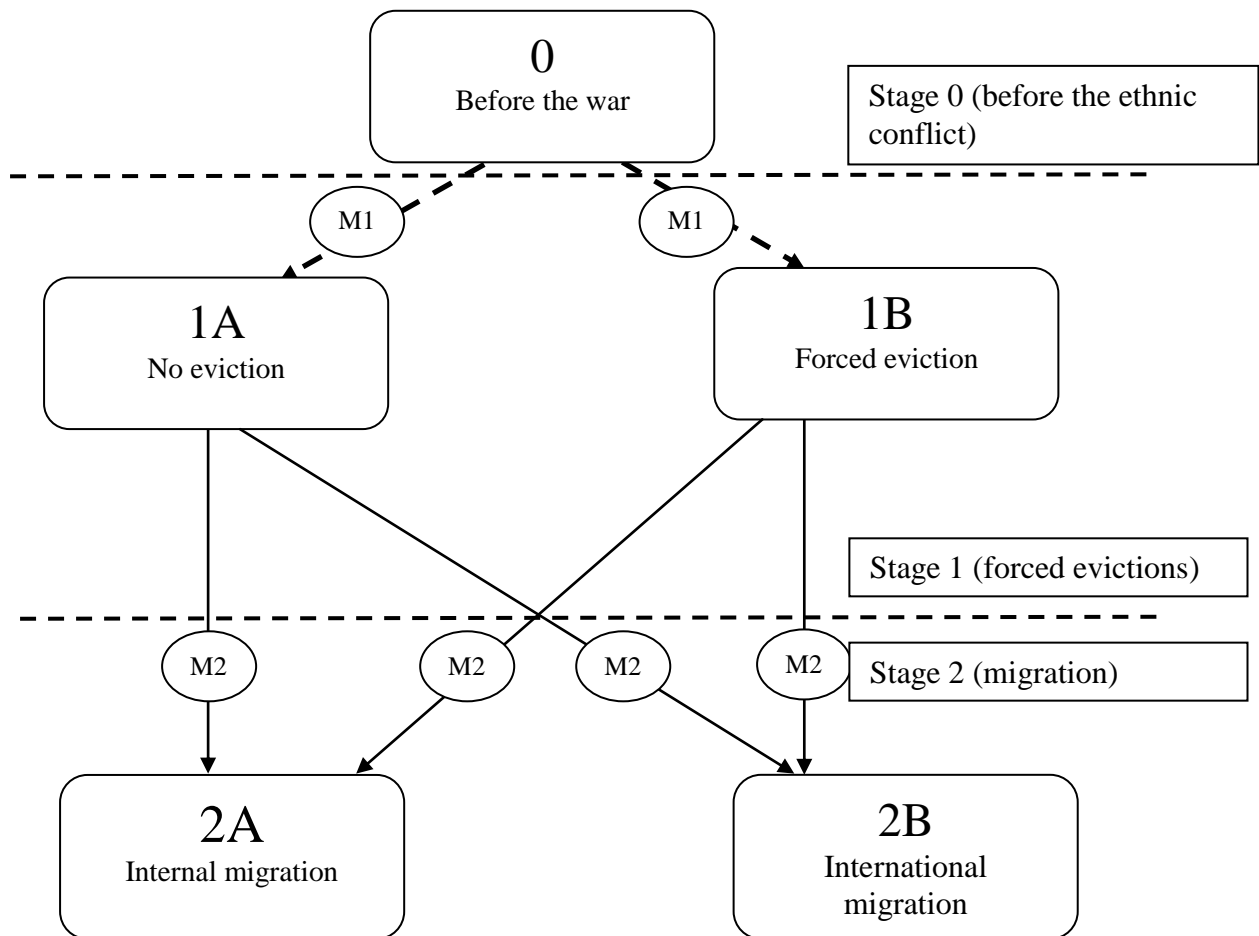
<sup>33</sup> According to the available data on the displacement in Bosnia-Herzegovina, almost 100% of individuals who were in a type B situation, were forced to leave their homes during the conflict. In addition, there have been takeovers of some municipalities by an opposing ethnic group. Since other ethnic groups have already been evicted, this takeover usually implied eviction of the total population of the municipality, just at different points of time.

<sup>34</sup> The type B situation can be compared to a flooded area, or an area affected by a development project. These similarities give an argument for using the evidence from the ethnic cleansing displacement for explanation of displacement as a result of natural disasters and development projects.

municipality controlled by authorities of their ethnic group first. From that new destination, households were then making further displacement decisions.

There has been certain amount of displacement observed by individuals being in type A situation, besides households displaced from B type situations. As explained previously, an event such as conflict or natural disaster reduces economic opportunities to all individuals and introduced indirect threats. For these reasons, some households although not being forcibly evicted from their homes decided to migrate abroad. The entire process of ethnic cleansing, including both forced displacement and subsequent migration by the evicted and non-evicted, can be presented in Figure 3.2. below, which is drawn in the form of a decision tree.

Figure 3.4. The pattern of displacement during a conflict



In Figure 3.4, the blocks represent types of situation in which a household finds itself as a conflict occurs, broken arrows exogenous change and full arrows endogenous change in the well-being of households, both absolute and relative. Arrows labelled by M1 represent changes in the well-being due to the event causing forced displacement, such as a conflict or natural disaster and those labelled by M2 the change due to the migration. The above figure presents the pattern of displacement in Bosnia-Herzegovina, as described in the presentation of the results of semi-structural interviews, as well as the idea of two-stage process of the ethnic cleansing, which is the main contribution of the theoretical model developed below. The first block (0) is a pre-event position of households, in terms of their well-being. As the event occurs, people move from 0 to 1 (the move presented by two broken arrows denoted by M1 from the block 0 to two blocks at the middle level of figure). The two types of situations in which households may find themselves in are distinguished, the one when households find themselves in a more “friendly” environment (type A position), such as a municipality controlled by their ethnic group (block 1A) or the one when they find themselves in a more “hostile” environment (type B position), such as a municipality controlled by another ethnic group (block 1B). The households from the block A (type A position) were not forced to displace, but their well-being was affected by the conflict, both in absolute and relative terms. Those from the block B (type B position) were forced to displace to the nearest municipality controlled by their ethnic group. After this change in well-being (which, for some, includes forced displacement), households were making decision whether to stay in the (pre-war or new) municipality to displace elsewhere within the country (block 2A), or to migrate abroad (block 2B).

The distinction between the two types of situations in which households find themselves are important for the correct identification of the extent to which the well-being of households with different characteristics was changed. This is important for measuring the size of relative deprivation of households when they compare their position during conflict (stage 1) with pre-



conflict position (stage 0). According to Figure 3.1, there are two types of forced migrants in the case of ethnic cleansing: namely those who were affected by the conflict and decide to leave their homes, in order to reduce the risk and/or for economic motives; and those who, once forced to leave their homes and lost their property, decide whether to be internally displaced (by staying in a place of their immediate displacement or to move to another place within a country) or to move abroad. Thus, the forced evictions, in addition to the occurrence of conflict, cause much more significant decrease in the well-being of households than just the occurrence of the conflict. The well-being is changed both in terms of absolute income and relative position within a reference group. According to the Neoclassical theory of migration, larger migration from countries affected by a conflict is expected because the absolute income of the vast majority of individuals is negatively affected by the conflict, so the pre-war utility of migration may change from being lower to becoming higher than utility of staying. Also, the individuals who were forcibly evicted are expected to be more likely to migrate, as they suffered more significant losses in terms of their absolute income and the gain from migration by these individuals, or their expected wage differential is higher than by those who were not forcibly displaced. In addition to this, the relative deprivation hypothesis states that the migration decision will depend not only on the change in absolute income, but also on the change in individual's relative position within a reference group. As a large proportion of individuals were affected, either by forced displacement or by reduced economic opportunities, the relative deprivation of each individual relative to the reference group will not necessarily increase for all individuals. Therefore, the relative deprivation hypothesis does not predict increased overall number of migrants, but instead predicts positive self-selection of migrants, or their skill composition. Furthermore, it suggests that we can equally observe migration by both those who were and those who were not forcibly displaced.

Based on the results of the investigation of process of ethnic cleansing in Bosnia-Herzegovina by conducting a small scale survey of households' displacement experience, presented above,

specific features of ethnic cleansing were identified. The interviews confirmed the fact that individuals were forcibly evicted from their homes, they were non-randomly targeted and that the well-being of the entire population was negatively affected by the conflict. However, the absolute income of those who were forcibly evicted was much more severely affected than of those who were not. These specific features were then used as a platform to develop a formal model of ethnic cleansing. It is a type of migration characterized by forced evictions of part, but not of the entire population. The affected individuals are a non-randomly chosen segment of the population. Individuals with characteristics such as ethnic origin in the case of conflict, or place of living in the case of disasters and some development projects, are forced to flee. They were not given any option to stay. Also, those who were not displaced were affected by the worsened economic situation and increased risk. Then, some individuals from both groups, those who were and those who were not forcibly displaced, make their migration decision. Accordingly, the model of ethnic cleansing, which will be developed in the next section, should incorporate these facts: the two-stage process in particular; non-random targeting; influence of both absolute change in income and relative deprivation; as well as the factor of risk.

As defined previously, the main aim of this thesis is to analyse factors affecting migration of highly educated individuals and the feedback effect of this migration on human capital formation in a home country affected by ethnic cleansing, so it is of particular interest to understand how does an ethnic cleansing affect the skill composition of migrants. If it is assumed that highly educated people had higher income and were less relatively deprived (or, in other words, they had higher level of relative satisfaction), then it could be expected that they suffer greater losses in terms of absolute income, but also of their relative satisfaction than low educated individuals. Also, their relative deprivation compared to the position before the event causing ethnic cleansing increases (more), compared to the low educated. If individuals with tertiary education incurred greater welfare losses of emigration as a result of war (and/or being forced to move), they may be more

prone to emigrate in order to restore those losses. This may then act as a self-selection mechanism of ethnic cleansing. So, according to the Neoclassical models of migration, we should observe increased number of individuals migrating from areas affected by a conflict, but cannot predict their skills composition. According to the relative deprivation hypothesis, briefly described in the previous chapter, a positive self-selection of individuals in the case of ethnic cleansing should be observed. This means that the ethnic cleansing increases total emigration from a country by decreasing the absolute income of individuals (Neoclassical models), but also the emigration rates of highly educated individuals by decreasing their relative position within the society (relative deprivation hypothesis). Empirically, this would mean that the observed outcome, on average, is a larger proportion of highly educated individuals outside the country as a result of ethnic cleansing, compared to voluntary migration. The empirical test of this hypothesis is made possible by recently collected data on the skill composition of immigrants in OECD countries by Docquier and Marfouk (2006).

### **3.3. Economic model of ethnic cleansing**

The pattern of displacement from Bosnia-Herzegovina described above and presented in Figure 3.1, reveals that ethnic cleansing, compared to voluntary migration, involves large scale forced evictions of individual, where those who were evicted are non-randomly targeted and that such event changes both absolute and relative income of individuals. Individuals compare their pre- and post-ethnic cleansing well-being and their migration decisions are affected by the differences between their well-being in the two periods. These specific features of ethnic cleansing are not taken into consideration in the models of voluntary migration, presented in Chapter 2. As a consequence, a model for ethnic cleansing needs to be developed.

The following model of the ethnic cleansing is based on Stark and Taylor (1991), in which a relative deprivation hypothesis is presented. 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). One of the key differences is that the model proposed in this thesis is presented as a two-stage process. In the first stage, households' utility is exogenously affected by conflict (change from 0 to 1A in Figure 3.1). 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 Figure 3.1), where the migration decision of a household is based on the comparison of its income and relative deprivation before (Stage 1) and after (Stage 2) migration, but conditional on these values before ethnic cleansing (Stage 0). The most important feature of the proposed model is a new hypothesis, based on the original Runciman's explanation of the relative deprivation and findings of descriptive analysis of ethnic cleansing in Bosnia-Herzegovina, a "restoration hypothesis", which is incorporated into the model.

The relative deprivation hypothesis, introduced in the migration context by Stark and Taylor (1991), states that households evaluate migration decisions not only on the basis of absolute, but also of relative income differences within a community. Households evaluate their position relative to the community and feel deprived of having commodities that households richer than them have. The further below the average community income the household earns, then the more prone to migrate (in order to improve their relative income position in a community). Under the assumption of a continuous income distribution, where each income unit can be represented by a range  $(x, x + \Delta x)$  and where  $\Delta x \rightarrow 0$ , the relative deprivation function of a household is presented by the following equation:

$$RD_i = \int_{y_i}^{y_h} g[1 - F(x)]dx \quad (3.1)$$

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,  $x$  represents an income unit (or Runciman's  $X$ ),  $F(x)$  the cumulative distribution of income in a reference group (Lorenz curve) and  $1 - F(x)$  the percentage of households whose income is higher than  $x$ . Equation (3.1) represents the area below the Lorenz curve between household's position and position of the richest person in a community. This shows that a relative deprivation of an individual can be reduced by either increase in his income or by decrease in income of the richer individuals. Stark and Yitzhaki (1988) provided a proof that the right-hand side of Equation (3.1) can be decomposed into the product of proportion of household whose income is higher than that of a household  $i$  and their mean excess income. Hence, this hypothesis suggest that, given absolute income levels and expected gains from migration, individuals who feel more deprived are more likely to migrate. Moreover, migration flows should be in direction from societies with higher to societies with lower income inequality. In addition to this, if we extent this idea onto the additional part of Runciman's original quote related to individual's comparison of their well-being to the one in some previous point of time,<sup>35</sup> mentioned in Chapter 2, then we should expect that those who were affected by ethnic cleansing event more severely, are expected to feel more deprived in term of their current to pre-conflict position and thus are more likely to migrate.

This insight suggests a need for introducing a new hypothesis into the migration models. The "restoration hypothesis" is based on the observation that an ethnic cleansing event affects households' well-being. The event 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. Consequently, conflicts generally

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<sup>35</sup> As mentioned in Chapter 2, this part of Runciman's original explanation of relative deprivation was generally neglected in the migration literature, because of the characteristics of voluntary migration. Once the ethnic cleansing is described as a two-stage process where the second stage decision is conditional on the first stage changes in income and relative deprivation, this part of the Runciman's explanation becomes particularly relevant.

increase the level of relative deprivation of households compared to their position in pre-conflict period, so they are therefore expected to increase overall migration from areas affected by conflict. The more the well-being worsened, the more likely they should be to migrate abroad in order to restore<sup>36</sup> their pre-event well-being. As presented in the Figure 3.1, 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 the restoration 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-event level of utility. It should be also expected that households which were richer before the war will suffer larger absolute losses due to the war. Moreover, regarding the relative deprivation, it could be expected that richer households are worse-off in terms of the increase in their relative deprivation (or decrease in the relative satisfaction), 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. Thus, the “restoration hypothesis” predicts that individuals who migrate as a result of their absolute income differences and relative deprivation, will be positively selected in terms of their income and accordingly in terms of their level of education. This is of particular importance for the analysis of the impact of ethnic cleansing on the magnitude of brain drain from the affected country.

Following Stark and Taylor’s (1991) hypothetical example, it is assumed initially that half of the population in a village have income of 150 income units and other half 100 income units, while income in a town is 200 units. If, due to a shock, the income of the first group falls from 150 to 100 and of the other group from 100 to 80, decrease of migration by households from a group with

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<sup>36</sup> The term “restore” used here does not mean that the model assumes that individuals will be equally well-off after migration as before the ethnic cleansing, but it assumes that individuals are expected to be better-off after migration than they would be if they decide not to migrate.

income of 80 may be observed. Although they experience an absolute decrease in income, their relative position due to the decrease in the average income of the reference group has actually improved. However, a group with higher relative income has experienced decrease in both absolute income and relative position. Therefore, they would be now more inclined to migrate to a town in order to restore both their absolute income and their relative position. In the case of refugees, it may be expected that households with higher pre-war income may be less able to adapt to new conditions brought by a conflict than households with lower income, thus having additional motives for migration. These insights should be incorporated into the model of ethnic cleansing now.

In any model of migration, assuming that individuals are rational economic agents, we should expect that they will decide to migrate only if:

$$U_{id} > U_{i0} \tag{3.2}$$

where  $U_{id}$  denotes utility of a household  $i$  after migration and  $U_{i0}$  its utility with no migration. According to the Neoclassical economic theory, the utility is primarily based on the wage, thus wage differential between two countries is the main driving force of migration. But, as explained above, individual's utility is based on the absolute income, but also relative deprivation and its change between two periods, as well as indirect risk. So, for the explanation of ethnic cleansing, we need to incorporate both the relative deprivation hypothesis developed by Stark and Taylor (1991) and restoration hypothesis proposed here, in order to develop a model which will generate satisfactory predictions about this type of migration process.

So, the utility of an individual is then:

$$U_{ij} = U(Y_{ij}, RD_{ij}, X_{ij}) \tag{3.3}$$

$$\delta U_{ij} / \delta Y_{ij} > 0,$$

$$\delta U_{ij} / \delta RD_{ij} < 0 \text{ and}$$

$$\delta U_{ij} / \delta X_{ij} < 0$$

where  $U$  denotes utility,  $Y$  income,  $RD$  relative deprivation,  $X$  level of risk (ranging between 0 = no risk and 1 = maximum risk), subscript  $i$  the individual observation<sup>37</sup> and subscript  $j$  the displacement decision,  $j=0, 1, 2$ , where 0 is the pre-ethnic cleansing situation (the same as stage 0 in Figure 3.2), 1 is a situation during-the-war and before displacement, where we have decrease in utility due to the conflict as well as forced evictions (Stage 1 in Figure 3.4) and 2 is case of migration (Stage 2 in Figure 3.4). The first part of Equation (3.3) shows that the household's utility is a function of his income, relative deprivation and the level of risk. The second part of the Equation explains that their utility is increasing function of income and decreasing function of relative deprivation and risk.

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 means that households, which were in the country when a conflict or a natural disaster happened, were in the country because their utility of staying was higher than utility of migrating, so were not potential migrants. This assumption excludes the possibility of "bogus refugees".<sup>38</sup> But, as an event occurs, the utility of households changes, which induces migration of households that would otherwise not migrate.

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:

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<sup>37</sup> Individual observation in this model and subsequent empirical estimation is a household. The reason for it is that the analysis of the process of ethnic cleansing revealed that the migration decision is generally made at the household level, since the risk cannot be diversified between household members, as income in the case of voluntary migration. Also, the data used in this thesis show that in the most cases entire households emigrated.

<sup>38</sup> "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 host country.



$$\Delta U_1 = U_1 - U_0 = U(Y_1, RD_1, X_1) - U(Y_0, RD_0, X_0) \quad (3.4)$$

$$U_1 < U_0,$$

$$Y_1 < Y_0,$$

$$X_1 > X_0 \text{ and}$$

$$\Delta RD_1 < (\Delta Y_1 - \Delta X_1)$$

This equation represents the first stage of the conflict-induced migration process. Equation (3.4) shows that the utility after the event (such as conflict or natural disaster) decreases compared to the pre-event situation, because the income is lower and risk is higher. For relative deprivation, it is difficult to make assumption about its sign, but it can be expected that (most of) households are not likely to be better-off once the event occurs. This condition is required to have the difference between  $U_1$  and  $U_0$  always negative, regardless of the direction of change in  $RD$ .

As presented above,  $RD$  is a non-linear function of cumulative income of a reference group. In order to include  $RD$  into the model and make the necessary mathematical operations, a transformation of Equation (3.1) from a definite integral into linear form is required. Following Stark and Taylor (1991), this is done by first-order Taylor-series transformation of Equation (3.1) around  $Y_0$ .<sup>39</sup> The Taylor-series transformation approximates a small change in  $RD$  by a product of a small change in the household's income and the first order derivative of his  $RD$  with respect to income. After this transformation,  $Y_1$  can be replaced by  $Y_0 + w_1$  and  $RD_1$  by  $RD_0 + RD'_0 w_1$ , 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,  $X_1$  can be now expressed as  $X_0 + r_1$ , where  $r_1$  is the increase in risk a household faces as a result of conflict. The income loss of conflict ( $w_1$ ), when original Runciman's explanation of

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<sup>39</sup> This is merely an approximation of the non-linear Lorenz curve by linear tangent on it at point of household  $i$ 's income. This transformation will therefore hold only in cases of small changes in  $Y$ . Unfortunately, this might affect precision of estimation of the impact of large decrease in income on the migration decision.

relative deprivation is applied, is actually relative deprivation of households based on their comparison of current and pre-conflict well-being. The larger the loss, according to the restoration hypothesis, then the more deprived households will be and therefore more prone to migrate. When substituting these approximations into Equation (3.4), the utility can be expressed as a function of  $Y_0$ ,  $RD_0$ ,  $X_0$ ,  $w_1$  and  $r_1$ . It is assumed here that  $w_1 < 0$ , or  $Y_1 < Y_0$ , meaning that income of all individuals are negatively affected by a conflict or disaster, although to different extent, depending whether an individual was in a position of type A or type B (Figure 3.1). There may be some exceptions,<sup>40</sup> 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 Figure 1). Also, it may be assumed that, for the majority of people, except those at the bottom of income distribution, relative deprivation decreases because of decline in the average income, which may have a positive impact on migration of the individuals with tertiary education, because their “positive” relative deprivation (or relative satisfaction) actually decreases ( $\Delta RD < 0$ ). Finally, it is assumed that  $r_1 > 0$ , or  $X_1 > X_0$ , which means that risk increases with occurrence of a conflict or a disaster.

$$\begin{aligned} \Delta U_1 &= U(Y_0 + w_1, RD_0 + RD_0' w_1, X_0 + r_1) - U(Y_0, RD_0, X_0) \\ &= \phi(Y_0, RD_0, X_0, w_1, r_1) \end{aligned} \quad (3.5)$$

Equation (3.5) shows that a change in utility from  $U_0$  to  $U_1$ , as a consequence of a conflict or natural disaster (which, for some households, includes forced evictions) is a function of initial income, initial relative deprivation, as well as decrease in absolute income and increase in risk during the event. After the household experienced such decrease in the utility, the situation in terms of the difference between the utility of staying and utility of migrating abroad changes, so the original positive difference between the utility of staying compared to the utility of migrating

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<sup>40</sup> For example, smugglers who abuse difficulties caused by a conflict and get rich by reselling goods with extremely high margin.

$(U_0 > U_2)$  can turn into negative  $(U_1 < U_2)$ . So, some of them, in the second stage of the ethnic cleansing process described in Figure 3.1, decide to migrate. The net utility gain from migration is then:

$$\Delta U_2 = U_2 - U_1 = U(Y_2, RD_2, X_2) - U(Y_1, RD_1, X_1) \quad (3.6)$$

$$Y_2 > Y_1, \text{ or}$$

$$RD_2 > RD_1, \text{ or}$$

$$X_2 > X_1$$

The first part of Equation (3.6) is similar to Equation (3.4). Only, Equation (3.4) represents the change in the individual's utility in the first stage of ethnic cleansing, whereas Equation (3.6) is for the stage 2, which is related to migration. It is also assumed here that the individuals are rational economic agents, so at least one of the inequalities from the second part of Equation (3.6) should hold in order to observe migration by an individual. This means that an individual migrates if he expects to increase his utility by migrating, which will increase at least one of the elements of his utility, either absolute income, or relative satisfaction, or security.

If the change of relative deprivation in the second stage is approximated by its Taylor-series expansion and its value is replaced by the values from the stage 1 and their change between the two stages, as we did in transformation of Equation (3.4) into (3.5) and also the values from the stage 1 by their approximations from Equation (3.5), Equation (3.6) will look like:

$$\Delta U_2 = U(Y_1 + w_2, RD_1 + RD_1' w_2, X_1 + r_2) - U(Y_1, RD_1, X_1) \quad (3.7)$$

Equation (3.4) represents the change in the utility as a result of forced evictions (Stage 1) and Equation (3.7) represents the change in the utility as a result of eviction-induced migration (Stage 2). However, as Runciman (1966: 10), in his original explanation of relative deprivation stated, individuals do not only compare their current situation with the reference group, but also with their own situation in some previous time period. Applied in the context of ethnic cleansing as a two-stage process, it will mean that the change in utility of individual as a result of migration, presented in Equation (3.7), will not depend only on the absolute income and relative deprivation from the stage 1, before migration, but also on these values in the stage 0, before forced evictions, as hypothesized above through the “restoration” hypothesis. Consequently, it is necessary to incorporate such a hypothesis into the final model of migration as a result of ethnic cleansing, by replacing values from the stage 1 in Equation (3.7) by values from the stage 0 plus change between stages 0 and 1, which are presented in Equation (3.5).

By replacing these values, Equation (3.7) is presented as follows:

$$\begin{aligned} \Delta U_2 = & U(Y_0 + w_1 + w_2, RD_0 + RD_0'w_1 + RD_1'w_2, X_0 + r_1 + r_2) \\ & - U(Y_0 + w_1, RD_0 + RD_0'w_1, X_0 + r_1) \end{aligned} \quad (3.8)$$

The final model of the ethnic cleansing is presented by Equation (3.9). The model shows that the eviction-induced migration decision depends on the difference between the current level of utility (stage1) and utility of migration (stage 2), but conditional on the pre-conflict level of utility (stage 0).

$$\Delta U_2 = \theta(Y_0, RD_0, RD_1, RD_0'w_1, RD_1'w_2, X_0, w_1, w_2, r_1, r_2) \quad (3.9)$$

Equation (3.9) that is obtained after the transformations applied, reveals that the migration decision in the ethnic cleansing setting, when incorporating the effect of relative deprivation and relative loss of utility during the event (and, for some households, also forced eviction) 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 ( $S_0$ ), change in income due to the event ( $w_1$ ) and income gain of migration ( $w_2$ ); difference in relative deprivation not only between the situation before and after migration ( $RD_1'w_2$ ), but also the change caused by the event and, for some, forced evictions ( $RD_0'w_1$ ), as well as risk increase as a consequence of an event ( $r_1$ ) and risk decrease as a result of migration ( $r_2$ ). Variable  $Y_0$  is standard income variable of migration models. The relative deprivation hypothesis is captured by  $RD_0$  and  $RD_1$ , while the restoration hypothesis is presented in the model by variables  $w_1$  and  $w_2$ . Finally, the risk factors influencing eviction-induced migration are also included, by variables  $X_0$ ,  $r_1$  and  $r_2$ .

The theoretical model presented above has a number of important features. First, compared to the model of Stark and Taylor (1991), this model incorporates the risk factor. Therefore, it may be considered as a more appropriate model to be used in the context of forced migration, instead of models developed for explanation of the process of voluntary migration. Second, compared to the previously developed models of forced migration, such as Kirchhoff and Ibanez (2001) model, it is more suitable for the ethnic cleansing as it does not only include risk (or probability of threat) as additional motive for migration, but also acknowledges that the threat was certain and has been already exercised towards a non-random part of the population. This makes the model more appropriate for the explanation of the process of ethnic cleansing compared to the models of conflict-induced migration. Third, the ethnic cleansing in this model is presented as a two-stage process of migration. It takes into account that individual's utility was affected as a result of a conflict or a disaster. Finally, 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 thesis. Individuals compare their relative position to not only the reference group in a single period of time, but also to their own position in the previous point of time. Thus, migration decision is influenced by both pre-event income and relative deprivation ( $Y_0$  and  $RD_0$ ), but also the change in both of these ( $w_i$  and  $RD_iw_i$ ) during the ethnic cleansing.

The model can be tested empirically both at the household and cross-country level. At the household level, household’s and community’s incomes give information about absolute and relative position of a household within a society and an information whether a household was forcibly displaced during an event such as conflict or a disaster can be used as a proxy measure of a change in the relative deprivation. At the cross-country level, GDP and its difference before and after event are measure of absolute income and its change, respectively. Measures of inequality, such as Gini or Theil coefficient, can be used a proxies for relative deprivation. Change in these coefficients measures change in relative deprivation. The extent of ethnic cleansing can be captured by a number of internally displaced individuals within a country. The level of risk to all individuals (after some were forcibly evicted) can be measured by the information on the total number of deaths during a conflict or a disaster.

### **3.4. Models of brain gain in the context of ethnic cleansing**

The previous discussion has explained how the ethnic cleansing can have negative impact on the stock of human capital. However, the new brain gain theories argue that such emigration can induce reverse positive impact on the stock of human capital. The literature has identified several channels through which the negative effects of brain drain for a home country may be mitigated by positive reverse effect of brain drain on human capital formation in a home country. These channels are: the incentive effect, where migration prospects induce more individuals to invest in education;

remittances effect, where receipt of remittances increases income of remittances receiving households and relaxes liquidity constraints they are facing, thus making possible their increased education investments; and return migration of highly educated individuals and their impact on subsequent human capital formation in a home country, through their increased propensity to invest in education upon return. These different channels were presented in Figure 3.1. The arrows 2, 3 and 4 of Figure 3.1 show the types and direction of impact of different channels of brain gain. Two of these channels will be empirically tested in Chapter 5. The first empirical analysis tests the idea that migration prospects induce increased education investments by those remaining at home, thus increasing human capital stock and reducing negative effects of brain drain from a home country (Arrow 2). The second empirical analysis investigates the positive impact of remittances on relaxation of liquidity constraint and increased educational investments by remittances receiving households (Arrow 3). The third analysis (Arrows 4a and 4b), which would test the impact return migration on human capital formation will not be conducted, as such type of empirical work is beyond the scope of this thesis, primarily due to the data availability issues.

### **3.4.1. Incentive effect of brain drain**

The model of “brain gain”, explaining the incentive effect, has been presented previously in Beine *et al.* (2006a). It assumed that there is no unskilled migration, migrants are risk-neutral and that the probability of migration is exogenous and determined by the situation in a home country. If the wage in a period before making the education investment decision is denoted by  $w_t$  and the wage in the period after acquiring education by  $w_{t+1}$ , education acquired by  $h$  (where  $h$  is normalized to 1) and costs of education by  $c$ , then in the absence of emigration an individual will invest in education if:

$$w_t - c + w_{t+1}h > w_t + w_{t+1} \quad (3.10)$$

So, the incentive for education is:

$$w_{t+1}(h-1) - c > 0 \quad (3.11)$$

This is simply a home country's returns to education. Once the possibility of migration enters the wage equation, then Equation (3.10) becomes:

$$w_t - c + (1-p)w_{t+1}h + pw_{t+1}^*h > w_t + w_{t+1} \quad (3.12)$$

where  $p$  is probability of migration and  $w_{t+1}^*$  wage in a host country. The incentive for education with migration probability is now:

$$w_{t+1}(h-1) + ph(w_{t+1}^* - w_{t+1}) - c > 0 \quad (3.13)$$

The second term of the equation,  $ph(w_{t+1}^* - w_{t+1})$ , is additional schooling incentive for potential emigrants once migration possibility is introduced. As  $p > 0$ , this implies that migration probability to a country with higher returns to education increases expected returns to education, compared to no migration. The size of this positive influence is positively related to migration probability and differences in returns to education between two countries. This analysis suggests that poorer countries with higher rates of educated emigrants are expected to have stronger migration-induced incentive for education.

Schiff (2005) doubted the arguments of Beine *et al.* (2006a) model and presented different models of brain gain showing that this effect is much lower once some of the assumptions of the



above model are relaxed. First, once the possibility of emigration by low educated individuals is introduced, the education incentive effect is the difference between the migration premiums for high and low educated individuals. Second, the probability of migration is not set by home countries, as assumed in Beine *et al.* (2006a), but actually by host countries. Third, the probability is based on receiving countries' immigration quotas, rather than the proportion of highly educated. Hence, once the education incentive is present and individuals opt for education, which increases the number of highly educated, the probability of migration decreases for all individuals. Therefore, the probability of migration cannot be considered as exogenous. This assumption is important for the analysis of ethnic cleansing, but in a slightly different manner than presented in Schiff (2005). If human capital stock in a country is denoted by  $S$ , education investment with no migration prospects by  $E$ , the number of highly educated emigrants from a country (brain drain) by  $BD$  and additional emigration-induced education (brain gain) by  $BG$ , then the net effect in time  $t$  of emigration of highly educated in time  $t-1$  is:

$$S_t = S_{t-1} + E_t + BG_t - BD_t = S_0 + \sum_{i=1}^t (E_i + BG_i - BD_i) \quad (3.14)$$

This means that the positive impact on the stock of human capital in a country affected by brain drain is expected if the additional schooling due to the incentive effect of migration is larger than the decrease in the stock of human capital due to the brain drain.

In order to simplify the entire model, Beine *et al.* (2006a) assumed that migration probability is constant. Schiff (2005) relaxes this assumption and shows that, once probability of emigration decreases with increase in the stock of human capital,  $BG$  decreases in each subsequent period, which eventually leads to a zero additional schooling as a result of migration incentive in a steady state. However, he assumes constant  $BD$ . In the context of ethnic cleansing, mass emigration of highly educated individuals in one period causes  $BD$  to be higher in one than in other periods. This

actually increases the probability of emigration in subsequent periods by individuals remaining in the country and potentially increased brain gain effect (BG) in each period after the ethnic cleansing. However, as brain drain caused by ethnic cleansing has been large in the previous period, the positive net effect could be expected only after several subsequent periods. Thus, although the incentive effect is expected in the case of ethnic cleansing as well, still it should be, on average, weaker than in the case of voluntary migration, once the migration probability is approximated by the stock of highly educated emigrants from a country.

Additionally, in the context of ethnic cleansing, the drawback of such an approach is measuring the probability of migration by the stock of emigrants. If ethnic cleansing occurs, the stock of emigrants will rapidly increase in a short period of time. However, this will not necessarily increase immigration quotas for that country by developed countries, which is something that potential highly educated migrants remaining within a home country should be aware of. This will cause the probability of emigration from a country affected by ethnic cleansing, if measured by a stock of highly educated emigrants, to be much larger in subsequent periods than it actually is and will potentially increase expected brain gain effect as a result of increased migration incentives. If the incentive effect is averaged over different groups of countries, both those with voluntary and those with forced migration, it could give misleading results. For that reason, the incentive effect should be measured by distinguishing between these two groups. This would provide better insight into the extent of this effect in a subset of countries which were affected by ethnic cleansing, as well as the differences between two types of migration.

Based on the previous discussion, the empirical analysis of the incentive effect should follow the above model and would be simply re-estimation of the Beine *et al.* (2006a or 2008) regression model on a sub-sample of conflict-countries, with additional variables capturing severity of conflict in each country. The specification of the empirical model to be estimated, list of potential

explanatory variables and other alternative aspects of the empirical analysis that draw on previous empirical studies, is presented in the next chapter.

### **3.4.2. Remittances and human capital formation**

Remittances are considered as one of the key channels<sup>41</sup> mentioned in the arguments that brain drain might have a positive impact on human capital formation in a home country. As described in Chapter 2, the main argument that remittances can positively influence households' educational investment decisions is that receipt of remittances relaxes liquidity constraints for education investments and reduces children's labour participation in remittance receiving household (*e.g.* Hanson and Woodruff, 2003; Cox and Ureta, 2003; Amuedo-Dorantes *et al.*, 2008). However, if household budget constraints are not binding, remittances should not have any significant impact on education expenditures (Miluka and Dabalén, 2007).

Notwithstanding, the income effect of remittances is not the only effect. Another important effect that has to be taken into account is the disruptive effect. The remittances are mainly sent by migrant parents. In households with migrant heads children face increased non-financial costs of education due to the reduction in adult role models, the missing educational input of parents in school work and supervision and higher responsibilities in terms of family business. Consequently, children from migrant households may have a lower probability of remaining in school, even if financial resources are available for education investment, reducing the optimal unconstrained education level (McKenzie and Rapoport, 2006). A set of studies argue that emigration usually implies parental absence which may have a disruptive effect on children's educational achievement (Hanson and Woodruff, 2003; Rapoport and Docquier, 2005; McKenzie and Rapoport, 2006; Minuka and Dabalén, 2007; Amuedo-Dorantes *et al.*, 2008). Thus, the impact of remittances is

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<sup>41</sup> Other channels, as described in the previous chapter and also presented here, include the incentive effect and the effect of return migration.

different for household without migrants receiving them, compared to households receiving remittances from absent household member.

Analysis of the impact of remittances on educational investments of remittances receiving households needs to disentangle the impact of different migration-related characteristics of a household. In that sense, we can distinguish four types of households, according to two characteristics: 1) whether they have migrants or not and 2) whether they receive remittances or not. These different types of households are expected to be affected to a different extent by different influences presented above. The types of households and their likely effects on educational investments are presented in the matrix below.

*Table 3.1. Types of households based on the receipt of remittances and migration status*

<b>Type of household</b>	<b>With migrants</b>	<b>Without migrants</b>
<b>Receives remittances</b>	<ol style="list-style-type: none"> <li>1. <i>Net income gain</i></li> <li>2. <i>Disruption effect</i></li> </ol>	<ol style="list-style-type: none"> <li>1. <i>Income gain</i></li> </ol>
<b>No remittances</b>	<ol style="list-style-type: none"> <li>1. <i>Income loss</i></li> <li>2. <i>Disruption effect</i></li> </ol>	<ol style="list-style-type: none"> <li><i>No effect</i></li> </ol>

Once both possible effects are taken into account, it can be expected that the net effect of receiving remittances on household's educational investment is a difference between the positive impact of relaxation of liquidity constraint and negative impact of parental absence.

The motivation for a micro-level study of impact of remittances on educational attainment in a country affected by conflict is the interest in the analysis of the influence of specific features of conflict-induced migration on the relationship between remittances and human capital formation in

a home country. It is expected that the context in which remittances receiving households are making human capital investment decisions influence the extent of these decisions. Moreover, empirical evidence suggests that conflict-induced migrants generally migrate as a family, thus remittances are sent to relatives driven by purely altruistic motives, rather than to family members from a migrant parent. This implies that the human capital investment might not necessarily be a part of a household's risk diversification and intra-household income allocation. This might limit the extent of the positive impact of remittances on the educational attainment of children in a remittances receiving household. On the other hand, the receipt of remittances by relatives instead of family members might limit the negative impact of parental absence and thus increase the positive impact of remittances on education attainment of children in remittances receiving households in conflict countries. Therefore, as the theoretical prediction about the overall impact of remittances on human capital formation in a home country affected by conflict is inconclusive, empirical tests of these predictions are necessary for better understanding of these relationships in the conflict-induced migration setting. The empirical analysis of this channel of brain gain is presented in the next chapter.

### **3.4.3. Return migration**

Analysis of return migration in the context of the analysis of the net effect of emigration of highly educated individuals on human capital stock in a home country is important for several reasons. Once left, highly educated emigrants may decide to return. Low educated emigrants may acquire useful skills while abroad and bring them back to the home country. Also, all migrants may bring back both financial and non-financial instruments (such as “social remittances”) that should positively affect the educational attainment of their children. For the first type of impact, the “brain return”, it is important to understand not only the magnitude of the brain drain but also the skills

acquisition during the period of stay in a host country. Moreover, appropriate understanding of the magnitude of this impact, the self-selection mechanism of return migration need to be developed and understood.

As described in the introductory part of this chapter and presented in Figure 3.1, the analysis of return migration could be made in two different directions. First, it should analyse the self-selection mechanism of return migration of conflict-induced migrants (“brain return”), taking into consideration specific features of their migration and context of their (often forced) return (arrow 4a in Figure 3.1). Second analysis should deal with the impact of migration experience on educational investments of returnees, or “social remittances” effect (arrow 4b in Figure 3.1). This thesis will empirically test the incentive effect and the effect of remittances on educational attainment of children. A separate analysis of return migration is beyond the scope of this thesis, but is intended direction of future research. But, the effect of “social remittances” will be investigated through the analysis of the impact of remittances, by including a variable on the migration experience of households.

## **Concluding remarks**

This chapter presented a theoretical framework for the analysis of the net effect of ethnic cleansing on the stock of human capital in a country affected. As described in the first section of the chapter, ethnic cleansing causes a brain drain, which reduces human capital in a country. However, there are also positive feedback effects (brain gain) on human capital formation in a country that result from this brain drain. Therefore, the analysis that attempts to explain the net effect of ethnic cleansing on human capital stock needs to take into consideration both negative and positive effects.

In the second section of this chapter, the theoretical model of brain drain as a result of ethnic cleansing is developed. This model is the main theoretical contribution of this thesis. It explains

ethnic cleansing as a two-stage process, where individuals are forcibly evicted without the option to stay in the first stage and then they make migration decision in the second stage. The migration decision in the second stage is explained in the framework of relative deprivation model. Here, the model assumes that individuals do not only evaluate their well-being relative to a reference group, but also relative to their well-being in the period before they were evicted. Based on this assumption, the model hypothesizes that individuals who are more severely affected by a conflict will have higher incentive to migrate. This hypothesis is called the “restoration” hypothesis and is an additional theoretical contribution of this thesis. As more educated individuals are, on average, more severely affected by a conflict, the model predicts positive self-selection of migrants from areas affected by ethnic cleansing. Hence, the ethnic cleansing causes increased brain drain. The extent to which ethnic cleansing increases brain drain, thus decreasing the stock of human capital in a country, needs to be tested empirically. The empirical test of this model is presented in the next chapter.

In the third section, models of brain gain are presented. As described in the introduction to this chapter, brain drain can also have certain positive feedback effects on human capital formation in a country. These effects need to be taken into account when measuring the overall impact of ethnic cleansing on human capital stock in a country. The channels through which brain drain has a positive feedback effect are the incentive effect of migration on education investments, the impact of remittances on educational attainment of children and return migration. All these channels are described and applicability of models, developed for the context of voluntary migration, that explain effect of these channels in the context of ethnic cleansing is discussed. Different modifications of these models that need to be considered when being applied in the specific context of ethnic cleansing were presented, which can also be considered as additional theoretical contribution of this thesis. Results of empirical estimations of these models will be presented in Chapter 5.

# ***Chapter 4: Empirical evidence on the brain drain under ethnic cleansing***

## ***Introduction***

### ***4.1. Household-level study: The case of Bosnia-Herzegovina***

#### ***4.1.1. The model***

#### ***4.1.2. Data***

#### ***4.1.3. Results***

### ***4.2. Cross-country study:***

#### ***4.2.1. Model and data***

#### ***4.2.2. Results***

## ***Concluding remarks***



## 4.1. Introduction

Ethnic cleansing, as defined previously, causes both negative and positive effects on the stock of human capital in a country. Besides highly educated individuals killed during a process of ethnic cleansing,<sup>42</sup> many highly educated individuals decide to emigrate abroad. This is known as brain drain. In the recent migration literature (Muntford, 1997; Stark *et al.*, 1997; Beine *et al.*, 2001) brain drain as a negative effect of migration on the stock of human capital in a country is considered as one side of the coin, while positive feedback effects of this emigration on the stock of human capital in a home country are also acknowledged. The concept of positive effects of migration is known as brain gain and includes effects of incentives produced by migration and of remittances on education investment, as well as positive impact of return migration on the stock of human capital in the country. The sign of the net effect of ethnic cleansing on human capital stock will consequently depend on the magnitude of each of these different factors and cannot be determined *a priori*. As explained in the introduction, brain drain can be measured by simply collecting the data about the number of highly educated emigrants from a country. But, the effect of brain gain needs to be estimated. In order to provide appropriate evidence about the sign of the net effect of ethnic cleansing on the stock of human capital in the country, this thesis will not only measure, but also try to estimate effects of different determinants on brain drain figures. The theoretical model of the determinants of brain drain from countries that experienced ethnic cleansing was developed and presented in Chapter 3. The model will be empirically tested in this chapter, while the empirical evidence on the brain gain will be presented in the next chapter.

The theoretical model, developed on the basis of evidence from Bosnia-Herzegovina about the process of displacement as a result of “ethnic cleansing” and presented in Equation (3.9), shows

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<sup>42</sup> A process of ethnic cleansing is very often accompanied by conflict and „merges with deportation and genocide”. In Bosnia-Herzegovina, for example, ethnic cleansing started before the war, but then turned into a conflict as ethnic groups suffering ethnic cleansing responded by organized resistance.

that the migration decision by the individual who was displaced during an ethnic cleansing is a function of her or his absolute income ( $Y$ ), change in absolute income during migration ( $w$ ), relative deprivation ( $RD$ ) and its change during migration ( $RD'w$ ), but conditional on these values before the cleansing and their changes as a result of ethnic cleansing, as well as of the risk the individual is facing during this process ( $X$ ). According to the two hypotheses specified in Chapter 3 and incorporated into the theoretical model, namely the relative deprivation and the restoration hypothesis, the model predicts that individuals who were more severely affected by the ethnic cleansing are more likely to migrate. This means that the change in income and/or in relative deprivation is expected to be negatively correlated with the migration of an individual. Moreover, the initial level of income is expected to have a positive and the initial level of relative deprivation negative, correlation with the migration decision of an individual. When the education levels of individuals is considered, the more educated are expected to be more severely affected by the ethnic cleansing in terms of the change in both their income and relative deprivation, therefore the model predicts that they should be more likely to migrate. This means that the more severe the ethnic cleansing was, the more brain drain it caused. Expressed in the migration terminology, this means that the model suggests positive self-selection of forced migrants from countries affected by ethnic cleansing.

In order to test this model, empirical data on the migration from countries affected by a conflict are needed. For the purpose of providing an empirical test of the theoretical model from Chapter 3, two empirical studies will be conducted in this thesis and presented in the following sections of this chapter. The first study is a household-level study of the revealed migration behaviour of individuals during the conflict in Bosnia-Herzegovina in the 1990s. There is a household level dataset available for this country, which was collected through the World Bank's Living Standard Measurement Survey (LSMS). The dataset for this country is not perfect,<sup>43</sup> as it

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<sup>43</sup> Detailed explanation of the dataset and its shortcomings is provided in the next section, while solutions for improving the current situation regarding data availability will be discussed in Chapter 6.

contains information about the survey year's, but not the pre-conflict, income and relative deprivation of individuals. But, neither do datasets from other countries contain such data, so a better alternative was not available.

The second study that will be presented in this chapter is a cross-country analysis of the determinants of brain drain. As the data availability for the micro-level study allows for the inclusion of dummy variables only, the results from that study will be qualitative in nature, but will provide useful information about the direction of the impact of the changes in absolute income and relative deprivation on the migration decision. However, the macro level study should reveal the size of the impact of ethnic cleansing on the magnitude of the brain drain from a country. Also, by making a comparison between countries that were and countries that were not affected by a conflict, this study should provide information on the differences between voluntary and forced migration, in terms of not only total emigration rates but also the skill composition of migrants. The cross-country (or macro level) study of the impact of conflicts on the stock of human capital in a country will be conducted by using the set of variables for which the data were collected from the databases such as *World Development Indicators* and the *World Income Inequality Database*. The final section of this chapter will provide conclusions that can be drawn about the relationship between ethnic cleansing and brain drain.

## **4.2. Micro – level study: The case of Bosnia-Herzegovina**

### **4.2.1. The model**

The model presented in the previous chapter explains the process of migration in the specific context of ethnic cleansing as a two stage process, where individuals were forcibly evicted from their homes and/or their well being was severely affected by a conflict in the first stage and then in

the second stage they make their migration decision considering their current and pre-conflict well-being. The main aim of this empirical study is to provide evidence on the determinants of the migration decision of a household in the second stage of the process. Accordingly, the dependent variable in the empirical model should be expressed as a probability of making such a decision. The revealed behaviour of households, or information whether they made such a decision or not, will be used to construct the values of the dependent variable. The estimation method to be used in this empirical study will be a logit model.<sup>44</sup> Assuming that households make their migration decision in order to maximize their utility and based on Equation (3.6), the probability that they will migrate abroad<sup>45</sup> is:

$$P(2) = P[U(Y_2, RD_2, X_2) > U(Y_1, RD_1, X_1)] \quad (4.1)$$

Here, the subscript 2 denotes that a household chooses to migrate abroad and 1 that it chooses to stay within a country (in her homes if not evicted and as internally displaced if evicted). Variables  $Y$ ,  $RD$  and  $X$ , the same as in Chapter 3, denote household's income, relative deprivation and the level of risk they face, respectively.

Equation (4.2), based on the transformations used in Chapter 3, can also be expressed as:

$$P(2) = P[U_2 > P(U_1)] = P(\Delta U_2 > 0) \quad (4.2)$$

where, according to Equations (3.7) and (3.8),  $\Delta U_2$  is expressed as:

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<sup>44</sup> The dependent variable is binary. There is no clear argument in the econometric literature whether the logit or the probit model should be preferred, thus this study follows the Stark and Taylor (1991) approach and chooses the logit model.

<sup>45</sup> These households can also decide to displace internally, but this is not relevant in the context of the thesis, as only migration across borders is considered as a brain drain. Another reason why a simple instead of multinomial logit was used is that the dataset did not contain information about household's moves during the war, after they were forcibly evicted or not. Therefore, this thesis uses the binary logit model, instead of multinomial logit used in Stark and Taylor (1991).

$$\begin{aligned}
\Delta U_2 &= U(Y_2, RD_2, X_2) - U(Y_1, RD_1, X_1) = U(Y_0 + w_1 + w_2, RD_0 \\
&+ RD_0' w_1 + RD_1' w_2, X_0 + r_1 + r_2) - U(Y_0 + w_1, RD_0 + RD_0' w_1, X_0 + r_1) \\
&= \theta(Y_0, RD_0, RD_1, RD_0' w_1, RD_1' w_2, X_0, w_1, w_2, r_1, r_2)
\end{aligned} \tag{4.3}$$

Here Y, RD and X are as defined in Equation (4.1), while RD'₀ and RD'₁ are changes in relative deprivation during conflict and after migration, respectively. Subscript 1 refers to the level of a variable after forced eviction and subscript 0 refers to the level of a variable before forced eviction.

Data availability allows only the approximation of values of changes in income, relative deprivation and risk. In previous empirical work (*e.g.* Stark and Taylor, 1991), the variables used as proxies for income, relative deprivation and risk were different household and community characteristics. If the changes in the income ( $w_i$ ), relative deprivation ( $RD'$ ) and risk ( $r_i$ ) in Equation (3.9) are substituted by the set of household ( $H_i$ ) and community characteristics ( $C_i$ ), then the probability of migrating abroad is

$$P(\Delta U_2 > 0) = P[U(Y_0, RD_0, RD_1, X_0, H_2, C_2) > 0] \tag{4.4}$$

If the logit reference category is no migration, then the logit equation is given by:

$$P(2) = \frac{1}{1 + \exp^{(\beta_0 + \beta_1 Y_0 + \beta_2 RD_0 + \beta_3 RD_1 + \beta_4 X_0 + \beta_5 H_2 + \beta_6 C_2 + u_i)}} \tag{4.5}$$

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

$$\ln\left[\frac{P_2}{(1 - p_1)}\right] = \beta_0 + \beta_1 Y_0 + \beta_2 RD_0 + \beta_3 RD_1 + \beta_4 X_0 + \beta_5 H_2 + \beta_6 C_2 + u_i \tag{4.6}$$

The expression on the left-hand side is the dependent variable of the logit model, interpreted as the log odds-ratio. As mentioned previously, the data from the LSMS survey<sup>46</sup> were collected in 2001, while the process of ethnic cleansing happened in the period 1992-1995. This dataset contains information about households' income and other characteristics in 2001. But, there were no data about the characteristics of individuals in 1992, before the process of ethnic cleansing started. Therefore, the proxy variables had to be constructed from the available data. The characteristics of the data and the construction of variables are explained in the next section.

#### **4.2.2. Data**

For the purpose of testing the model developed in Chapter 3, household level data on its demographic characteristics, information on whether a household was displaced during the conflict, as well as the income levels of both the household and the community (necessary for measuring the degree of relative deprivation for each household) are required. Data on the demographic characteristics of households, as well as on their displacement status were taken from the World Bank's Living Standard Measurement Survey (LSMS) conducted among 5,400 households in 25 municipalities in Bosnia-Herzegovina in 2001.<sup>47</sup> This dataset is obtained from the World Bank. The LSMS survey collected responses to the questions on migration from all members of a household older than 15. However, in general, the displacement decision tends to be made predominantly at the household level.<sup>48</sup> As a result, it was decided these data will be analysed at the level of household, thus having 5,400 observations. Unfortunately, for the purpose of this thesis, in 2,839

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<sup>46</sup> These data were the best possible alternative dataset for the purpose of this study.

<sup>47</sup> There are more recent 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 households, thus the 2001 survey has been chosen as preferred because of the richness of the data from 5,400 households.

<sup>48</sup> This is confirmed by the results of semi-structured interviews. Most of the respondents have stated that they have been displaced together with other members of a household.

out of 5,400 questionnaires, there has not been a response to the question on the current displacement status of a household, thus making it impossible to determine the value of the dependent variable. Besides this information, there were many other responses missing for these households, particularly to the questions from the Module 8 (on migration). As a result, the observations for these households were excluded from the dataset, as they could not have been used in the following analysis.

The LSMS survey was conducted among (displaced and non-displaced) households living in Bosnia-Herzegovina in 2001 and thus included four sub-groups of displaced households (beside a group of non-displaced): “internally displaced”<sup>49</sup>; “returned internally displaced”<sup>50</sup>; “returned refugees”<sup>51</sup>; and “returned refugees - internally displaced”.<sup>52</sup> However, as the survey was conducted among households living in Bosnia-Herzegovina at the moment of survey, it did not include refugees in the sample. If this group of displaced people would not be included in the dataset, it would create a systematic sample bias, as those who decided to migrate abroad and then to remain in a host country are not necessarily a non-randomly selected group of people. In order to have a more representative dataset, which will contain information about households from all alternative displacement statuses, it was decided that a separate survey should be conducted among Bosnian refugees still living outside the country. This survey used part of the LSMS Survey questionnaire in order to make these data comparable to the data from the LSMS. The survey was conducted via e-mail<sup>53</sup> and 465 usable responses to the questionnaire,<sup>54</sup> out of 915 collected in total, were received.

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<sup>49</sup> These are households which were displaced during the war, but did not return to their pre-war place of living in 2001.

<sup>50</sup> These are internally displaced households which returned to their pre-war place of living.

<sup>51</sup> Household which emigrated abroad and then returned to their pre-war place of living after the war.

<sup>52</sup> Some refugees have not been able to return to the place of their pre-war living after they have been repatriated to Bosnia-Herzegovina. Thus, their status is changed from “refugees” to “internally displaced”. In order to distinguish them from internally displaced who did not leave their country during the war, these households were put into category called “refugees-internally displaced”.

<sup>53</sup> It is necessary to acknowledge the potential bias in 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 the majority of them are Bosniaks. But, a survey of a population currently living in more than 50 countries and all 5 continents could not have been conducted in 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.

<sup>54</sup> The questionnaire used for this survey is provided in Appendix 3.2.

Since the two surveys were conducted at different times and the primary interest of this thesis is the situation in 1992, changes to the responses were made in order to make them match the situation in 1992. 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 youngest head of a household in the sample is 20 years old. In the case of the own survey, conducted in 2007 via e-mail, without possibility to completely control who will be the respondent, a number of responses were collected from individuals who were younger than 20 in 1992. However, on the basis of information about the age of the youngest household head in 1992 from the LSMS survey, it has been decided to exclude all observations from the own survey where heads of a household were younger than 20 in 1992. This way, the final dataset contained information about household which existed at the beginning of the war. At the end, the combined dataset, by using data collected from the LSMS and from our own survey, contains information on 2,798 households.

The dataset has several drawbacks that need to be acknowledged, as far as this thesis is concerned. The survey was conducted in 2001 and all the information relate to a household's current situation. Although some information, such as household's place of living before the war, were available, while other time-invariant information such as age, gender and ethnicity can also be used, still some very important information was missing. Consequently, the available information was combined in order to create the best possible proxy variables from the limited data and to make the empirical analysis possible. The process of finding the best compromise between the information required by the theoretical model and the data available in order to develop a testable empirical model is graphically presented in the Table 4.1. (arrows representing the links between specific data available, variable of the theoretical model and variable of the empirical model).



Table 4.1. Relationships between the theoretical model, data and empirical model.

Theoretical model		Empirical model		Data
Income	→	Household's head education (EDU), age (AGE) and a dummy variable for female headed households (FHH)	←	Household's head education (highest degree completed), age and gender
Relative deprivation	→	Interaction variable between income <sup>55</sup> and type of place of living (EDUURB)	←	Type of place of living, if it's urban, semi-urban or rural
Change in income	→	A dummy variable for forced eviction (FE)	←	Ethnicity of household's head <sup>56</sup>
		Interaction variable between income and dummy variable for forced eviction (EDUFE)		Municipality of living
Change in relative deprivation	→	Interaction variable between relative deprivation variable and dummy variable for forced eviction (EDUURBFE)		

One of the key data missing in this dataset is the information on a household's and community level income in 1992.<sup>57</sup> This does not allow creation of the key variables on income, relative deprivation and changes of both for each household by using quantitative data collected by

<sup>55</sup> In order to simplify the model by avoiding making a large number of interaction variables, only one of the proxy variables for income, namely education was used to create interaction variable between income and type of place of living as a proxy for relative deprivation.

<sup>56</sup> This variable was not available in the LSMS survey from 2001, but was in the "Living in BiH" survey from 2002. As the same households were interviewed in both surveys, this variable was imported from 2002 into the 2001 survey's dataset, under the assumption that ethnicity is stable over time.

<sup>57</sup> The year when the war in Bosnia-Herzegovina started and when majority of forced evictions took place.

the survey. The best that can be done is creation of qualitative variables that will still allow us to measure differences in the average value of the dependent variable between groups with different values of the independent variables. This way, the estimation results should at least inform us about the direction, if not the size, of the impact of the hypothesized determinants of the forced migration decision. The dataset contains information about the household's size, household head's gender, age and education level, as well as place of living (whether it is an urban, semi-urban or rural area).<sup>58</sup> As these variables are important determinants of household's income, they can be used to approximate income and level of relative deprivation of a household immediately before the war. As a result, the data about household characteristics available in the dataset were used to construct proxy variables for these determinants of the migration decision. In the case of income, the only information about households useful for approximating true values of income were age (AGE), gender (FHH) and education level (EDU) of the head of household. These variables are included in the model in order to capture the effect of the initial income level of the household<sup>59</sup>. In the case of relative deprivation, additional useful information was the type of place of living of a household immediately before the war, distinguishing between urban, semi-urban and rural areas. This information approximates average community income, which is higher in urban than in rural areas. This means that, by creating an interaction variable between household's income (EDU) and average community income (URBAN), we will get a variable that should approximate the level of relative deprivation of households with different income levels living in different areas (EDUURB).

The variable on the change in income has been created by the interaction of the proxy variables on the household's head income with the variable indicating whether a household was

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<sup>58</sup> The division of municipalities into urban, semi-urban and rural areas in the LSMS dataset followed the latest 1991 Census, where the municipalities were divided into these three groups based on the predominant source of income in a municipality. Consequently, this variable, based on income, is appropriate proxy for a community income and can be used to construct a measure of relative deprivation of a household as its income position relative to other households in a community.

<sup>59</sup> It should be acknowledged that these variables can only serve as proxies. For example, studies about inequality in former Yugoslavia (*e.g.* Estrin, 2010: 132) report that income inequality was fairly low, and that existing wage differentials were based more on profitability of enterprise and were sectors-specific, rather than depending on education levels.

forcibly evicted (EDUFE). In a similar way, an interaction variable between the relative deprivation measure (EDUURB) and a variable indicating whether a household was forcibly evicted (FE) was created (EDUURBFE). These two variables are introduced to distinguish between different groups according to the extent of the change in their absolute income and relative deprivation. It can be expected that, once the ethnic cleansing occurs, the ones who had higher absolute income were more severely affected in terms of absolute income, but the ones who were forcibly evicted even more than those who were not. Also, the relative deprivation of households with higher level of relative satisfaction before the conflict is expected to increase, whereas for the ones who were already deprived it can even decrease once the absolute income of those above them on the income distribution scale has decreased. Hence, according to the assumption that the same set of factors influences the extent to which absolute income will decrease and relative deprivation increase after the forced evictions and move in the opposite direction after migration, a positive sign of the dummy variables for income and relative deprivation, constructed from this information on household characteristics, would confirm the predictions from the Neoclassical models of migration and the relative deprivation hypothesis. Also, if the results of the empirical model show that the ones who suffered more significant losses in terms of absolute income and relative deprivation are more likely to migrate, it would confirm the “restoration hypothesis”. So, although the data available did not allow creation of quantitative variables, they still allow qualitative tests of the hypotheses of the theoretical model.

Moreover, the datasets used here<sup>60</sup> do not contain exact information on whether a household was forcibly evicted or not.<sup>61</sup> It contains information on a respondent’s ethnicity and place of living immediately before the war. The information about the ethnic group controlling each municipality was collected by the author separately from this survey. As the LSMS survey was conducted in 25

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<sup>60</sup> The LSMS dataset does not contain it, so this information was not collected in the own survey, for the purpose of comparability.

<sup>61</sup> There is an answer to a question on reason of displacement during the war, whether it was because of war or because of other reasons, but it does not allow clear distinction as to whether a household was forcibly evicted or not.

municipalities, these were identified as being controlled by a particular group on the basis of information from various local reports about the war in these municipalities. In addition, there were several additional municipalities mentioned in our own survey. The data about these municipalities were collected in the same way as for municipalities from the LSMS survey.<sup>62</sup> If the information about a household's ethnicity is matched with whether it was in the beginning of war living in a municipality that was controlled by a different ethnic group, we can derive information on whether a household was facing forced eviction (certainty that a threat will be exercised) or not. Additionally, if a municipality was taken over by another ethnic group during the war, then all households from such municipalities were considered as being forcibly evicted (FE), as households from different ethnic groups were forcibly evicted from the same municipality in different periods of time. Moreover, this information was additionally checked by using each household's responses to the survey question about their displacement status in 2001,<sup>63</sup> in order to derive information on forced eviction.

Finally, a control variable for the pre-conflict migration experience of a household head (ME), which is a dummy variable that takes value of 1 if the place of living of household's head immediately before the war was different from her/his place of birth, is included in the model. It can be expected that households with a head who has previous migration experience are more likely to migrate, *ceteris paribus* (Ibanez and Velez, 2003).

The model to be estimated is then:

$$\ln\left[\frac{P_2}{(1-p_1)}\right] = \beta_0 + \beta_1 EDU_0 + \beta_2 AGE_0 + \beta_3 FHH_0 + \beta_4 URB_2 + \beta_5 EDUURB_2 + \beta_6 FE + \beta_7 EDUFE + \beta_8 URBFE + \beta_9 EDUURBFE + \beta_{10} ME + u_i \quad (4.7)$$

where:

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<sup>62</sup> Detailed list of municipalities and their division on the basis of ethnic group controlling it, for the purpose of giving an opportunity to readers to check the validity of such divisions, is provided in Appendix 4.1.

<sup>63</sup> The survey year.

$\ln\left[\frac{P_2}{(1-P_1)}\right]$  - the dependent variable, expressed as a log odds ratio of the probability of migrating

abroad over a probability of staying within a country,

EDU<sub>i</sub> – a variable for the education level of a head of household, which is expressed as a set of indicative variables. The set contains four indicative variables on the highest level of education of a respondent: primary (PE), secondary (SE) and tertiary (including postgraduate) education (TE). No education is a reference category,<sup>64</sup>

AGE<sub>i</sub> – age of a household head, in years,

FHH<sub>i</sub> – a dummy variable taking the value of 1 if a head of household is female, 0 if male,

FE<sub>i</sub> – a dummy variable taking the value 1 if a household was forcibly evicted during the war, 0 otherwise,

URB<sub>i</sub> - a dummy variable taking the value 1 if a household was living in an urban municipality immediately before the war, otherwise 0,

EDUURB<sub>i</sub> – an interaction variable between EDU and URB, expected to capture the difference in relative deprivation between different groups of households,

EDUFE<sub>i</sub> – an interaction variable between EDU and FE, expected to capture the change in absolute income,

URBFE<sub>i</sub> – an interaction variable between URB and FE,

EDUURBFE<sub>i</sub> – an interaction variable between EDU, URB and FE, expected to capture the change in relative deprivation,

u<sub>i</sub> – error term.

Table of descriptive statistics for each variable are provided in the table below.

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<sup>64</sup> Relationship between these empirical variables and variables from the theoretical model is described in the Table 4.1.

Table 4.2. Descriptive statistics of variables used in the empirical estimation

Variable description	Variable name	Obs	Mean
Dependent variable (if household migrates or not)	<i>Y</i>	3359	0.17
Dummy variable for female headed household	<i>FHH</i>	3369	0.27
Age of household head, in years	<i>AGE</i>	3369	45.24
Dummy variable for household head with tertiary education	<i>EDU</i>	3029	0.18
Dummy variable, taking value of 1 if household lived in urban municipality before the war	<i>URB</i>	2051	0.60
Dummy variable, taking value of 1 if household was forcibly evicted during the war	<i>FE</i>	3027	0.21
Dummy variable, taking value of 1 if household's head has pre-war migration experience	<i>ME</i>	3213	0.29

The dataset contains information on the education level by a highest degree completed. So, it was decided to use dummy variables for different levels of education, instead of a continuous variable for years of education. The rationale for this is that the effect of education on the probability of emigration does not change with every year of education linearly and that this effect is better captured by controlling for differences between different levels, rather than years, of education. In other words, between group differences in education are more significant than within group differences. In addition to that, it was decided to include only one instead of several dummy variables. So, a variable for education (*EDU*) indicates whether a household's head completed post-secondary education. A positive (negative) sign of the coefficient on the education variable should suggest that more educated households are more (less) likely to emigrate abroad, which would give an answer to our question about the potential selection mechanism in the process of conflict-induced migration. The more likely a highly educated individual is to migrate, the more severe depletion of human capital (brain drain) ethnic cleansing will cause. This finding would be further supported by the cross-country analysis of determinants of the magnitude of brain drain. Age of household's head (*AGE*) is expected to have a negative impact on the migration probability. With regards to the gender of a household's head (*FHH*), it is not quite clear what to expect *a priori*,

because this variable may influence the migration decision in two different ways, affecting it in opposite directions. Household with a female head may be more risk averse (particularly regarding the children) and be more prone to emigrate. But, on the other side, female headed household may be less mobile and have higher family-level costs of displacement. A dummy variable on whether household head has changed her/his place of living between birth and 1992 (ME) 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. Besides these, interaction variables between these variables are also included in the model. First, interaction between education level of a household's head and household's place of living before the war (EDUURB) was included to capture the effect of relative deprivation of a household, as a household's income relative to a community income. Second, interaction term between education and forced eviction (EDUFE) and one between EDUFE and place of living (EDUURBFE) are included to measure the effect of change in income and change in relative deprivation of a household as a results of war, depending whether it was forcibly evicted or not. As the restoration hypothesis predicts that those who suffered larger losses in both income and relative deprivation are expected to have higher migration probability. Finally, an interaction between place of living of a household and whether it was forcibly displaced or not (URBFE) is used to distinguish between different categories of households, as will be explained subsequently.

Inclusion of interaction variables changes the meaning of the original variables in the 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 average odds ratios or probabilities for each category. For instance, if we have a model with two dummy variables,  $D_1$  and  $D_2$  and an interaction term between them, this can be represented by a following equation:

$$y = \beta_0 + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_1 x D_2 + u_i \quad (4.8)$$

then the relationship between the coefficients and different categories represented by the original and interaction variables can be described as presented in the tables below.

*Table 4.3. Relationship between variables and categories*

	D <sub>2</sub> =0	D <sub>2</sub> =1
D <sub>1</sub> =0	$\beta_0$	$\beta_0 + \beta_2$
D <sub>1</sub> =1	$\beta_0 + \beta_1$	$\beta_0 + \beta_1 + \beta_2 + \beta_3$

Table 4.3 should help clarify the way to interpret these coefficients. For example, once the interaction between education and place of living (EDUURB) is included, the original variable for education (EDU) represents the effect of education on the migration probability for a reference category of place of living, which is non-urban (rural or mixed). In the same way, a coefficient for households from urban areas (URB) represents the category of low educated (reference category for education). Once triple interactions are included, then even double interactions change their meaning, as they now represent only a category omitted from the triple interaction. Thus, with triple interaction we have eight different categories. For this reason, the results in the next section will be presented not only as original coefficients but also as average odds ratios and probabilities for each category.



### 4.2.3. Results

The estimated results of the logit estimation of the model, with two different specifications of the education variable, expresses as odds ratios (and standards errors in parentheses) are provided in the Table 4.4.<sup>65</sup>

Table 4.4. Results of the logit model estimation

Variable description	Variable name	Log odds ratio	Odds ratio	Probability <sup>66</sup>
<i>Dependent variable (= 1 if household migrates abroad)</i>	<i>Y</i>			
<i>Female headed household</i>	<i>FHH</i>	0.879*** (0.149)	2.409 (0.359)	0.707
<i>Age of household head</i>	<i>AGE</i>	-0.042*** (0.007)	0.959 (0.007)	0.490
<i>Education of a household's head (=1 if household head has tertiary education)</i>	<i>EDU</i>	2.074*** (0.537)	7.955 (4.275)	0.888
<i>If household lived in urban municipality before the war</i>	<i>URB</i>	1.503*** (0.251)	4.493 (1.128)	0.818
<i>If household was forcibly evicted during the war</i>	<i>FE</i>	1.703*** (0.288)	5.489 (1.580)	0.846
<i>If household's head has pre-war migration experience</i>	<i>ME</i>	-1.579*** (0.154)	0.206 (0.032)	0.171
<i>Interaction between education and forced eviction variables</i>	<i>EDUFE</i>	-0.529 (1.005)	1.636 (1.645)	0.621
<i>Interaction between education and urban</i>	<i>EDUURB</i>	0.492 (0.572)	0.589 (0.337)	0.371
<i>Interaction between tertiary urban and forced eviction</i>	<i>URBFEE</i>	0.182 (0.361)	1.199 (0.433)	0.545
<i>Interaction between education, urban and forced eviction</i>	<i>EDUURBFEE</i>	0.052 (1.074)	1.053 (1.131)	0.513
<i>Intercept</i>	<i>CONS</i>	-0.759** (0.336)		
<i>Number of observations</i>		1,575		
<i>Pseudo R<sup>2</sup></i>		0.342		
<i>LR chi-squared (10)</i>		680.34		
<i>Correctly classified (%)</i>		79.87		

\*\*\* significant at 1% level of significance

\*\* significant at 5% level of significance

Positive sign of the log odds ratio (or, equally, the value of odds ratio above 1) of probability to migrate abroad for the coefficient of the household head's gender variable (FHH) and negative sign for the coefficients of age variable (AGE) suggests that household with female and younger

<sup>65</sup> Detailed results of the model estimation are provided in Appendix 4.2.

<sup>66</sup> Probability is calculated as Odds ratio/(1+Odds ratio).

household head are more likely to migrate abroad than to stay. This is what we could expect, as younger individuals are more prone to migrate, while female headed households might be more risk averse and therefore more likely to migrate. In addition to that, households without a male head involved in fighting are not bound to stay by such a commitment of a household head. As explained previously, the other coefficients presented in table 4.4 cannot be interpreted in the usual way, since the introduction of interaction terms changes their original meaning and they now measure differences between different groups. For that reason, the odds ratios and probabilities are calculated for each alternative category, which should make interpretation easier. These new values are presented in the Table 4.5.

*Table 4.5. Results of the logit model estimation, by category*

<i>Category number</i>	<i>Category description</i>	<i>Coefficients used</i>	<i>Log odds ratio</i>	<i>Odds ratio<sup>67</sup></i>	<i>Probability</i>
1	<i>Low educated, from non-urban areas, not evicted</i>	$\beta_0$	-0.759** (0.336)	0.468	0.319
2	<i>Low educated, from urban areas, not evicted</i>	$\beta_0+\beta_4$	0.744** (0.299)	2.104	0.678
3	<i>Highly educated, from non-urban areas, not evicted</i>	$\beta_0+\beta_1$	1.315** (0.559)	3.725	0.788
4	<i>Highly educated, from urban areas, not evicted</i>	$\beta_0+\beta_1+\beta_4+\beta_5$	2.289*** (0.341)	9.865	0.965
5	<i>Low educated, from non-urban areas, evicted</i>	$\beta_0+\beta_6$	0.944*** (0.330)	2.571	0.720
6	<i>Low educated, from urban areas, evicted</i>	$\beta_0+\beta_4+\beta_6+\beta_8$	2.628*** (0.358)	13.853	0.933
7	<i>Highly educated, from non-urban areas, evicted</i>	$\beta_0+\beta_1+\beta_6+\beta_7$	3.510*** (0.877)	33.448	0.971
8	<i>Highly educated, from urban areas, evicted</i>	$\beta_0+\beta_1+\beta_4+\beta_5+\beta_6+\beta_7+\beta_8+\beta_9$	3.707*** (1.164)	40.731	0.976

\*\*\* significant at 1% level of significance

\*\* significant at 5% level of significance

Note: Calculations performed using STATA **lincom** command.

<sup>67</sup> The odds ratio for a category is calculated as an exponential value of the sum of log odds ratios (original coefficients) for that category.

The estimated probabilities, when appropriate different categories are compared, suggest that it is more likely that a household will decide to migrate if they are from urban areas, if the household head is more educated and if they were forcibly evicted during the war. This is in line with the predictions of the model presented in Chapter 3. For example, a comparison between categories 3 and 1, 4 and 2, 7 and 5, or 8 and 6, suggest that the probability of migration increases for highly educated, holding constant other category characteristics. This, in addition to the probabilities estimated for variables on household's head age and gender,<sup>68</sup> suggests that the households with higher income are more likely to migrate. For relative deprivation, categories 2 to 1, 4 to 3, 6 to 5, or 8 to 7, should be compared. The comparison shows that a probability between two categories differing in their place of living only (*ceteris paribus*) is higher for categories which are from urban areas. Besides that, the coefficient expressed as a log odds ratio for the interaction term between education and urban area is positive, which suggests that individuals who were less relatively deprived before the conflict are more likely to migrate. The evidence presented, both for income and relative deprivation, can be explained by the fact that households, once they make migration decision, compare their current (Stage 1 from Figure 3.1) situation with expected gains from migration. Also, their relative deprivation is measured as their relative position compared to their previous (pre-war) level, rather than their position within a reference group. This is explained through the "restoration hypothesis" and expressed as a change in income and relative deprivation between stages 0 and 1 in the theoretical model presented in Chapter 3. Finally, if we compare category 5 to 1, 6 to 2, 7 to 3 or 8 to 4, we will see that the ones who were evicted are more likely to emigrate abroad. This also captures the effect of a change in income and relative deprivation on the migration probability. As richer households and households from urban areas, initially having a higher level of income and a lower level of relative deprivation are expected to have more severe depletion of both, also the households which were evicted, regardless of their education or place of

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<sup>68</sup> All the three variables were used as proxies of household's income.

living, are expected to be more severely affected than households which were not evicted. This also confirms the prediction of the theoretical model developed in Chapter 3.

The micro level study presented above has provided evidence on the self-selection mechanism operating in a specific setting of conflict-induced migration settings and affecting the selection of individuals into migrants by their education level. The evidence presented suggests that the sign of self-selection is, as in the case of voluntary migration, positive. Households who experienced more severe impact of a conflict on their absolute and relative position within a community, according to the “restoration” hypothesis are expected to be more likely to migrate. The ones with better absolute and relative position within a community are generally more educated, which increases brain drain from such a country. But, as migration rates are generally higher during a conflict, this does not yet reveal if the selection mechanism in the case of conflict-induced migration is of different size compared to voluntary migration. Higher rates of migration usually bring higher brain drain, but we are also interested to see whether the proportion of highly educated emigrants from countries in conflict is larger than in the case of voluntary migration. In order to perform such estimation, it is necessary to conduct further analysis, where emigration rates of highly educated from countries which experiences conflict would be compared to those of countries which did not experience it. This will be done in the next section, by using country level data, in order to provide additional evidence on the size of relationship between these factors and the magnitude of “brain drain” from a country. It should also enable comparison of the size of the effect of these factors between cases of voluntary and forced migration.

### **4.3. Macro – level study**

#### **4.3.1. Model and data**

There have been relatively few attempts to provide evidence on the relationship between the characteristics of conflict and the size of refugee flows or proportions of refugees in the total number of displaced persons, based on the analysis of cross-country data sets (Melander and Oberg, 2004; Davenport *et al.*, 2003; Moore and Shellman, 2006). Also, there has not been any attempt yet to investigate the relationship between the characteristics of conflict and the magnitude of brain drain, *i.e.* the proportion of individuals with tertiary education in the total population of refugees at country level. This mainly reflects the lack of available data on the brain drain. Yet the recently collected dataset on the stock of immigrants from more than 190 countries in OECD countries by education levels (Docquier and Marfouk, 2006), which makes possible derivation of emigration rates of highly educated individuals by country, gives an opportunity to perform such an analysis. The very first attempt to estimate the determinants of brain drain by using the Docquier and Marfouk (2006) dataset was a paper by Beine *et al.* (2008). They regressed skilled emigration rates by country on a set of explanatory variables expected to capture both push and pull factors of brain drain, with particular focus on controlling for the differences between small and large states. They found significant differences in the brain drain between countries of different size.

The idea behind the empirical analysis in this section is very similar to the Beine *et al.* (2008). Their approach was followed in order to make comparison between their and own results possible. If inclusion of variables that distinguish between different types of migration (voluntary or forced) improve the explanatory power of the Beine *et al.* (2008) model, it would be a good justification of the study conducted here and prove the key idea behind this thesis, that forced migration is different from voluntary, in which case the theoretical models of voluntary migration

are not appropriate to explain forced migration. But, besides following their approach, the present model goes further by including additional variables of the specific model of forced migration, developed in this thesis. In the empirical estimation presented below, not only the differences in the absolute income will be included as factors influencing brain drain, but also the differences in relative deprivation of migrants between different countries, as well as the magnitude of forced evictions during a conflict, which is based on the theoretical model developed in Chapter 3.

The empirical strategy employed in this section will, for the reasons explained earlier, follow the strategy used in Beine *et al.* (2008). Besides that, alternative estimation methods, such as natural experiment, would be used in order to test the robustness of the model and provide additional information about the hypothesized relationships.

The model to be estimated is:

$$m_{it}^s = \beta_i + \beta_1 GDP_{it} + \beta_2 GDP_{it}^2 + \beta_3 POP_{it} + \beta_4 GINI_{it} + \beta_5 WAR_{it} + u_{it} \quad (4.8)$$

where:

$m_{it}^s$  - emigration rates of highly educated individuals from country  $i$  to the OECD countries in a period  $t$ ,

$GDP_{it}$  and  $GDP_{it}^2$  - GDP per capita and its squared value of country  $i$  in period  $t$ , to capture the effect of differences in absolute income between the country of origin and some OECD country (destination of migrants),

$POP_{it}$  –size of country in period  $t$ , measured as population of the country, to control for the differences in size of countries,

$GINI_{it}$  – Gini coefficient of a country in period  $t$ , as a measure of inequality in a country, to capture the effect of differences in relative deprivation between a country of origin and some OECD country (destination of migrants),

$WAR_i$  - one of the alternative variables for characteristics of conflict, such as number of battle-related deaths in country  $i$  in period of ten years prior to the year analysed (BRD), duration of conflict during the period of ten years before year when migration rates were measured (WARY) and a dummy variable taking the value of 1 if a country was in conflict during the period of ten years before the year when migration rates were measured (WARDV), to measure the differences in emigration rates by education levels between countries with different type of migration (voluntary or forced),

$u_{it}$  – time variant error term.

For the dependent variable ( $m_{it}^s$ ), this study uses *the emigration rate of individuals with tertiary education – the proportion of refugees with tertiary education in the total stock of individuals with tertiary education in a sending country*. The idea behind using such a dependent variable is specified on a theoretical basis for the influence of different factors on numbers of refugees and the micro level study suggesting that individuals with different education levels respond differently to such displacement incentives. Accordingly, it should be found that, comparing two periods, change in emigration rates from countries which experienced conflicts have shown a different pattern than change in emigration rates from countries which did not experience a conflict between the two periods. The emigration rates in Docquier and Marfouk (2006) dataset are calculated by the following formula:

$$m_{t,s}^j = \frac{M_{t,s}^j}{N_{t,s}^j + M_{t,s}^j} \quad (4.9)$$

where:

$m_{t,s}^j$  - emigration rate of individuals of education level  $s$  from country  $j$  at time  $t$ ,

$M_{t,s}^j$  - stock of emigrants of education level  $s$  from country  $j$  at time  $t$ ,

$N_{t,s}^j$  - stock of individuals of education level  $s$  in a country  $j$  (non-migrants) at time  $t$ .

$s = l, m, h$  ( $l$ =primary education,  $m$ =secondary education and  $h$ =tertiary education)

Consequently, the emigration rate denotes the intensity of emigration by education level from a home country to OECD countries. These data are available for the years 1990 and 2000 only, which limits the number of alternative estimation methods to be used here. As Beine *et al.* (2008) used random effect model estimation; the analysis will be based on the methods for panel data. Possible alternatives are estimation of the model using first differenced data and a natural experiment approach.

Variables for initial values of GDP per capita ( $GDPC_{90}$ ) and its squared value<sup>69</sup> ( $GDPC_{90}^2$ ) are included to control for the incentive effect of the differences in absolute income between the home and the host country. The poorer the home country, then the larger is the difference in the expected returns to education and hence more individuals will tend to migrate. However, as the economic conditions in a home country improve, the incentive effect is weakening, thus decreasing migration rates. However, previous studies on migration suggest the presence of a “migration hump”.<sup>70</sup> For this reason,  $GDPC^2$  is introduced in the model, along with  $GDPC$ .

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<sup>69</sup> Squared term for GDP is used to control for possible non-linear effect of country's income on the magnitude of brain drain.

<sup>70</sup> The term “migration hump” was introduced by Martin and Taylor (1996) to explain the shape of the relationship between economic development and migration from a country. At low levels of income in the country, individuals lack resources to cover migration costs, therefore do not migrate. As the level of economic development increases the income of individuals, more individuals can cover migration costs and migration rate from a country increases. But, after a certain point of economic development, high levels of income weaken push factors of migration, meaning that the expected wage difference between the home and host country decreases. Consequently, migration rate from



Size of a country ( $POP_{i90}$ ), expressed in terms of country's population, is used as a proxy for the country's openness toward international flows of goods, capital and people. It has been observed that small countries are usually more open to these flows and therefore are expected to have larger rates of emigration of highly educated individuals, *ceteris paribus*. Also, descriptive analysis of the data shows that the majority of leading countries in terms of the emigration rates are very small countries. This suggests that we should control for a country's size.

A variable for inequality (GINI) is a measure of relative deprivation from the theoretical model presented in Chapter 3 and according to the predictions of the model, is expected to capture the effect of relative deprivation on migration decision. We expect a positive relationship here, as more inequality in a country causes a higher level of relative deprivation among the population of a country, on average.

Besides the above variables, Beine *et al.* (2008) used three proxies for a country's push factors, namely ethnic fractionalization and indicators of governance and economic freedom. In this study, the variable for war (WAR) will be included. This variable is expected to replace other factors of political instability and risks used in Beine *et al.* (2008) model, by capturing their effect through the war variable. Finally, Beine *et al.* (2008) also used variables for distance between a country of origin of migrants and closest OECD country and a dummy variable indicating whether a country had colonial links with any of OECD countries, as proxies for migration costs. These variables were not included in our model, as they are not relevant policy variables and they are time-invariant, so cannot be used in fixed effects estimation.

The study will combine three different data sets. The first one, Docquier and Marfouk (2004) dataset contains the data on immigration to all OECD countries by level of education and by sending country for 1990 and 2000, collected from the census data of OECD countries. The number

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countries at higher stages of development decreases. This creates an inverse U shape in the relationship between economic development and migration.

of emigrants, selection and emigration rates are reported.<sup>71</sup> The data are far from perfect. The data on the stock of immigrants only in member countries of the OECD are available and there is no data for immigrants in non-OECD countries. Also, the data are not annual flows, but stocks in two periods. This means that we cannot analyse the relationship between annual flows of refugees and the characteristics of a conflict in that particular year, but only changes in the stock between 1990 and 2000 as a result of conflicts in a country during 1990s. Thus, these data contain voluntary and involuntary migrants for countries which have not experienced a conflict during the entire period between 1990 and 2000. As a consequence of the dissolution of the former Soviet Block, Yugoslavia and Czechoslovakia, not all countries appear in the lists for both years. Out of 174 countries in 1990, 3 did not exist in 2000 (Yugoslavia, USSR and Czechoslovakia). Also, there is a list of countries which gained independence in 1990s and the data for 1990 for these countries were not available. So these countries were excluded from the list as well.

The second dataset is from the Uppsala University's Uppsala Conflict Data Program (UCDP), which provides information on the characteristics of conflict, which we use for creation of the variables for risk levels during a conflict, expressed as number of battle-related deaths during the conflict. In this data set, the location of conflict does not always coincide with the territory affected by a conflict and with the country of refuge from the Docquier and Marfouk dataset, particularly in the case of territorial disputes. Therefore, all the locations conflict were checked additionally and characteristics of a conflict (number of battle-related deaths) were associated to the territory which has been affected by the war. For example, a war between Burkina Faso and Mali arising from the Agacher Strip dispute affected mainly this region and refugees from that region in OECD countries were counted as emigrants from Burkina Faso (the Agacher Strip is still a part of Burkina Faso).

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<sup>71</sup> Explanations and formulas for selection rate and emigration rate are provided in the previous page.

The third dataset is the World Development Indicators (WDI) dataset, from which the data for creation of variables on GDP per capita, the Gini coefficient and population were obtained. The descriptive statistics of the variables used in this analysis are presented in the table below.

*Table 4.6. Descriptive statistics of the variables used in the macro model*

<i>Variable description</i>	<i>Variable name</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
<i>Emigration rates of highly educated from country i to OECD countries, in percentages</i>	<i>ERH</i>	<i>300</i>	<i>20.712</i>	<i>22.838</i>	<i>0.17</i>	<i>96.73</i>
<i>GDP per capita of a country, in thousand US dollars</i>	<i>GDPC</i>	<i>300</i>	<i>8.531</i>	<i>8.978</i>	<i>0.359</i>	<i>48.217</i>
<i>Population of a country, in millions</i>	<i>POP</i>	<i>300</i>	<i>34.864</i>	<i>126.742</i>	<i>0.038</i>	<i>1262.474</i>
<i>Gini coefficient</i>	<i>GINI</i>	<i>217</i>	<i>41.283</i>	<i>10.218</i>	<i>22.7</i>	<i>64.3</i>
<i>Battle related deaths during the previous decade, in thousands</i>	<i>BRD</i>	<i>229</i>	<i>34.778</i>	<i>159.122</i>	<i>0</i>	<i>1264</i>
<i>Duration of war in previous decade, in years</i>	<i>WARD</i>	<i>300</i>	<i>1.803</i>	<i>3.320</i>	<i>0</i>	<i>10</i>
<i>A dummy variable taking value of 1 if a country was in war in previous decade</i>	<i>WARDV</i>	<i>300</i>	<i>0.386</i>			

One of the interesting findings of all previous studies is that only countries directly affected by fighting have experienced significant increases in forced migration. Therefore, the analysis should cover only countries which experienced conflict on their territory. Accordingly, the variable for war is based on the location of conflict. For instance, countries such as the allies in the Gulf War, such as the United States, the United Kingdom or Sweden, are not expected to experience increase in emigration flows as a consequence of their involvement in that war. Out of these 150 countries, 65 of them were recorded in the Uppsala University's dataset as those which experienced conflict during the 1990s.

According to data from United Nations High Commissioner for Refugees (UNHCR) for the period 1955 and 1995, the top five destinations of refugees were: Iran; Pakistan; Zaire (now

Democratic Republic of Congo); Somalia; and Sudan (Moore and Shellman, 2004). As these data imply, most refugees simply cross the border. All of these countries are outside the OECD. “Refugees are overwhelmingly concentrated in the poorest countries” (Castles and Loughna, 2003). Therefore, it may be questionable whether the data from Docquier and Marfouk's (2004) dataset can be used, which is limited to the data on immigrants with tertiary education to OECD countries only. However, according to Docquier and Marfouk (2006), more than 85% of the total population of emigrants with tertiary education are in OECD countries. Thus, the data used in this study may be considered as representative, particularly regarding reported emigration rates. But, in the case of using selection rates, it can be only assumed that the data from OECD countries are representative for the total population of emigrants from a particular country in all other countries. This may be a strong assumption, given the UNHCR data mentioned above.

The possibility of an upwards bias to the effect of a conflict on emigration of individuals with tertiary education is accepted, since the data covers only OECD countries. These countries may attract a higher proportion of individuals with tertiary education in the total population of refugees to these countries compared to other countries of refuge, particularly neighbouring states which usually host a significant part of the total refugee population of a particular country.

### **4.3.2 Results**

The model presented above was, as in Beine *et al.* (2008), estimated by a random effect model. Although it might be appropriate to use random effect, still OLS, fixed and random effects models will be estimated here in order to perform diagnostic tests for choosing the most appropriate estimator. The approach used here is general-to-specific. The first model that was estimated had all potential variables included and then the ones that were not significant were excluded from the

model. The results of the model with the parsimonious specification, estimated by three alternative methods, with cluster robust standard errors in parentheses, are presented in the Table 4.5 below.<sup>72</sup>

*Table 4.7. Results of the estimation of the macro model*

<i>Variable</i>	<i>OLS</i>	<i>Fixed effects</i>	<i>Random effects</i>
<i>Dependent variable: emigration rate of highly educated from a country to OCED countries (%)</i>			
<i>GDP per capita, in \$ thousands</i>	-0.225 (0.157)	-0.356* (0.207)	-0.301** (0.101)
<i>Gini coefficient</i>	0.086 (0.129)	-0.117 (0.087)	-0.065 (0.081)
<i>Population of a country, in millions</i>	-0.020** (0.008)	-0.011 (0.010)	-0.020*** (0.006)
<i>Dummy variable indicating whether a country was in conflict in the previous decade</i>	1.696 (2.587)	3.949** (1.721)	3.543** (1.594)
<i>Dummy variable for 2000</i>	1.566 (2.405)	0.265 (0.962)	0.492 (0.751)
<i>Intercept</i>	14.260** (6.253)	21.994*** (3.339)	21.793*** (3.697)
<i>Number of observations</i>	217	217	217
<i>Adjusted R2</i>			

\*\*\* significant at 1% level of significance

\*\* significant at 5% level of significance

\* significant at 10% level of significance

The model was estimated by using three different specifications of the conflict variable, as explained earlier. The dummy variable indicating whether a country was in war in previous decade performed the best in these models, therefore was chosen as the most appropriate one. The variable for squared GDP per capita was also used in the general model, but was excluded due to its insignificance. This suggests that the “migration hump” hypothesis is not supported by our data.<sup>73</sup>

<sup>72</sup> Detailed results of the model estimation are provided in Appendix 4.3.

<sup>73</sup> Alternative explanation is that this is just due to the high correlation between this variable and GDP per capita.

Beine *et al.* (2008) suggest using logarithmic transformation of variables, which might help to reduce possible problems of non-normality and outliers. For instance, China and India are naturally outliers in terms of their population. But, the test for the normality of the residuals from the levels model does not suggest any problem; hence this transformation was not used. Besides this, the modified Wald test for groupwise heteroskedasticity in the residuals of fixed effects estimation was conducted. The results of the test suggest that heteroskedasticity is present in the residuals. Consequently, the estimation was performed by computing cluster robust standard errors.

Different tests for the choice of the model were performed.<sup>74</sup> First, the results of the F test for the joint significance of fixed effects suggest that fixed effects model is preferred over OLS, as the estimated value of the test statistic is much larger than the critical value (and the probability of committing error by rejecting hypothesis of no joint significance of fixed effects is very low, well below any standard level of significance). Then, the Breusch and Pagan Lagrangian multiplier test was used to test to compare random effects and OLS models. Again, the estimated test statistics strongly suggests that random effects model is preferred over OLS. So, effects models are more appropriate. The final choice to be made is between fixed and random effects. For that purpose, the Hausman test was performed. The result suggests that we can reject the null hypothesis of consistency of the random effect estimates and therefore should use fixed effect estimation instead.

Coefficients on all the alternative estimations have the expected sign. We expect that emigration rates decrease with increase in GDP per capita, as increase in GDP reduces the incentive for migration. In the preferred model, the one estimated by the fixed effects, the estimated coefficient on the GDP per capita suggests that increase in GDP per capita by \$1,000 will decrease emigration rate of the highly educated by 0,36%, which is a plausible result and similar to the figures obtained in previous studies (*e.g.* Beine *et al.*, 2008). Countries with smaller populations have higher emigration rates of the highly educated. For every additional million of inhabitants,

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<sup>74</sup> All the results of diagnostics tests are provided in Appendix 4.3.

countries experience 0.02% lower emigration rates. This is also in line with all the previous studies. As discussed above, small countries are generally more open to all international flows, including migration. Therefore, it should be expected that emigration rates of the highly educated from small countries are larger, on average. But, this assumption is not supported by our results, as the coefficient is not statistically significant at any conventional level of significance. The Gini coefficient does not appear to be statistically significant, which may be due to the quality of the data. But, it is not too insignificant (p-value of the coefficient is about 0.17) and it has the expected sign and therefore it was not excluded from the models, as it still contributes to the explanatory power of the model. The main variable of our interest, a dummy variable indicating whether a country was previously in conflict, is statistically significant at the 5% level of significance. The estimated coefficient suggests that countries that experienced conflict have, on average, almost 4% higher emigration rates of the highly educated than the ones which did not experience conflict (i.e. emigration from these countries is predominantly voluntary). This suggests that countries which experience conflict and countries which did not experience it significantly differ in terms of their average emigration rates of the highly educated. As our theoretical model predicts, conflict increases brain drain. This is additional support to the argument that conflicts have particularly negative consequences for the stock of human capital in a country affected.

## **Concluding remarks**

The main theoretical contribution of this thesis 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 was presented in Chapter 3. In order to test the model, this thesis provides two different analyses, based on two different datasets. The first is a micro level study on the determinants of displacement, based on household level data and the other is a macro

level study of the relationship between the type of migration (whether it is voluntary or forced) and magnitude of brain drain from a particular country. Findings from the micro-level study suggest that ethnic cleansing, characterized by forced eviction, increases probability of migration, particularly of highly educated. So, forced emigrants are, according to these findings, also positively self-selected in terms of their education level, as voluntary migrants. Findings from the macro-level study suggest that countries which experienced a conflict have, in general, produced more migrants with tertiary education, in total and in the proportions of total number of emigrants, thus losing the most valuable factor of economic growth. These two findings combined, confirm the predictions of the theoretical model, that ethnic cleansing has more severe negative consequences for the stock of human capital in a country than voluntary migration. These findings also suggest that conflict do not only produce increased emigration figures, but may increase proportion of individuals with tertiary education among these emigrants as well. 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.

As the new literature on the brain drain argues, the emigration of highly educated individuals, besides depleting the stock of human capital in a home country, can also have positive reverse effects on the human capital formation, through increasing incentive for education by introducing migration prospects, or through the increased inflows of remittances that relax liquidity constraint for educational investments by households. These channels of positive impact of ethnic cleansing on human capital formation in a country will be investigated in the next chapter.



# *Chapter 5: Empirical evidence on the brain gain under ethnic cleansing*

## *Introduction*

### *5.1. The incentive effect*

#### *5.1.1. Description of the effect*

#### *5.1.2. The baseline model*

#### *5.1.3. Data*

#### *5.1.4. Results*

#### *5.1.5. Estimation of alternative specifications*

### *5.2. Remittances effect*

#### *5.2.1. Description of the effect*

#### *5.2.2. Background: Remittances and education in Bosnia-Herzegovina*

#### *5.2.3. Empirical approach*

#### *5.2.4. Results*

## *Concluding remarks*

## Introduction

The recent economics literature on migration and brain drain (Stark, 1997; Beine *et al.*, 2001, 2006a) argues that the emigration<sup>75</sup> of highly educated individuals does not necessarily reduce the stock of human capital in a country, as brain drain may have positive feedback effects on the formation of human capital, through different channels. The main channels discussed in the literature and described in detail in Chapter 3 (Figure 3.1) are: the “incentive effect”, whereby increased incentives for investments in education increase prospects for migration; the “remittances effect”, whereby the receipt of remittances increases household’s income, thus increasing their invested in education; and the “return migration effect”, whereby migrants return with human capital acquired abroad and also continue to invest in education upon return. The previous empirical evidence on the effect of brain drain on human capital formation in a home country (Beine *et al.*, 2006a; Schiff, 2005; Beine *et al.*, 2006b) was inconclusive. Moreover, the empirical studies did not distinguish between different types of migration. Therefore, in order to properly investigate the impact of brain drain on human capital formation in countries that suffered from ethnic cleansing, empirical analysis using data from such countries is required.

This chapter presents the findings from two separate empirical studies, which test the brain gain arguments by analysing two different channels of the impact of brain drain on human capital formation. In the first section, the Beine *et al.* (2006a) model of the brain gain is empirically tested by controlling for the type of migration (if a country was in conflict during the period investigated). The model uses country level data and regresses the stock of human capital in a country on a set of explanatory variables, including the emigration rate of the highly educated (brain drain) and the type of migration. The findings of this study are expected to reveal the extent of the impact of the

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<sup>75</sup> Including voluntary and forced migration. As explained in the discussion of the positive effects of migration as a result of ethnic cleansing in Chapter 3, the theory does not suggest differences in the expected positive effects of this type of migration, compared to voluntary migration. Still, empirically, the magnitude of such effects may be different, therefore this chapter presents evidence on it.

“incentive effect” (the first of the three main channels mentioned above) in the context of ethnic cleansing. In the second study, household data from Bosnia-Herzegovina were used in order to analyse the potential impact of the receipt of remittances on household’s education investment decisions. The analysis should provide economic insight into the second main channel of the impact of brain drain on human capital formation in a home country, the “remittances effect”. The third main channel, the one on return migration is not analysed, due to the lack of appropriate data available. This third channel can only be suggested as a potential direction for further research.

## **5.1. The incentive effect**

### **5.1.1. Description of the effect**

The theoretical model of “brain gain”, which explains the incentive effect, is developed by Beine *et al.* (2006a). The model and its applicability in the context of ethnic cleansing was discussed in Chapter 3. The main argument of this model is that, once migration possibility is introduced, it will produce additional schooling incentive for potential emigrants. However, as explained in Chapter 3, it is based on a set of assumptions that do not necessarily hold in the case of the ethnic cleansing; the main one is that potential migrants realize that more education increases their migration prospects. The migrants from ethnic cleansing were not selected by the host countries on the basis of their education level, but were provided an asylum as refugees. Therefore, empirical evidence taking into account the differences between voluntary and forced migration is required for gaining insight into the incentive effect and the net effect of emigration due to the ethnic conflict on human capital formation in a home country.

In the previous empirical work (*e.g.* Beine *et al.*, 2006a), emigration rates of highly educated individuals<sup>76</sup> were used to describe the migration probability. These values may be appropriate for explanation of migration with relatively stable emigration rates. But, in the case of ethnic cleansing, significant increase in the number of migrants is observed. This, even if the proportion of highly educated emigrants in the total number of emigrants<sup>77</sup> remains stable, will increase the emigration rate of the highly educated. Consequently, if the new emigration rate is used as a variable that approximates migration probability, it will wrongly assume that the probability of emigration for the remaining highly educated individuals in a country rapidly increased and that individuals observe such increase. The model then predicts that, according to the incentive effect hypothesis, human capital in countries affected by ethnic cleansing increases at much higher rates than in other countries. This may not be true for a number of reasons. First, forced emigrants currently residing in developing countries did not emigrate because they are highly educated, but because they were forced to migrate. This means that emigration rates do not properly reflect results of restrictive and selective immigration policies and thus the migration probability for the highly educated. Second, the difference between migration probability and emigration rates may be observable by individuals in a home country, thus not giving them as strong an incentive as would be predicted by the empirical model that uses emigration rates as a proxy for migration probability. Finally, countries in conflict usually suffered destruction of the facilities of the education system, thus the post-conflict environment may be such to not allow the full utilization of the incentive effect created by emigration of highly educated people during the conflict. All these suggest that the incentive effect should not be as strong as the theoretical model, initially developed for the context of voluntary migration, would predict and therefore requires controlling for the type of migration in the empirical analysis. The magnitude of the estimated impact of the migration on human capital formation in a home country is therefore expected to be less positive for forced migration than in

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<sup>76</sup> The emigration rate of highly educated is expressed as a proportion of highly educated emigrants in the population of highly educated individuals from a country (including emigrants).

<sup>77</sup> This term is called “selection rate” in Docquier and Marfouk (2006).

the case of voluntary migration and this difference can be explained by either a different degree of awareness of potential migrants about the migration prospects brought by additional education, or by the fact that capacities for formation of human capital in a home country are negatively affected by a conflict, thus the potential of the incentive effect cannot be exploited fully.

### 5.1.2. The baseline model

The empirical analysis of the incentive effect in the case of ethnic cleansing will generally follow the approach applied in Beine *et al.* (2006a) in their analysis of the same effect in the context of voluntary migration. The arguments mentioned previously and explained in detail in the theoretical discussion of the incentive effect presented in Chapter 3 suggest that the model of the incentive effect does not differ significantly between voluntary and forced migration, although the magnitude of the effect might be different. For these reasons, a variable that will distinguish between different types of migration from different countries will be introduced in the model. The baseline regression model to be estimated will be the same as in Beine *et al.* (2006a), with one additional variable on the type of migration from a country. The model is:

$$\Delta \ln(H_{90-00}) = \beta_0 + \beta_1 \ln(H_{90}) + \beta_2 \ln(p_{90}) + \beta_3 DENS_{90} + \beta_4 SSAD + \beta_5 LATD + \beta_6 RM_{90} + \beta_7 CDV_{90} + \beta_8 CDV_{00} + u_i \quad (5.1)$$

where:

$\Delta \ln(H_{90-00})$  - the dependent variable, expressed as a log value of the change in the stock of human capital in a country between 1990 and 2000,

$\ln(H_{90})$  - log of initial stock of human capital in a country in 1990,

$\ln(p_{90})$  - variable for migration probability, expressed as a log of the highly educated emigration rate in 1990,

$DENS_{90}$  - population density in a country in 1990,

$SSAD$  - dummy variable for South American countries,

$LATD$  - dummy variable for countries from Sub-Saharan Africa,

$RM_{90}$  - inflow of remittances to a country in 1990, expressed as a share of GDP

$CDV_{90}$  - a dummy variable taking value 1 if a country was at war during a decade before 1990 (from 1980 to 1989), zero otherwise,

$CDV_{00}$  - a dummy variable taking value 1 if a country was at war during a decade before 2000 (from 1990 to 1999), zero otherwise,

$u_i$  - a random error term.

The dependent variable in the model proposed by Beine *et al.* (2006a) is the log change of the human capital stock in a home country between two periods ( $\Delta H_{00-90}$ ), where human capital is measured as a proportion of highly educated individuals<sup>78</sup> in the population. This variable is regressed on a set of variables proposed by the theoretical model of the incentive effect, developed in Chapter 3. The key variable is migration probability at the beginning of the period ( $p_{90}$ ). In the empirical model, it enters as an emigration rate from a country, measured as a proportion of highly educated emigrants in the total stock of highly educated individuals in a home country, including emigrants.

The emigration rates corrected by the age of entry are used, where only individuals emigrating at age 22 or above were included in the calculation of the emigration rates. That is, only migrants who acquired their education in a home country and then emigrated are taken into account

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<sup>78</sup> As highly educated individuals are considered those who have 12 or more years of education.

and not those who acquired their education after migration. Although the Beine *et al.* (2006a) study does not reveal any significant differences in results where all migrants or only those of age 22 and above were included, here the choice of corrected rates was made according to the belief that these figures measure actual brain drain more accurately. According to its definition, the brain drain is emigration of the highly educated, not the “will be” highly educated. Also, if we assume that the stock of highly educated emigrants is a proxy for actual migration probability, resulting from immigration restrictions, then we should exclude those emigrating before their age of 22, as emigration of low educated individuals who acquire their education after migration should not affect probabilities for emigration of highly educated individuals.

Other independent variables included in the Beine *et al.* (2006a) model are: initial stock of human capital in a country ( $H_{90}$ ); population density ( $DENS_{90}$ ); remittances ( $RM_{90}$ ); and two regional dummies, for Latin America ( $LATD$ ) and for Sub-Saharan Africa ( $SSAD$ ). Initial stock of human capital, measured as a proportion of highly educated individual in a population, enters the model in order to control for a potential catching-up effect, *i.e.* the negative sign of the coefficient of this variable should indicate convergence trends in the human capital levels among countries. The population density is a proxy for the costs of acquiring education. Increase in population density is expected to decrease distance to schools and thus education expenditures. Remittances, expressed in the model as remittances *per capita*<sup>79</sup>, are expected to have a positive impact on the relaxation of liquidity constraints.<sup>80</sup>

Besides the variables used in Beine *et al.* (2006a), two additional variables controlling for the type of migration were included.<sup>81</sup> As discussed in the theoretical model in Chapter 3, although

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<sup>79</sup> In fact, in the Beine *et al.* (2009) model, they are presented in the model explanation as a share of GDP and then in the results reported as remittances per capita. In an e-mail conversation with the author (Michel Beine), his explanation of this ambiguity was that he thinks it is remittances as a share of GDP.

<sup>80</sup> We may expect that this effect is not linear, but the poorer the country is, the stronger this impact should be, *ceteris paribus*. This argues for inclusion of the interaction variable between initial levels of remittances and GDP ( $rem90gdp90$ ). But, once we include this variable, it significantly reduces the sample size; therefore the model was not estimated and reported.

<sup>81</sup> This modelling strategy follows the Beine *et al.* (2009) approach in making a distinction between small and large countries. But, as will be presented in the discussion of alternative estimation strategies (next section), this approach

the presence and the direction of the incentive effect arising from forced migration on human capital formation in a home country is expected to be similar to voluntary migration, still its magnitude may differ, due to either different impressions of potential migrants about migration prospects or due to the decreased capacities of countries affected by a conflict to utilize such an opportunity for formation of human capital. Therefore, two variables that should capture the effect of conflict on migration are included in the model. First is a variable on conflict before 1990 ( $CDV_{90}$ ). It is expected to control for the impact of conflict-induced migration on the true migration probabilities for the highly educated, which may not be properly expressed by the stock of emigrants. Another variable is for a conflict between 1990 and 1999 ( $CDV_{00}$ ). This variable is expected to capture the impact of conflict on the capacity of a country to produce new human capital. Both variables are expressed as dummy variables, taking the value of 1 if a country experiences conflict in a given period and zero otherwise.<sup>82</sup> In order to compare the results without and with a variable that controls for the type of migration, three different models will be estimated. Model 1 will be an estimation of the Beine *et al.* (2006a) model. Replication of their results in this thesis will be done with the purpose of comparison with the new models estimated here. Model 2 will, in addition to the Beine *et al.* (2006a) variables, estimate the model with one additional variable to control for the impact of the type of migration on the emigration rates of the highly educated. The variable is  $CDV_{90}$ . Also, Model 3 will, besides variable  $CDV_{90}$ , also include variable  $CDV_{00}$ , which is expected to capture the effect of the country's capacity to utilize the incentive effect created by emigration in order to increase production of human capital in a country.

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was found to be inappropriate, as it does not capture the differences in size of the incentive effect between different countries.

<sup>82</sup> Alternative specifications of these two variables, such as average annual battle-deaths of a conflict during a given period and total battle deaths during the conflict as a proportion of population of a country, were used, but all of them appear to be highly insignificant and reduce the value of  $R^2$  once they entering the model.



### 5.1.3. Data

The data used for the purpose of this empirical study are taken from the same sources as the ones used in Beine *et al.* (2006a) study, for comparative purposes. The purpose of such comparison is that the results from empirical analysis that does not distinguish between types of migration (in Beine *et al.*, 2006a) will be compared to the results from the analysis that follows, which is specific in a way that it makes distinction between voluntary and forced migration. As explained above, the entire analysis here is based on the assumption that models such as the one in Beine *et al.* (2006a) suffer from omitted variable bias by not making such distinction between different types of migration. Data on GDP and GNI, life expectancy at birth, population size and density and remittances are taken from the *World Development Indicators* (World Bank, 2009). For the human capital levels and emigration rates by education level, there are two alternative datasets that could have been used in this study. First, there is the Docquier and Marfouk (2006) dataset on the emigration rates by education level of migrants from 175 countries in 1990 and 195 countries in 2000 to all OECD countries. Second, there is the Defoort (2006) panel dataset for emigration rates by education level of migrants from 195 developing countries to the six major receiving OECD countries (Australia, Canada, France, Germany, United Kingdom and United States) for six periods between 1975 and 2000. Unfortunately, as refugees are found to be less concentrated than voluntary migrants and are more likely to remain in the neighbourhood of their countries, hence less likely to move to the OECD countries, the Defoort (2006) dataset might not be well representative, so we believe that the figures from the Docquier and Marfouk (2006) dataset represent emigration rates of the highly educated from countries in conflict more accurately. As a result, the human capital stock and emigration rates data are taken from this dataset. The formula for the emigration rate is:

$$m_{t,s}^j = \frac{M_{t,s}^j}{N_{t,s}^j + M_{t,s}^j} \quad (5.2)$$

Where:

$m_{t,s}^j$  - emigration rate of individuals of education level  $s$  from country  $j$  at time  $t$ ,

$M_{t,s}^j$  - stock of emigrants of education level  $s$  from country  $j$  at time  $t$ ,

$N_{t,s}^j$  - stock of individuals of education level  $s$  in a country  $j$  (non-migrants) at time  $t$ .

$s = 1, m, h$  (1=primary education, m=secondary education and h=tertiary education)

Consequently, the emigration rate denotes the intensity of emigration by education level from a home country to OECD countries.<sup>83</sup> The formation of human capital between two periods ( $\Delta H_{a,00-90}$ ) is the dependent variable in all the models to be estimated in this study and is expressed as the log change of the human capital stock in a home country between two periods.

In addition to Docquier and Marfouk (2006) dataset, this study uses Uppsala Conflict Data Program (UCDP)<sup>84</sup> dataset in order to create variables about conflict.<sup>85</sup>

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<sup>83</sup> This variable was also used by Beine *et al.* (2009).

<sup>84</sup> Version 4-2008 of the dataset was used here. The dataset contains information about the intensity of conflict as well, which allows creation of continuous variable. However, as the main purpose of the study is to analyse differences between countries with different type of emigration, not the effect of intensity of conflict on human capital formation, use of dummy variables was considered as more appropriate.

<sup>85</sup> The main characteristics of the two datasets used for this study, Docquier and Marfouk (2006) dataset and Uppsala Conflict Data Program (UCDP)<sup>85</sup> dataset, are explained in the previous chapter, as these two dataset were used for the cross-country study of the determinants of brain drain.

Table 5.1. Descriptive statistics of variables

Variable description	Variable name	N	Mean	Std. Deviation	Minimum	Maximum
Emigration rates at the beginning of the period, in percentages	P90	168	18.21	22.59	0.10	93.50
Emigration rates at the end of the period, in percentages	P00	168	16.62	18.82	0.30	81.90
Initial stock of human capital in a country, in percentages	HA90	127	6.53	5.80	0.10	24.80
Stock of human capital in a country at the end of period, in percentages	HA00	127	9.30	7.74	0.40	31.60
Population of a country at the beginning of the period, in millions	POP90	146	31.60	119.74	0.02	1,135.19
Inflows of remittances to a country in 1990, , in million \$	RM90	103	663.31	1,175.44	1.00	5,075.00
GDP per capita at the beginning of the period, in \$	GDPPC90	141	4,247.83	7,096.07	97.76	35,490.56
Population density in a country at the beginning of the period, in thousands <sup>86</sup>	DENS90	146	94.56	156.52	1.34	1,125.00
Valid N (listwise)		49				

Table 5.1 shows that the countries included in the sample differ significantly in terms of their emigration rates as well as their stock of human capital. As we can see, the average stock of human capital increased between the two periods, which was expected. Also, we see that in our sample, 32% of countries experience a conflict during the decade preceding 1990 and 31% of countries experienced conflict during the period between 1990 and 2000. The only figure that might be somewhat surprising is that the average emigration rates are lower in the second period, although different trends are generally reported throughout the world. The only explanation is that, as the data on emigration rates cover OECD countries only, the emigration rates are declining to OECD countries and increasing to other parts of the world.

<sup>86</sup> This variable was expressed in thousands, since reporting them as in Beine *et al.* (2006) produces estimates that are not easily readable. All other variables are expressed in the same way as in Beine *et al.* (2006) for comparative purposes.

#### 5.1.4. Results

The summary results of the estimations of three alternative specifications of the baseline model from Equation (5.1), where robust standard errors<sup>87</sup> are in parentheses, are presented in Table 5.2.<sup>88</sup> The first specification (Model 1) is the Beine *et al.* (2006a) model, which is presented by Equation (5.1), only without the two dummy variables on conflict.<sup>89</sup> The second specification (Model 2) introduces a dummy variable on conflict before 1990 into the model, while the third specification (Model 3) also includes a dummy variable on conflict between 1990 and 2000. All the three models are estimated by OLS, for comparative purposes. Alternative estimation strategies are discussed in the next section.

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<sup>87</sup> Robust standard errors are reported because the tests for heteroskedasticity strongly (with very low p-value of the test) suggest that the assumption of the constant variance of residuals is violated in the model used. The results of the Breusch-Pagan/Cook-Weisberg test and White's test for heteroskedasticity, both estimated in STATA, are provided in Appendix 5.1.

<sup>88</sup> Detailed results of the estimation of this model are provided in Appendix 5.1.

<sup>89</sup> Also, without variable on remittances, as this variable reduces the sample size and is not statistically significant in any of the specifications. This was also found in Beine *et al.* (2006), so they also excluded this variable in further reported results of the model.

Table 5.2. OLS estimation results of the baseline model

Dependent variable: Change in the log of stock of human capital in a country between two periods (1990 and 2000)	Model 1	Model 2	Model 3
	OLS	OLS	OLS
Emigration rates at the beginning of the period ( $p_{90}$ )	0.048** (0.02)	0.050** (0.02)	0.050** (0.02)
Initial stock of human capital in a country ( $H_{90}$ )	-0.237*** (0.04)	-0.248*** (0.04)	-0.257*** (0.04)
Population density ( $DENS_{90}$ )	-0.063 (0.14)	-0.064 (0.13)	-0.052 (0.13)
Regional dummy for Latin America (LATD)	0.028 (0.06)	0.029 (0.06)	0.032 (0.07)
Regional dummy for Sub-Saharan Africa (SSAD)	-0.375*** (0.08)	-0.393*** (0.08)	-0.396*** (0.08)
A dummy for countries experiencing conflict before 1990 ( $CDV_{90}$ )		-0.108** (0.05)	-0.083* (0.04)
A dummy for countries experiencing conflict between 1990 and 2000 ( $CDV_{00}$ )			-0.066 (0.05)
Intercept	-0.092 (0.08)	-0.074 (0.07)	-0.093 (0.08)
Number of observations	122	122	122
$R^2$	0.42	0.44	0.44
Overall F-test	9.19	8.05	7.13

\*\*\* statistically significant at 1% level,

\*\* statistically significant at 5% level,

\* statistically significant at 10% level.

The results presented in the Table 5.2 show that the estimated coefficients have the same sign and similar size throughout different specifications. The signs obtained are the same as in Beine *et al.* (2006a) and are expected. Moreover, the estimated values of coefficients do not change considerably between the specifications. The Ramsey RESET test statistic for omitted variables is slightly above the 5% level of statistical significance level in the first model specification and below 1% level in other specifications. These results suggest that a problem of omitted variables might exist in the model estimated. Notwithstanding, the current theory on the incentive effect of brain

drain does not give any suggestion about potential additional explanatory variables that should be included in the model. The checks for variance inflation and correlation do not suggest any significant problem with correlations between regressors included in the model.<sup>90</sup>

Estimated coefficients of the variables used on Beine *et al.* (2006a) have very similar values to the ones reported by Beine *et al.* (2006a) in all model specification, which suggests that the model is robust and not sensitive to the inclusion of our conflict variables. First, the variable capturing the incentive effect, the initial emigration rates of the highly educated from a home country to OECD countries ( $p_{90}$ ) is statistically significant at the 5% level and positive in all models estimated. As interpreted in Beine *et al.* (2006a), this value suggests that doubled migration propensity increases human capital formation in a country by 5%. This clearly suggests that the incentive effect positively influenced the formation of human capital in a country. Second, the initial stock of human capital in a country ( $H_{90}$ ) is statistically significant at the 1% level and negative in all three specifications reported, suggesting convergence in levels of human capital between countries over the period analysed. The population density ( $dens_{90}$ ) does not appear to be statistically significant. A regional dummy for Sub-Saharan Africa reveals relatively lower performance of countries from this region in human capital formation, compared to other regions.

The key variable of the above specifications, the dummy variable on the conflict before 1990 ( $CDV_{90}$ ) in the reported Model 2 specification is statistically significant at standard levels of significance. This suggests that the human capital formation increases at a slower pace in countries that were affected by a conflict compared to the countries with the same emigration rates (the migration probability) that were not affected. The negative sign on the variable suggests that the average increase in the human capital between two periods will be lower for countries that experienced conflict in the period before. Alternatively, in terms of the brain drain, this means that conflict-induced migration of highly educated individuals will have less positive impact on human

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<sup>90</sup> Results of post-estimation tests run after each of the model estimated are provided in Appendices 5.1. to 5.3, after the reported estimation results.

capital formation in a home country in subsequent periods. Thus, the incentive effect of the same size may be expected to have weaker effect in countries that experienced conflict (and produced refugees). On the other hand, the dummy variable on conflict during the period ( $cdv_{00}$ ) is not statistically significant. This result suggests that, although it may be expected, the formation of human capital is not significantly affected by the existence of current conflict in a country.

Still, such a model specification, although measuring the differences between countries that did and those that did not experience conflict in their human capital accumulation (dummy variables for conflict), is not capable to show differences in the size of the incentive effect between these two types of countries, which is the main aim of this analysis. In order to capture these differences, an interaction variable between the incentive effect and the dummy variable for conflict needs to be introduced. This new model specification will be estimated by alternative methods in the following section.

### **5.1.5. Estimation of alternative specifications**

In addition to the baseline model from Equation (5.1), four alternative specifications will be estimated, based on the following arguments. This analysis is based on the second specification of the baseline model (Model 2), as the results in the previous section justify inclusion of such a variable, but not the additional variable included in the Model 3. This specification will be augmented by an additional variable that should capture the differences in the size of the incentive effect between different countries, which is an interaction term between the incentive effect and a dummy variable for conflict in 80s ( $p_{90}CDV_{90}$ ). This model (Model 4) will be estimated by OLS first, in order to see the difference in its results compared to models without this variable (Models 1 to 3). Then, the new model will be estimated by new methods, proposed by both the authors in their subsequent work and by critics of their initial model estimated in the previous section (Schiff, 2005;

Groizard and Llull, 2007). These authors raised several issues related to the model that may affect the internal validity of the estimated results. First, Schiff (2005) argues that the probability of migration is not necessarily exogenous. Immigration policies in developing countries are set based on quotas, rather than on proportions of the highly educated in a country. This means that the increase in human capital will decrease migration probability for all the highly educated individuals remaining in a home country. The solution proposed by Beine *et al.* (2006a) is an instrumental variable approach, where the potential exogenous instruments affecting probability of migration are population size of a country and number of emigrants living in OECD countries at the beginning of the period.<sup>91</sup> The argument for inclusion of the population size of a country is that small countries tend to be more open,<sup>92</sup> which makes this instrument relevant and the size of a country is not expected to affect human capital formation, so the instrument is exogenous. The argument for inclusion of the initial stock of emigrants is that it is expected to be positively correlated with the probability of migration, as a larger migrant stock decreases costs of migration and increases expected wages after migration, but is not expected to affect human capital formation. So, Model 5 to be estimated will be the instrumental variable approach to the estimation of the baseline model presented in Equation (5.1), where the initial population ( $pop_{90}$ ) and number of emigrants living in OECD countries at the beginning of the period ( $MT_{90}$ ) will be used as instruments for the probability of migration. The summary results of this estimation are presented in the second column of the Table 5.3 and detailed results are provided in Appendix 5.5. The reported standard errors are Newey-West heteroskedasticity-robust standard errors, as the tests of heteroskedasticity for all different specifications of the model suggest that the variance of residuals is not constant, therefore the homoskedastic standard errors are not appropriate.

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<sup>91</sup> Also, some other variables were considered as potential instruments, such as life expectancy at birth (capturing general living conditions in a country), the initial level of GDP per capita and a variable for racial tensions (capturing “push” factors<sup>91</sup> of migration), but were discarded because of likely endogeneity of these variables.

<sup>92</sup> Analysis of the Docquier and Marfouk (2006) dataset shows negative correlation between size and migration rates from a country. Also, small countries tend to be more open in terms of other international flows, namely trade and financial.



The argument used by Beine *et al.* (2006a) to justify the instrumental variable approach seems plausible. Still, the estimation methods that address potential endogeneity, such as instrumental variable approach, should not be performed by default, as these estimation methods will produce less efficient estimators than the OLS method if the variable which we believe to be endogenous is actually exogenous (Wooldridge, 2003: 483). Therefore, before using this method we need to test for endogeneity of the variable. The method proposed by Davidson and McKinnon (1993), known as the Durbin-Wu-Hausman test, is to include residuals from the first-stage model as a regressor in the second-stage model. If the estimated coefficient of the residual is statistically significant, then the OLS estimates are not consistent and the use of the instrumental variable approach is justified. The estimated coefficient in this case is statistically significant at 1% level of significance,<sup>93</sup> which suggests that the regressors are endogenous and that the instrumental variable approach should be used.

Moreover, the instruments used in the estimation are valid only if two conditions are met. First is instrument relevance, meaning that the variable used as an instrument should be correlated with the endogenous variable from the original model; and, second is instrument exogeneity, meaning that an instrument is not correlated with the error term of the original model. If an instrument is not relevant, then the estimated coefficients will be even more biased than those estimated by OLS (Baum *et al.*, 2007: 20). A more recent literature (Stock and Yogo, 2005) argues that even when instruments are correlated with the endogenous variable, the instrumental variable estimation will perform poorly. Consequently, in order to confirm relevance of the instruments used in this analysis, both tests for under-identification and weak identification are performed.<sup>94</sup> The computed value of the F-test is 28.09, which is above the “rule of thumb” value of 10,<sup>95</sup> suggesting that neither under-identification nor weak identification of instrument is a problem at any standard

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<sup>93</sup> Actually, the computed *p-value* of the test statistics is very close to 0. The detailed results of this diagnostic test are provided in Appendix 5.5.

<sup>94</sup> Detailed results of these tests are presented in Appendix 5.5.

<sup>95</sup> Angrist and Pischke (2009) proved that even the value of F-statistics that is well below 10 can be acceptable in the case of multiple instruments and developed an alternative first-stage F-test for such situations.

level of significance.<sup>96</sup> The test of instrument exogeneity is also performed. The computed p-value of the Wooldridge robust test score statistic suggests that the instruments are uncorrelated with the error term. This means that the second condition for a valid instrument is met: the instruments used in the model are not correlated with the error term of the original regression.

Second issue that may affect the internal validity of the estimated results is that it may be expected that the incentive effect is not homogenous across countries. Beine *et al.* (2006a) suspect that the impact of the migration prospects on human capital formation may be different in countries with low levels compared to countries high levels of income. As the migration prospects raise expected returns to education, the difference between these returns without and with migration and thus the incentive effect, is expected to be stronger in poorer countries. For that reason, Beine *et al.* (2006a) introduced an interactive term between the emigration rate and a dummy variable for countries with GNI below certain poverty level, where three different thresholds were used. Although their empirical results did not reveal any statistical significance of this interactive variable, this argument may be used for inclusion of an interaction term between the severity of conflict and the poverty level dummy variable<sup>97</sup> ( $CDV_{90}GNID_{90}$ ) into Model 6, as the impact of the conflict on human capital formation may be non-linear across countries at different levels of income.

Third, the simplified theoretical model sets the migration prospects of low educated individuals to zero. This presumes that the mechanism set out in the theoretical model is based on absolute migration propensity. However, in reality, it is more likely that relative migration prospects affect human capital formation. Consequently, if the assumption of no migration of low educated is relaxed then low educated migration rates should be included in the empirical model. The solution

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<sup>96</sup> Actually, the *p-value* of this test is 0.000.

<sup>97</sup> Beine *et al.* used different thresholds for this dummy variable, such as \$500, \$700 and \$900, but the result remain the same. So, in this study, the threshold of \$500 was chosen, This means that a dummy variable for poverty ( $GNID_{90}$ ) takes value of 1 if a country has GNI per capita above \$500.

proposed in Beine *et al.* (2009) is the ratio of highly educated over low educated emigration rates at the beginning of the period ( $ps_{90}pu_{90}$ ). So, Model 7 is Model 4 augmented by the variable  $ps_{90}pu_{90}$ .

Besides the above mentioned critiques, which were taken into account in subsequent analysis and different estimation of the model presented in the following text, the Groizard and Llull (2007) critique of the Beine *et al.* (2006a) model was also analysed, but not chosen as one of our possible alternative estimation methods. Groizard and Llull (2007) reestimated Beine *et al.* (2006a) model by excluding the initial human capital level and found that the incentive effect disappears when this variable is excluded. Their explanation is that the positive effect of emigration rates found in Beine *et al.* (2006a) is a result of the bias introduced by inclusion of the initial level of human capital, which is an endogenous variable resulting from possible reverse causal effect of the emigration rates on the stock of human capital, expressed as proportion of highly educated people in the total population. We disagree with such an argument, as a growth model without a variable on initial level of dependent variable suffers from significant omitted variable bias and such results cannot be considered reliable.

The summary results of the three alternative specifications (Models 4 to 7) are presented in the Table 5.3.<sup>98</sup>

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<sup>98</sup> The STATA outputs of the model estimations and post-estimation tests for the models 4 to 7 are presented in Appendices 5.4 to 5.7.

Table 5.3. Alternative models: estimation results

Dependent variable: Change in the log of stock of human capital in a country between two periods (1990 and 2000)	Model 4	Model 5	Model 6	Model 7
	OLS	IV (2SLSL)	OLS	OLS
Log of emigration rates at the beginning of the period ( $lnp_{90}$ )	0.054** (0.025)	0.203*** (0.054)	0.057** (0.024)	0.042 (0.028)
Log of initial stock of human capital in a country ( $lnh_{90}$ )	-0.247 (0.037)	-0.255*** (0.033)	-0.283*** (0.040)	-0.222*** (0.040)
Population density ( $DENS_{90}$ )	-0.069 (0.132)	-0.088 (0.199)	-0.017 (0.127)	-0.053 (0.115)
Regional dummy for Latin America (LATD)	0.028 (0.063)	-0.099 (0.101)	0.051 (0.067)	0.040 (0.063)
Regional dummy for Sub-Saharan Africa (SSAD)	-0.391*** (0.083)	-0.337*** (0.080)	-0.348*** (0.076)	-0.340*** (0.078)
A dummy for countries experiencing conflict in 1980s ( $CDV_{90}$ )	-0.148 (0.093)	-0.512*** (0.171)	-0.071 (0.100)	-0.092 (0.090)
Interaction term between $p_{90}$ and $CDV_{90}$ ( $p_{90}CDV_{90}$ )	-0.017 (0.034)	-0.166** (0.068)	-0.014 (0.033)	-0.005 (0.038)
A dummy for poor countries ( $GNID_{90}$ )			0.226** (0.088)	
Interaction between conflict in 1980s and a dummy for poverty ( $CDV_{90}GNID_{90}$ )			-0.073 (0.093)	
Ratio between highly and low educated emigration rates ( $ps_{90}pu_{90}$ )				0.001 (0.001)
Intercept	-0.064 (0.077)	0.149*** (0.11)	-0.362*** (0.132)	-0.072 (0.089)
Number of observations		122	122	111
$R^2$	0.44	0.24 <sup>99</sup>	0.49	0.42
Overall F-test	6.96		6.78	6.51
Test of linear combination of variables $lnp_{90}$ and $p_{90}CDV_{90}$		0.037 (0.023)		

\*\*\* statistically significant at 1% level,

\*\* statistically significant at 5% level,

\* statistically significant at 10% level.

<sup>99</sup> Measure of fit reported for the estimation of Model 5 (instrumental variable regression) in the Table 5.3. is uncentered  $R^2$ .

The results for the variables which appear in the baseline and alternative specifications are consistent over the specifications. The signs and statistical significance of the coefficients remain the same, while their size changes slightly. The most significant change on the coefficients of key variables is when the instrumental approach is used instead of OLS. As the above mentioned results of diagnostic test have shown, the OLS method is not appropriate and instrumental approach should be used, a migration probability is an endogenous variable. Therefore, the following interpretation of the results and conclusions will primarily rely on the coefficients estimated by the instrumental variable method. The results suggest that the use of inappropriate method actually underestimates the impact of the incentive effect of voluntary migration and suggest that doubling migration propensity increases the stock of human capital by 5%, while the more appropriate instrumental approach suggests it will increase by 20%.

The coefficient of the variable on conflict ( $CDV_{90}$ ) is significant and negative in the alternative specifications, as they were in the baseline model (Table 5.2). But, it has to be noted when interpreting this coefficient that it, once the interaction term is included, represents the omitted category from the interaction term. In this case, coefficient of the variable  $lnp_{90}$  measures the incentive effect for countries that were not in conflict,<sup>100</sup> while the interaction term shows the difference in the size of that effect between two groups of countries. The size of the coefficient for  $lnp_{90}$  variable is considerably larger compared to the model where the interaction term is not included, while the sign of the interaction term is negative. The results, presented in the table 5.2., suggest that, once the interaction term that controls for the differences between countries in terms of their recent history of conflict on their territory is included, the size of the incentive effect in countries that did not experience conflict in recent history (and record voluntary emigration flows) is considerably larger than if we approximate this effect across different countries. When the coefficient is estimated as an average for different countries, the impact of migration prospects on

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<sup>100</sup> Dummy variable for conflict ( $CDV_{90}$ ) takes value of 1 if country was in conflict, therefore the omitted category (value of 0) is that country was not in conflict.

human capital formation in a country is estimated to be around 5%. The estimated coefficient for the interaction term on the other hand, that controls for the differences in the incentive effect between the two types of countries, shows that the difference is negative, *i.e.* countries that were in conflict have a substantially lower incentive effect. The estimated coefficient for the interaction term is -0.16. As the interaction term measures the difference in the effect between the two groups of countries, then the actual measured value of the incentive effect for countries that were previously in conflict is 0.04. This means that doubling migration prospects in countries that did not experience conflict in previous decade will increase the stock of human capital by 20%, but by only 4% in countries that experienced conflict in previous decade. When we further estimate the linear combination of the two estimators ( $p_{90}$  and  $p_{90}CDV_{90}$ ), we can see that the effect is not statistically significant at standard levels of significance.<sup>101</sup> This suggests that, although the incentive effect average across the countries is positive and statistically significant, it actually exists for countries that were not in conflict (and is much larger than when averaged), but for countries that were in conflict the incentive effect it actually does not exist at all. This is expected result according to the predictions made in the theoretical discussion of the model developed for voluntary migration and its appropriateness in the context of ethnic cleansing, which was provided in Chapter 3.

The interaction term between variables on conflict and poverty included in the Model 5 does not appear as statistically significant, suggesting that the impact of conflict on human capital formation does not differ considerably between poor and rich countries. The coefficients of the incentive effect variable ( $p_{90}$ ) and initial human capital stock variable ( $H_{90}$ ) are statistically significant and have the same sign across all different model specifications. The variable controlling for the emigration of low educated ( $ps_{90}pu_{90}$ ) included in the Model 6 is also not statistically significant. This means that the migration of low educated individuals does not have a significant effect on the formation of human capital in a home country.

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<sup>101</sup> Result of the test of linear combination of estimators  $p_{90}$  and  $p_{90}CDV_{90}$  (lincom command in STATA) is presented in Table 5.3.

The issue of possible omitted variable bias should be acknowledged here. Some of the variables that should have been included in the models above in order to avoid this bias are remittances and government policies regarding education investments. Unfortunately, data availability did not allow the inclusion of these variables. However, the results reported can still be considered robust for two reasons. First, the coefficient of the variable for remittances was not significant in previous empirical studies (*e.g.* Beine *et al.*, 2006) and therefore the non-inclusion of that variable should not cause omitted variable bias in the model. Second, although the estimated effect can be considered as a composite effect, there is no reason to expect differences in the effect of remittances or increased educational investments by governments between countries that did and the ones that did not experience conflict. Therefore, the estimated difference in the effect of interaction term between migration probability and history of conflict ( $p_{90}CDV_{90}$ ) can still be attributed to the difference of the impact of incentive effect.

## **5.2. The remittances effect**

### **5.2.1. Description of the effect**

The findings from the macro level empirical analysis of the incentive effect suggest that the impact of migration on human capital formation in countries that were previously in conflict is positive but weaker than in countries that did not experience a conflict. This confirms the hypothesis of the incentive effect of migration, where migration prospects influence increase in educational investments by individuals who intend to migrate, but only in countries that were not previously in conflict or, in other words, which experience voluntary migration. However, in the case of the countries that experienced conflict and forced migration, this effect does not exist. The

theory of brain gain suggests that remittances and return migration can also have a positive impact on the human capital formation. But, the results from the macro level models, such as the one estimated above, fail to find any significant impact of remittances and return migration<sup>102</sup> on human capital formation. But, for more subtle analysis of the brain gain argument, it was decided to perform additional micro level analysis by using evidence from a country that experienced ethnic cleansing recently, in addition to the cross-country evidence of the incentive effect presented in the previous section. As micro level data on return migration are not available and extremely difficult to collect, it was decided to conduct the analysis of the effect of the receipt of remittances on households' education investment behaviour and to leave the analysis of the return migration for a post-doctoral research project.

Remittances are considered as one of the arguments that emigration of highly skilled individuals might have a net positive impact on human capital formation in a home country.<sup>103</sup> The possibility that remittances positively influence households' educational investment decisions are based on the idea of a relaxed liquidity constraint<sup>104</sup> and reduced children's labour participation in the remittances receiving household (*e.g.* Amuedo-Dorantes and Pozo, 2006: 4). This, in turn, induces investment in children's education leading to a positive relationship between remittances and children's educational attainment and a negative relationship between remittances and child labour supply. But as remittances are inseparable from migration processes, a potential countervailing effect that has to be taken into account is the effect of parental absence via the disruption of family life, which may subsequently negatively influence the educational attainment of children (*e.g.* Hanson and Woodruff, 2003; Rapoport and Docquier, 2005; Amuedo-Dorantes *et al.*, 2008). Moreover, Miluka and Dabalen (2007) and Amuedo-Dorantes *et al.* (2008) point out the possibility

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<sup>102</sup> The variable on remittances per capita received by a country, which should capture both the impact of remittances and return migration, appears to be statistically insignificant in all model specifications.

<sup>103</sup> Other channels include incentive effect of migration prospects and the effect of diaspora and return migrants.

<sup>104</sup> The liquidity constraint does not exist at all levels of income. For this reason, income deciles were introduced into the model, in order to control for the existence of the liquidity constraint. The inclusion of the variables is explained in detail later.



of a substitution effect. According to this argument, households with migrant networks have a higher probability of emigration. If these households expect higher earnings abroad, they face a higher opportunity cost of schooling due to the effect of forgone earnings. Thus, they may decide to emigrate and hence not to invest in education or invest less in education. But, this argument is in contradiction with the arguments of the brain gain literature (Beine *et al.*, 2001, 2006a) presented earlier, which argues that migration prospects increase educational investments. Moreover, new models of migration argue that the individual migration decision is made by calculating life-long benefits of migration and that migrants acquire education where it's cheaper and employ it where it brings higher returns. Consequently, the positive rather than the negative impact of migration on educational attainment among migrant households should be expected. Therefore, describing this effect as the “network effect” may be more appropriate.

In order to analyze the impact of remittances receipt on human capital formation in a home country, two different dependent variables will be used in the subsequent empirical analysis. The first is a dichotomous variable indicating whether a child is enrolled in school.<sup>105</sup> The model with this variable should reveal the sign and size of the impact of remittances receipt on a child's enrolment. But, along with this and as a new empirical contribution to the topic, another variable will be used. It will be household's investment in a child's education. This should directly measure change in the educational investments as a results of remittances receipt. As the educational investments by a household depends on whether a household self-selects itself into the one sending children to school or not, the results from the probit model with a child' enrolment as a dependent variable shall be used as a first stage results of the Heckman's two-stage procedure in the model with educational investments as a dependent variable.

With an aim to capture the impact of the three hypothesized determinants, different independent variables shall be included into the model. As discussed in Chapter 3, the three

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<sup>105</sup> This is most widely used dependent variable in previous studies. The summary table of previous studies is presented in Appendix 5.9.

hypothesized influences of remittances on households' educational investments decision - relaxation of liquidity constraints, disruption effects and network effects - may differ between households according to their characteristics related to remittances receipts and parental absence. To assess the effect of relaxing liquidity constraints,<sup>106</sup> it is necessary to take into account that, in households with absent member, remittances are not an exogenous addition to income, but the alternative source of household income to the situation when the absent member would stay within a household and earn a wage. Accordingly, absence of a member in a household which does not receive remittances may be considered as an income loss. Alternatively, there is evidence<sup>107</sup> that many households in Bosnia-Herzegovina receive remittances from relatives, which thus may be considered as an exogenous source of income. Therefore, besides accounting for receipt of remittances, the distinction between households which do and those which do not have absent members is necessary. To this end, counterfactual income for households that have absent members, compared to households without migrants, should be estimated. The receipt of remittances is income gain for households; the estimated counterfactual income for households with migrant members is income loss and the difference between the two for households with migrants receiving remittances is the net effect of migration and remittances on a household's income. To investigate the network effect, we will include a dummy variable for parental absence as an additional explanatory variable. For the network effect, an interaction variable between remittance receipt and absence of a parent will be included in the model. This is based on the assumption that children from households with migrants are more likely to migrate in the future (network effect) and that remittances may be used to finance migration, instead of education. Thus, the interaction term between these two is expected to capture this effect.

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<sup>106</sup> Liquidity constraint on the context of remittances should be interpreted as inability of households to borrow and to invest in productive activities, such as education, due to a lack of financial resources.

<sup>107</sup> The evidence is supported by the data collected through the survey. It is also supported by the idea that conflict-induced migration differs from voluntary migration in the sense that it is predominantly migration of entire families, instead of one or two members. This also affects the amount of remittances sent, as interfamily links are expected to be weaker than intrafamily links.

### **5.2.2. Background: Remittances and education in Bosnia-Herzegovina**

The purpose of this section is to introduce us to the empirical analysis, by providing brief background information about remittances and education in Bosnia-Herzegovina. The background on remittances will be the analysis conducted as a part of this thesis based on the LSMS data, as there were no such analyses done before this thesis. Such a brief background analysis, although focused on the key issues that are relevant for this thesis and without intention to provide a comprehensive overview of the situation in Bosnia-Herzegovina, still can be considered as a contribution to a better understanding of the remittances and their impact on the economic development of the country. Background information on education in Bosnia-Herzegovina will be based on previously published work.

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 more than 2 billion EUR, which is 20% of Bosnian GDP.<sup>108</sup> Moreover, remittances represent the most significant inflow to BiH, as they are six times larger than FDI and three times than development assistance to this country. It is also important to emphasize that the amount of remittance inflows is increasing each year since the end of war. These remittance inflows are a significant source of income for a large proportion of the BiH population. The data from the Living in BiH 2004 survey, used here for the purpose of the analysis of the impact of remittances on poverty and inequality, show that approximately 33% of households in Bosnia-Herzegovina receive remittances. The average value of remittances received is about 100 KM per month.

As yet there has been no analysis of the impact of remittances on poverty and inequality in Bosnia-Herzegovina. So, the figures presented below are the first attempt to shed more light on this issue, although a more comprehensive analysis of this relationship is necessary.

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<sup>108</sup> 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 a majority of these remittances are sent as cash transfers through informal channels.

*Table 5.4. Recipients of remittances by category*

<i>Criteria</i>	<i>Number of recipients (% of the sample)</i>	<i>Average amount received (KM)</i>
<i>All</i>	<i>33.50</i>	<i>100.54</i>
<i>Poor</i>	<i>28.32</i>	<i>52.98</i>
<i>Non-poor</i>	<i>34.32</i>	<i>105.98</i>
<i>Primary education</i>	<i>32.34</i>	<i>83.27</i>
<i>Secondary education</i>	<i>30.48</i>	<i>105.93</i>
<i>Tertiary education</i>	<i>26.03</i>	<i>104.92</i>
<i>Rural</i>	<i>36.40</i>	<i>112.24</i>
<i>Other urban</i>	<i>32.37</i>	<i>86.85</i>
<i>Capital</i>	<i>31.87</i>	<i>105.22</i>
<i>Fhh</i>	<i>44.74</i>	<i>98.39</i>
<i>Mhh</i>	<i>29.61</i>	<i>101.69</i>

Source: Own calculations based on the LSMS survey

According to the above figures, the remittances sent to Bosnia-Herzegovina are not pro-poor. A larger proportion of non-poor households receives remittances. Moreover, the average amount received is twice larger than the amount received by poor households. Still, a larger proportion of households with a low educated head receives remittances, albeit a slightly lower average amount compared to highly educated. Also, a significantly larger number of female headed households receive remittances than do male headed households. Households in rural areas receive more remittances, both in terms of the proportion of households that receive them and in terms of the average amount, than do households in urban areas. This suggests that remittances, although not contributing to poverty reduction overall, may be expected to have a positive impact on reducing differences in poverty incidence between rural and urban areas.

*Table 5.5. Recipients of remittances by decile*

<i>Criteria</i>	<i>Decile</i>										<i>Average</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	
<i>Number of recipients (%)</i>	27.4	33.6	30.8	35.2	37.6	36.6	38.2	34.0	35.4	26.3	33.5
<i>Average amount received (KM)</i>	51.7	74.6	62.6	103.5	83.0	106.7	107.3	107.2	140.5	169.6	100.5

Source: Own calculations

It can be seen from the table that remittances do not contribute to decrease in inequality, as the average amount of remittances tends to increase from the poorest to the richest decile. Also, the proportion of household receiving remittances in each decile, with the exception of the richest quintile, increases as we move from poorer to richer decile. These results are important for the argument that remittances influence educational investments only of households that fall into a specific income decile, which will be explained in detail later.

Different reports on the educational reforms in Bosnia-Herzegovina state that before the war, Bosnia-Herzegovina had had a relatively developed educational system, compared to other countries in the region. At primary and secondary school, about 27,000 teachers were employed in 2,235 schools in which around half a million students were enrolled. At the tertiary level, about 1,600 university teachers in 4 universities were employed to teach about 30,000 students (Rakotomanana and Yeager, 1996). During the three-year war, this situation has changed dramatically. More than 80% of schools were destroyed or damaged, while a very large proportion of teaching staff from all education levels emigrated. According to Uvalic (2005: 32), 81% of holders of Masters Degree and 75% of holders of a PhD Degree emigrated from BiH during the war.

The main characteristics of the educational system in Bosnia-Herzegovina today are a reluctance<sup>109</sup> to reform the inherited educational system from ex-Yugoslavia and the burden that the political organisation of the country puts on the educational system. According to the Dayton Peace Agreement, Bosnia-Herzegovina is a country organized in two entities, Federation of BiH (FBiH) and Republika Srpska (RS), where Federation of BiH is comprised of ten cantons. Education in RS is organised and controlled at the entity level, whereas in FBiH most education issues are regulated at the canton level. The lack of coordination between cantons and entities make any attempt of reform tremendously difficult.

Inheritance of the Yugoslav system, with highly subsidized education at all levels, but without appropriate reforms in terms of adjustments to the new structure of the economy and labour market needs, along with the lack of coordination between different levels of authority, result in significant mismatch between the skills produced by such an education system and those required by the labour market. The phenomena of “educated unemployment” and “overeducated” individuals (Fan and Stark, 2007), as reported in the Labour Market Surveys, seem to be widespread.

The structure of the education system in Bosnia-Herzegovina is as follows. The age of first enrolment is 6 years. Primary school lasts for 9 years and attendance is compulsory. Secondary school lasts for either 3 (technical schools) or 4 years (general schools) and the age of entry is 15. The University level education has four levels. The first level lasts 2-3 years and a graduate receives a “diploma of higher education” and a professional title (*e.g.* engineer, economist). At the second level, which lasts for 4-6 years, graduates receive a “diploma of high education” and a professional title (*e.g.* graduated engineer, graduated economist, *etc.*). At the third level, graduates receive an MA degree, while at the fourth level they receive a PhD degree.

In a country in which no Census has been conducted for the past 18 years, it is extremely difficult to obtain any relevant data on the literacy rates and education structure of the population.

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<sup>109</sup> For example, EU reports on the progress in implementation of the Bologna process as well as other reports provide information on the lack of commitment and efforts of Bosnian government to reform and improve the effectiveness of the country’s educational system.

According to the Census in 1991 (the last one conducted in Bosnia-Herzegovina), about 10% of the population were illiterate. Small-scale household surveys conducted in the meantime suggest that this rate has declined to about 5%. Also, these surveys suggest that about 9% of the population are without education, more than 30% with primary education only, about 50% with secondary education and 8% with higher education. The net enrolment rate in primary school is about 97%, in secondary school about 75% and in higher education about 20%. Around 55% of students enrolled in secondary schools graduate on time.

According to the BiH Agency of Statistics, the situation with the number of schools, student and teachers is as presented in the table below.

*Table 5.6. Official statistics about different levels of education, 2009*

<i>Education level</i>	<i>Number of schools</i>	<i>Number of students</i>	<i>Number of teachers</i>	<i>Student/teacher Ratio</i>
<i>Primary</i>	<i>1,920</i>	<i>350,206</i>	<i>24,360</i>	<i>14.37</i>
<i>Secondary</i>	<i>310</i>	<i>146,914</i>	<i>11,660</i>	<i>12.60</i>
<i>Tertiary</i>	<i>43</i>	<i>109,579</i>	<i>8,391</i>	<i>13.06</i>

*Source: BiH Agency of Statistics: Education Statistics, 2010*

Child labour is relatively uncommon in Bosnia-Herzegovina,<sup>110</sup> so the drop-out rates are generally very low for children of primary school age (6 to 15 years old), compared to some other countries in which empirical evidence on the remittances effect has been investigated (*e.g.* El Salvador, Colombia and Mexico). Therefore, the focus of this study will be on the educational attainment of young people of age 16 to 24. This age span encompasses young people of secondary and tertiary education where alternatives such as labour market participation are present and where drop-out rates are much more significant compared to primary education. According to the above, the focus of the study is educational attainment of young people of age 16 to 24.

<sup>110</sup> UNICEF, Child Labour Statistics 1999-2008.

### 5.2.3. Data

The analysis of the impact of migration on the educational attainment of children in Bosnia-Herzegovina can be conducted by using two alternative datasets. The first dataset is the publicly available dataset from *Living in BiH* (LBiH), conducted by the BiH Office of Statistics in three waves between 2002 and 2004. The second data set is from a survey conducted by the author in December 2008 in Bosnia-Herzegovina (ASO Survey). The two datasets each have their own advantages and disadvantages, thus the relationship between remittances and educational attainment will be tested on both datasets. The main characteristics and differences between the two datasets are explained below.

#### *Living in BiH Survey (LBiH)*

The *Living Standards Measurement Survey* (LSMS) was conducted by the World Bank and the BiH Agency of Statistics in 2001. Around 5,000 households were interviewed. After, the BiH Agency of Statistics decided to conduct three waves of the survey, in 2002-2004, based on the LSMS methodology and among 3,000 out of the original sample of 5000 households, in order to collect panel data. The survey was called the *Living in BiH* (LBiH) survey. Although it was based on the LSMS, the list of questions was different. For example, the LBiH survey, compared to LSMS, included questions on the receipt of remittances that is particularly important for this study. However, it did not include questions on the absence of household members, which was available in the LSMS. Besides this, comparison of the three waves of LBiH survey reveals that only the survey conducted in 2004 contains information about the educational expenditures of a household; thus this was chosen as the most appropriate one for this study.

The original sample of this survey was 2,837 households, or 7,409 individuals, including 3,080 individuals younger than 25. The number of school age (age 6 to 24) individuals was 2,317,



whereas the number of individuals of age 16-24 is 1,250. Additionally, this sample was slightly reduced by excluding observations with missing information about the child's enrolment. Thus, the final dataset used for the model estimation contains 1,187 observations.

The survey does not contain some important information relevant to this study, such as parental absence, which is necessary for testing the model where we separate the impact of remittances receipt from the impact of migration of parents. Therefore, a small scale survey was conducted by the author in order to collect a more comprehensive dataset for this study.

### *ASO Survey*

The small scale survey, funded by the Austrian Science and Research Liaison Office (ASO), was conducted by the author in order to collect additional information about households' characteristics and their remittances and education behaviour, which were not available in the LBiH dataset and to make possible testing some of the hypotheses stated above. The funds available were sufficient for interviewing up to 400 households in BiH, which is significantly less than the LBiH survey.

As mentioned above, there has not been any census in Bosnia-Herzegovina since 1991. In the meantime, a large displacement of people took place during the war in this country. Consequently, the information from this Census was considered to be inappropriate to prepare the sample for this survey. Therefore, at stage 1 of the sampling procedure, the World Bank LSMS sampling technique was used (BHAS, 2001). The selection of municipalities was made by using the stratification of municipalities used in the LSMS (and LBiH) survey, for which 25 were chosen from 146 Bosnian municipalities. Then, in the second stage of the sampling procedure, the number of households surveyed in each municipality was counted on the basis of the LSMS survey.<sup>111</sup> Households within municipalities were then chosen randomly, by dividing a municipality into

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<sup>111</sup> As the LSMS survey was conducted among 5,000 households and the ASO survey among 400 households, the number of households in each municipality was then calculated as the ratio 400/5,000 multiplied by the number of households from the LSMS survey.

several survey zones and choosing every fifth household unit, starting from the centre of the zone.<sup>112</sup> In the case that a head of household was not present at the moment of interviewing, or a household refused to participate in the interview, the interviewers were instructed to choose the next households in the street. Before interviewing, all the interviewers were provided with training and given detailed written instructions about the interviewing process and how to collect answers to each question. In order to make the control of interviewers' work possible, for each day of interviewing they had to fill in and submit the report with addresses and house numbers of each household interviewed.

The ASO survey provides demographic information both on the head of the household and other household members.<sup>113</sup> Furthermore, information on the socio-economic status of the household is also provided. One section of the survey is dedicated to children's schooling and work; and another section to migration networks, relationships with the migrants and remittances.

The most important questions in the survey, from the point of view of the analysis, were related to children's schooling, migration and remittances. Among the questions on children's schooling, the survey asks whether they are currently attending school, what their success at school is and whether they are working. The set of questions on migration and remittances ask whether the household has members living abroad and whether the household has had members abroad who have now returned. For each household member with migration experience, information is provided on their age at emigration, duration of migration and educational level. Additionally, households were asked about their relationship with the migrant in terms of the frequency of communication. The questions on remittances focus on the amount of remittances received on a monthly basis and whether the migrants impose any specific expenditure pattern of remittances on the recipient households.

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<sup>112</sup> In the case that the household head was not in a household, or did not accept participation in the survey, interviewers were instructed to choose the next household unit. As the survey was conducted during working days, this caused a slight bias towards households of elderly couples. Although many of these households reported receipt of remittances, in the end they were excluded from the analysis for not having school age children within the household.

<sup>113</sup> The questionnaire used in this survey is provided in Appendix 5.10.

Out of 400 households interviewed, only 198 households<sup>114</sup> reported having children aged 6-24 in the household, which was 285 children in total. According to the above explained motivation for the analysis of the educational attainment of post-compulsory school age children, the initial sample was restricted to young people<sup>115</sup> of age 16 to 24. Thus, in the end there were 161 observations, which were used for model estimation. Previous studies (*e.g.* Hanson and Woodruff, 2003; Miluka and Dabalén, 2007; Amuedo-Dorantes *et al.*, 2008) have focused primarily on children of primary and secondary education. As the main focus of this thesis is the analysis of the possible positive influences of remittances on human capital formation in a home country, which might offset the negative impact of emigration of highly educated individuals, this study also analyzes the impact of remittances on the educational attainment of young people of tertiary education age. In order to control for the differential impact of certain explanatory variables on two different levels of education (secondary and tertiary) the sample is divided into two groups by using a dummy variable for education level, while interaction variables between the educational level dummy variable and other explanatory variables will control for the differential impact of these variables on young people attending secondary school and those attending a university. This is necessary, because - for example - compared to the secondary education level the cost of education is much higher for tertiary education, as students have to pay tuition fees in addition to the other operational costs. Moreover, as universities are located mainly in the capital city, this implies that they have to incur transportation costs or even one-off or continuous relocation costs.

The list of variables used for the empirical analysis of the relationship between remittances and education available in the two different dataset and their descriptive statistics, are presented in the table 5.7. The names of variables starting with letter *c* indicate child level information, while

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<sup>114</sup> As explained above, this may be due to the fact that the ASO survey was conducted during weekdays. An additional interesting fact was that many of the excluded households, particularly households consisting of elderly couples, reported remittances receipt, which suggests that many remittances are sent to BiH from children to their parents, probably for altruistic reasons. More detailed study on the motives of remittances is needed before drawing any conclusion. But such a study is beyond the scope and main focus of this thesis.

<sup>115</sup> For students of age 16-24, the term “young people” was used in this thesis as more appropriate than “children”.

those starting with *h* indicate household level information. The letter *x* at the end of the variable's name indicated that the variable is expressed as an amount, instead of being dichotomous.

*Table 5.7. Summary descriptive statistics of variables*

<i>Variable description</i>	<i>Variable name</i>	<i>ASO Survey</i>			<i>LBiH Survey</i>		
		<i>N</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev.</i>
= 1 if child currently enrolled in education	<i>cenr</i>	160	0.56		1187	0.44	
The amount of household's education expenditure per child, in KM	<i>heepcx</i>	98	95.00	96.58	1186	149.28	455.55
Age of child	<i>cage</i>	161	20.09	2.37	1187	20.17	2.58
=1 if child is male	<i>cmale</i>	161	0.41		1184	0.50	
=1 if first born child*	<i>cfb</i>	160	0.69	0.46			
= 1 if an individual is of tertiary school age	<i>ctedu</i>				1187	0.69	0.46
=1 if household owns a business	<i>hbuss</i>	161	0.17	0.37	1186	0.01	0.11
=1 if female headed households	<i>hfh</i>	161	0.06	0.24	1127	0.18	0.38
=1 if the household head perceives the economic situation of the household will improve next year, 0 otherwise	<i>hfin1b</i>	158	0.39	0.49	1178	0.35	0.48
=1 if the household head perceives the economic situation of the household will worsen next year, 0 otherwise	<i>hfin1w</i>	158	0.29	0.46	1178	0.13	0.34
Employment status of a household's head, 1 if employed	<i>hhemp</i>	161	0.91	0.28	1186	0.65	0.47
If household owns a house	<i>hhouse</i>	161	0.96	0.20			
Number of household members within a household	<i>hhsz</i>	161	3.81	0.82	1187	4.23	1.44
Household income per capita, in KM	<i>hincpc</i>	161	323.33	286.26	1109	176.73	139.78
= 1 if mother has higher education degree*	<i>hmedu</i>	161	0.24	0.43			
Number of children in the household	<i>hnoc</i>	161	1.70	0.81	1187	2.22	1.06
Number of school age individuals in the household	<i>hnoc624</i>	161	1.73	0.65	1187	1.97	0.94
Number of primary school age individuals in the household	<i>hnoc615</i>	161	0.22	0.44	1187	0.34	0.63
Number of secondary school age individuals in the household	<i>hnoc1618</i>	161	0.46	0.59	1187	0.49	0.59
Number of tertiary school age individuals in the household	<i>hnoc1924</i>	161	1.05	0.67	1187	1.13	0.76
= 1 if parent is a migrant (absent)*	<i>hpa</i>	161	0.07	0.25			
=1 if a household receives remittances	<i>hrem</i>	161	0.13	0.34	1187	0.09	0.29
= 1 if household lives in urban area, 0 otherwise*	<i>hurb</i>	161	0.74	0.44			
= 1 if an individual is of school age, but lives in its own household	<i>ncsa</i>	161	0.11	0.31	1187	0.16	0.37

\* Not available in the LBiH dataset

Source: Own calculations from the two datasets used in this empirical study

The proportion of households reporting receipt of remittances, in the entire dataset, was 16.25% in the ASO dataset and 15.43% in the LBiH dataset. What is usually being underreported, as suggested in previous studies, is the amount of remittances. In the ASO dataset, the average amount of remittances received is EUR109.85, whereas in the LBiH dataset is EUR464.48. A possible explanation for such a large difference between the two datasets may be in the low response rate to this question, where less than 10% of households in each dataset reported this amount.

Out of remittances receiving households from the ASO dataset,<sup>116</sup> 50% of them are from migrant households and the other 50% is from non-migrant households.<sup>117</sup> Although it may be expected that households with migrants should be represented in a larger proportion, as remittances are particularly sent by migrants to their household's members at home, this is not surprising. The previous study in this thesis has revealed that conflict-induced migration is characterised by migration of entire families, which then send remittances to their relatives, rather than individuals who migrate for economic reasons and send remittances back to their family members. As a share of income, average education investment by a household is 11%.

#### **5.2.4. Empirical approach**

The theoretical setting requires adoption of a strategy that controls for the presence of different combinations of migration influences for different types of households, as presented in the table in Chapter 3. In order to distinguish between households which receive remittances from an absent parent (and thus experience the net effect of remittances plus disruption) and those who receive remittances from relatives (and thus experience income gain without disruption), a dummy

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<sup>116</sup> Cross-tabulation results where the migration of parent variable is used, is reported for ASO survey data only, as there is no such information in the LBiH survey data.

<sup>117</sup> The same high proportion of non-migrant remittance receiving households was found in Amuedo-Dorantes and Pozo (2006), in the case of Dominican Republic.

variable for absence of a parent will be included in the empirical model.<sup>118</sup> Here, we can assume that households receive remittances from an absent member; even if they might have an absent member and receive remittances from others, it does not make any difference in the expected effects of remittances on relaxation of the liquidity constraint.<sup>119</sup> In addition to this, some authors suggest that the remittances are not an exogenous addition to income, but the counterfactual income should be calculated in order to properly estimate the difference in the income effect between different types of households. The counterfactual income estimation should reveal how much remittance non-receivers lose by having an absent member as well as how much do remittances received overcome the losses in income by an absent member in remittance receiving households. Unfortunately, this is not possible, as the information about migrants' demographic characteristics and earnings, which would enable comparison with non-migrants, are not available in the datasets used. Finally, the interaction term between remittance receipt and parental absence will be introduced in order to control for the network effect on education.

The main argument of the brain gain literature about the positive impact of remittances receipts on educational investments is that remittances have a positive impact via relaxation of liquidity constraints that households face. But, this effect should not be expected for any household receiving remittances. The liquidity constraint is binding for low-income households only. Consequently, households at higher levels of income distribution were not facing liquidity constraint, so the receipt of remittances is not expected to change their education investments decisions. Also, receipt of remittances by households at the bottom of the income distribution is not expected to change their education investments behaviour, as the amount of remittances received is not yet sufficient to allow such investments. Remittances sent to such households are usually purely altruistically driven and are being completely spent on current consumption. Therefore, the receipt of remittances is expected to have an impact on education investments only among households that

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<sup>118</sup> This is possible by using ASO Survey data only, as we do not have this information in the LBiH dataset.

<sup>119</sup> Although it may psychologically have a negative effect, as household members do not receive support by their closest relations. But, that level of personal information couldn't have been collected in this survey.

are within a limited range of income distribution, where the pre-remittances level of income is sufficient for current consumption and the receipt of remittances is addition to income that allows them education investments. According to this, the empirical model to be estimated includes a list of dummy variables for income distribution, as well as a set of interaction terms between income distribution dummies and the amount of remittances received by a household. These variables will reveal the difference between households receiving and households not receiving remittances at different levels of income distribution.<sup>120</sup>

The purpose of this analysis is to provide evidence of the impact of remittances on both education enrolment of children and educational investments incurred by households on each child. Therefore, two different models will be estimated, the one with a dummy variable indicating whether a child is enrolled in school as the dependent variable and another with a dependent variable expressed as educational investments by a household on a particular child. In the case of educational investments, the nature of the data is such that one observes its values only for children who are enrolled in school; children out of school report zero expenditures. Using OLS in such circumstances would produce biased and inconsistent estimates. Therefore, two alternative estimation methods were considered here. The first is a probit model, where the receipt of remittances and the amount received is modelled together and the other is a two-stage Heckman model, where the receipt of remittances is modelled in the first stage and estimated by probit, while the amount received is modelled in the second stage and estimated by OLS, which is corrected for potential sample bias (*e.g.* Hoddinott, 1992; Cox *et al.*, 1998, 2004). As it may be expected that children enrolled in school are not a randomly drawn sub-sample of the population, which requires controlling for sample selection and as the interest of this study is to analyse determinants of children enrolment, the priority was given to Heckman's estimation method. This method controls

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<sup>120</sup> Average amounts of remittances received by households at different levels of income distribution in Bosnia-Herzegovina is presented in the Table 5.5.

for selection and the results from the model of determinants of school enrolment can be used as a first stage result of the Heckman's procedure.

In the first model, the dichotomous variable indicating the child's enrolment in school will be used as the dependent variable. The model is:<sup>121</sup>

$$\begin{aligned} cenr_i = & \beta_0 + \beta_1 hfh_i + \beta_2 h hemp_i + \beta_3 h house_i + \beta_4 cage_i + \beta_5 h noc_i + \\ & \beta_6 h noc624_i + \beta_7 h incpc_i + \beta_8 h rem_i + \beta_9 h medu_i + \beta_{10} h buss_i + \beta_{11} h size_i \\ & + \beta_{12} h pa_i + \beta_{13} h urb_i + \beta_{14} c male_i + u_i \end{aligned} \quad (5.3)$$

The data used for the estimation of the model are characterized by exogenous sample selection, as the values for most of the independent variables affecting a child's school enrolment are observed for children currently in school only, which may be considered as a self-selected group. Thus, in the second stage, we will apply the Heckman two-stage procedure,<sup>122</sup> by using the probit model as the first stage selection model of the procedure. This way, besides estimating the impact of remittances on child's school enrolment, as done in previous studies, we will go a step further and estimate the relationship between remittances receipt and educational investments by a household. In other words, in the second stage the determinants of educational investments in a child, conditional on the child receiving any formal education at all, is estimated. It should be a useful extension of models from previous studies in order to gain additional insight into the relationship investigated. So, in the second stage of the Heckman's procedure, the inverse Mills ratio is calculated from the estimated parameters of the first stage regression and included as an additional explanatory variable in the OLS estimation of the model. The inverse Mills ratio is the ratio of the probability density function over cumulative distribution function of a distribution. This

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<sup>121</sup> Description of variables used in this model is provided in the Table 5.7.

<sup>122</sup> Alternative considered here was tobit model. Heckman's two stage model and tobit model in their estimation procedure treat specific outcomes differently. For example, Heckman's model will treat unobserved values for children not attending school as unobserved, while tobit will treat them as zero values. Accordingly and due to the nature of the data used, Heckman's procedure has been chosen as more appropriate.



actually controls for the odds that the child will attend school at all. If the estimated coefficient of the Inverse Mills ratio is statistically significant, it confirms that the selection problem exists and that the Heckman's procedure was justified, otherwise not. Hence, the methods used here allow two different questions relevant for this study to be answered: the results of the first stage estimation will reveal the possible impact of remittances on the participation of children, while the results of the second stage estimations will show to which extent the educational expenditures of households change with receipt of remittances.

The model to be estimated in the second stage is:

$$\begin{aligned}
heepcx_i = & \beta_0 + \beta_1 hfh_i + \beta_2 hhemp_i + \beta_3 hhhouse_i + \beta_4 hnoc_i + \beta_5 cage_i \\
& + \beta_6 \sum d_i + \beta_7 \sum d_i hrem + \beta_8 hincpc_i + \beta_9 hrem_i + \beta_{10} hmedu_i + \beta_{11} hbuss_i \\
& + \beta_{12} hhfin1b_i + \beta_{13} hhfin1w_i + \beta_{14} hhsiz_e_i + \beta_{15} hpa_i + \beta_{16} hurb_i + \beta_{17} mills + u_i
\end{aligned} \tag{5.4}$$

One of the key problems with the Heckman 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. Still, there should be at least one variable that is included only in the first stage model, basically an instrument, in order to correctly calculate the Inverse Mills ratio (*mills*); 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 selection is likely to affect the amount as well. Therefore, any variable related to the income of household is discarded as potential instrument, as it is very likely to affect both the decision of the household to send the child to school as well as the amount spent. Other variables were taken into consideration and possible candidates chosen as instruments (variables that will appear in the first, but not in the second stage regression) are a dummy variable indicating that a

child is male (*cmale*), a variable for the number of school age children (*hnoc624*) and a variable for the absence of a parent (*hpa<sub>i</sub>*).<sup>123</sup> As these variables are expected to affect household's decision to send them to school, they are not expected to have an impact on the amount spent on their education once these children are enrolled.

The dependent variable in the second stage is educational investment by a household. As only household level data were available in both datasets and individual level data had to be used in the second stage (as they were used in the first stage as well), the only solution was to disaggregate household's education expenditures per (each) child enrolled. This was done by the following formula:

$$HEEPCX_p = \frac{HEE}{X_p + w_s X_s + w_t X_t} \quad (5.5)$$

where:

HEEPCX<sub>p</sub> = household's education expenditure per child in primary school

HEE = total household's education expenditure

X<sub>p</sub> = number of children from a household enrolled in primary school

X<sub>s</sub> = number of children from a household enrolled in secondary school

X<sub>t</sub> = number of children from a household enrolled in university

w<sub>s</sub> = weight for secondary school education investment

w<sub>t</sub> = weight for university education investment

The formula gives us the amount of education expenditures spent by a household on each child enrolled in primary school, given the number of children enrolled in other level of education.

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<sup>123</sup> This variable is included in the estimation of the ASO dataset only, as the data on parental absence are not available in the LSMS dataset.

If this amount is multiplied by the  $w_s$ , we will get the amount of education expenditures spent by a household on each child enrolled in secondary school and if it multiplied by the  $w_t$ , the resulting amount is the one devoted to each child enrolled in university. The weights are telling us how much more, on average, households spend on children in secondary and tertiary education than in primary. This way we ensure that, regardless of the number of children in a household, the amount spent on each child in secondary school is always larger than the amount for children in primary school by  $w_s$  and in university by  $w_t$ .

The weights are calculated by using the actual data from the LBiH dataset,<sup>124</sup> by calculating average household education expenditures in households with only one child. In this dataset, households with only one child enrolled in primary school reported average education investment of KM92.72, those with a child in secondary school of KM 150.95 and with one child in university, of KM162.14. This means that, according to these data, the weight for secondary school education investment by a household ( $w_s$ ) is 1.63 and for university an education investment ( $w_t$ ) is 1.75. By using the above formula and multiplying the values for primary school by the calculated weights in order to get the amounts for secondary and university education investments, we obtained the information about disaggregated household's expenditures per child.

The variable for the income of the household ( $hincpc_i$ ) is expressed as a sum of all sources of income, except remittances. This variable should capture the effect of the extent to which households are facing liquidity constraints on the amount of households' educational investments. As explained previously, not all households, but only ones below certain income level are expected to face such a liquidity constraint. In order to capture this effect more precisely, a set of dummy variables for consumption quintiles are created ( $\Sigma q_i$ ). As very poor households receiving remittances are likely to spend such additional income on basic needs, positive impact of remittances on educational investments is not expected among such households. For this reason, a

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<sup>124</sup> This dataset was used as it has more observations. Then the same weights were applied in the ASO dataset as well, in order to be consistent.

set of interaction terms between the remittances receipt and each consumption quintile ( $\Sigma q_i hrem$ ) are created. The strongest impact of remittances receipt on education is expected for households that are in a specific quintile, where they are not rich (still face liquidity constraint), but are not so poor to be forced to spend all the remittances received on basic needs.

There are three alternative variables for the receipt of remittances ( $hrem_i$ ). First is a dummy variable for receipt of remittances. Second is a continuous variable for the amount of remittances received during a year. Although the use of the dummy variable instead of the amount is justified by the empirical experience reported in previous studies (*e.g.* Borraz, 2005), suggesting that remittance receiving households are likely to underreport the amount of remittances received, the variable for the amount of remittances received was chosen here. The main reason is that the amount, rather than receipt as such, is expected to capture the effect of the remittances on educational investments by households.

The mothers' education level ( $hmedu_i$ ) variable is considered as a proxy of household wealth. Parents with higher education are expected to have a higher probability of wage employment and of earning higher wages than less educated parents. Consequently, households with better educated parents may be less likely to face liquidity constraints and therefore more likely to invest in children's education. Furthermore, the parents' education level may also proxy for unobservable influences on educational attainment such as the ability of their children, the lower disutility and lower non-financial costs of education. These may include influences such as putting more emphasis on children's education and helping with homework. Again, children who have parents with higher education levels may also consider it optimal to obtain high levels of education. Another channel through which parents' education impacts on children's education is that due to experience they are more likely to know the value of and the returns to education and to consider education as an investment rather than forgone earnings. Consequently, they may be more likely to financially support their children's education. Also, they may serve as positive role models for their

children in terms of educational choices. Accordingly, the *a priori* sign of this variable is positive. It is introduced through four dummy variables, namely whether the mother has higher education, secondary education, primary education or if she has less than primary education. The last option is used as the base category.

The gender of the household head ( $hfh_i$ ) dummy variable is included taking the value of one if the household head is a female, zero otherwise. As the majority of studies investigating poverty incidence and inequality between male and female headed households in BiH suggest a positive relationship between being a female headed household and household income, as well as that female household heads are on average more educated, this dummy variable is expected to have a positive impact on the educational enrolment of children and education investments, all else being equal.

The household's size ( $hhsiz_e_i$ ) variable is expected to have a negative impact on children's educational attainment. The larger is the household, the lower is the household budget *per capita* and thus the stronger is the liquidity constrain, all else equal. The number of school age children ( $hnoc624_i$ ) also affects educational attainment as the reservation income for education is lower *per capita* in households having more school age children. Household budget constraints may vary by household composition in terms of the age composition of children, as households with a higher share of its members of the age of primary school education face lower liquidity constraints in terms of education expenditure than households having a higher share of those of the age of higher education, all else remaining equal. This is expected to be captured by using the weights for the educational investments as dependent variable, which is decomposed from the household level data on educational expenditures into the individual children level data, by using different weights for children enrolled in different levels of education, as presented by Equation (5.5).

Household head's expectations of the economic situation of the household after one year is also included in the model by two dummy variables, one for household heads expecting the

situation to improve ( $hhfin1b_i$ ) and another for those expecting a worsened economic situation in the future ( $hhfin1w_i$ ).<sup>125</sup> It may be expected that the perception of the head of the household on the economic situation is an important determinant of the decision to emigrate for economic reasons. As emigration is costly and is conditioned by the household budget, just as are education investments, this study controls for this effect. This variable is introduced through three dummy variables, that is, whether the household economic situation will improve, remain the same or worsen. The middle option is used as the benchmark. If the household head expects the economic situation of the household to improve (worsen) in the future s/he might perceive it as reducing (increasing) household liquidity constraints and, hence, positively (negatively) impacting on education expenditure, all else equal. The effect of a reduction in household wealth is expected to be greater in magnitude than that of an increase, all else equal.

A household's involvement in business ( $hbuss_i$ ) is a variable controlling for the negative effect of the work incentive. This is expected to appear as particularly significant for tertiary educational attainment in Bosnia-Herzegovina, as the labour market there is characterized by very large unemployment rates and evidence suggests that in many cases individuals opt for further (highly subsidized) education after unsuccessful search for a job. Households offering a job opportunity to a young person, as well as being in a need of additional labour, might experience this disruptive effect on educational attainment of their children more strongly. Also, the costs of foregone earnings are higher for these households, compared to households not owning a business.

School drop-out rates at post-compulsory education, especially for girls, are higher in rural areas than in urban areas. This may be due to the cultural values and attitudes still predominant in rural areas. Furthermore, this may be due to infrastructural characteristics. As we lack measures to proxy for these two latter effects, except the distance from school, in this study the type of area ( $hurb_i$ ) is considered to capture both the effect of cultural and infrastructural differences and the

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<sup>125</sup> The data for these two variables are available in the ASO dataset only.

effect of economic differences. Consequently, all else equal, households living in rural areas are expected to invest less in children’s educational attainment. This effect is measured as a dummy variable taking the value of one if the household lives in a rural area.

### 5.2.5. Results

The results of the probit estimation (which is also the first-stage of the two-stage Heckman model), using the two dataset (with standard errors in parentheses), are presented in the table 5.8.

Table 5.8. First-stage results of probit model of the Heckman’s two stage procedure

<i>Dependent variable is a dummy variable taking value of 1 if child is currently enrolled in education</i>	<i>Name</i>	<i>LBiH Survey</i> <sup>126</sup>	<i>ASO Survey</i> <sup>127</sup>
		<i>Probit</i>	<i>Probit</i>
<i>Age of child</i>	<i>cage</i>	-0.28*** (0.02)	-0.38*** (0.00)
<i>=1 if child is male</i>	<i>cmale</i>	-0.29*** (0.09)	0.23 (0.26)
<i>=1 if female headed households</i>	<i>hfh</i>	0.15 (0.33)	1.17* (0.62)
<i>Household income per capita, in thousands KM</i>	<i>hincpc</i>	-10.82 (51.62)	1.95*** (0.65)
<i>Household size</i>	<i>hsize</i>	-0.03 (0.05)	0.25 (0.34)
<i>Number of children in the household</i>	<i>hnoc</i>	-0.11 (0.07)	0.09 (0.38)
<i>=1 if household head is employee</i>	<i>hemp</i>	-1.41*** (0.16)	0.24 (0.42)
<i>Number of school age individuals in the household</i>	<i>hnoc624</i>	-0.12 (0.09)	-0.49 (0.43)
<i>Average amount of remittances, in thousands KM</i>	<i>hrem</i>	<b>0.96</b> <b>(179.09)</b>	<b>-54.22</b> <b>(61.67)</b>

<sup>126</sup> Detailed results of the models estimated by using the LBiH dataset and reported in tables 5.8. and 5.9. are provided in Appendix 5.11.

<sup>127</sup> Detailed results of the models estimated by using ASO dataset and reported in tables 5.8. and 5.9. are provided in Appendix 5.12.

<i>Dependent variable is a dummy variable taking value of 1 if child is currently enrolled in education</i>	<i>Name</i>	<i>LBiH Survey</i> <sup>128</sup>	<i>ASO Survey</i> <sup>129</sup>
		<i>Probit</i>	<i>Probit</i>
=1 if household lives in urban area	<i>hurb</i>	0.26*** (0.09)	0.26 (0.29)
=1 if one of parents is absent migrant	<i>hpa</i>		0.57 (0.51)
<i>Quintile 1</i>		-0.94*** (0.15)	
<i>Quintile 2</i>		-0.78*** (0.14)	
<i>Quintile 3</i>		-0.58*** (0.14)	
<i>Quintile 4</i>		-0.46*** (0.14)	
<i>Quintile 1 x hrem</i>		0.16 (0.24)	
<b><i>Quintile 2 x hrem</i></b>		1.77** (0.80)	
<i>Quintile 3 x hrem</i>		0.06 (0.18)	
<i>Quintile 4 x hrem</i>		0.01 (0.20)	
<i>Intercept</i>		6.65*** (0.42)	6.53*** (1.51)
<i>Number of observations</i>		1293	160
<i>Pseudo R<sup>2</sup></i>		0.354	0.294
<i>Prob&gt;chi<sup>2</sup></i>		0.000	0.000
<i>Correctly classified (%)</i>		78.89	75.00

The results of the estimation of the model from Equation (5.3) on the determinants on child's school enrolment, presented in the table above, reveal that the main factors influencing child's enrolment are age of child, gender and economic situation of a household. Negative sign of the variable on the child's sex can be explained by the fact that female persons from the sample (age

<sup>128</sup> Detailed results of the models estimated by using the LBiH dataset and reported in tables 5.8. and 5.9. are provided in Appendix 5.11.

<sup>129</sup> Detailed results of the models estimated by using ASO dataset and reported in tables 5.8. and 5.9. are provided in Appendix 5.12.



15 to 24) face much less favourable labour market conditions,<sup>130</sup> thus employment opportunities do not have a diverting influence on their enrolment choice. Significance of the household income per capita variable in the ASO dataset and the alternative set of dummy variables in the LBiH dataset, show that the degree of liquidity constraint has a significant impact on the household's decision to send children to school. The negative sign of the coefficients on the quintile dummy variables is due to the fact that the benchmark category here is the fifth quintile, or the richest top 20% of households.

Results for the interaction terms between quintile dummies and the receipt of remittances support the model specification strategy used here. If we use a variable for remittance receipt only, without controlling for different impact of such receipts among households at different levels of income, the results would suggest that the receipt of remittances does not have any significant impact on school enrolment of children in Bosnia-Herzegovina (as found by estimating the ASO dataset without interaction terms). But, if the interaction terms are used, they show that remittances, although not having positive impact on child's enrolment for all households, still positively influence child enrolment among households in the second quintile of income distribution. If we know that the poverty line in Bosnia-Herzegovina is 18.2%, then these results show that the impact of remittances receipt on educational attainment is the strongest among households just above the poverty line. This is in line with the assumptions related to the presence of liquidity constraint at different levels of income, explained earlier in this chapter.

The results of the OLS estimation in the second-stage Heckman's procedure, with a control variable created from the inverse Mills ratio calculation, are presented in the table 5.9.

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<sup>130</sup> Unemployment rate among female workforce in Bosnia-Herzegovina is twice as high as for males.

Table 5.9. Second-stage results of OLS model of the Heckman's two stage procedure

<i>Dependent variable is the amount of household's education expenditure per child</i>	<i>Name</i>	<i>LBiH Survey</i>	<i>ASO Survey</i>
		<i>OLS</i>	<i>OLS</i>
<i>Age of child</i>	<i>cage</i>	492.63*** (98.77)	39.10* (21.34)
<i>Household income per capita</i>	<i>hincpc</i>	-10.82 (51.62)	42.13 (97.14)
<i>Household size</i>	<i>hsize</i>	919.87 (173.98)	-10.35 (54.24)
<i>Number of children in the household</i>	<i>hnoc</i>	-937.61*** (223.93)	32.66 (58.04)
<i>=1 if household head is employee</i>	<i>hhemp</i>	2486.19** (1099.30)	-37.39 (68.06)
<i>=1 if the household head perceives the economic situation of the household will improve next year, 0 otherwise</i>	<i>hfin1b</i>		-9.24 (42.18)
<i>=1 if the household head perceives the economic situation of the household will worsen next year, 0 otherwise</i>	<i>hfin1w</i>		-7.77 (46.75)
<i>=1 if the household lives in urban area</i>	<i>hurb</i>	-775.66*** (280.79)	14.94 (49.62)
<b><i>=1 if a household receives remittances</i></b>	<b><i>hrem</i></b>	<b>0.96</b> <b>(179.09)</b>	<b>-54.22</b> <b>(61.67)</b>
<i>Inverse Mills ratio</i>	<i>invmills</i>	-2308.12*** (658.87)	-149.39 (82.80)*
<i>Intercept</i>		-8109.14*** (1720.38)	-540.55* (322.52)
<i>Number of observations</i>		1293	
<i>Censored observations</i>		668	

The estimated coefficient of the Inverse Mills ratio in the results from the both surveys is statistically significant, suggesting that the sample selection problem exists and that therefore the Heckman's procedure was justified.

The results of the estimation of Equation (5.4) suggest that remittances do not have a significant impact on the educational expenditures incurred by households. Age of child has positive impact on the expenditures, which can be explained by increased costs of acquiring

education at higher levels of education. Decrease in educational expenditures as a result of increased number of children in a household can be interpreted as a redistributive effect, as more children share the same disposable household's budget for education. Living in urban areas decreases educational expenditures, as it decreases costs related to higher education, such as transportation costs, accommodation and other living expenses.

### **Concluding remarks**

The results of the two empirical studies presented above suggest several relevant findings. First, the macro level study reveals the existence of the incentive effect of emigration of highly educated individuals on human capital formation, but only in countries experiencing voluntary migration. However, in the case of conflict induced migrants, the effect is not as strong as it is in the case of voluntary migration. It can be explained by the fact that the opportunities for migration that will increase as a result of increased education are not observed in the case of forced migration by individuals remaining in the country and deciding about their education investments, therefore the same incentive effect does not exist. Moreover, even with the same incentive effect, countries affected by a conflict may lack facilities for human capital formation and thus not be able to completely utilize the positive impact of this incentive on interest in higher education. Second, the empirical evidence on the impact of receipt of remittances on educational investments by households suggests that the impact of remittances on educational attainment is positive, but limited to only a proportion of remittances receiving households. The reason is that not all households' educational investments are limited by liquidity constraint. Richer households can afford education even if they do not receive remittances. The receipt of remittances will not significantly alter their consumption patterns. On the other hand, poor households cannot afford education even when they

receive remittances, as they use these receipts for covering basic needs. Therefore, the receipt of remittances is likely to have positive impact on households just above poverty line.

All the evidence presented here suggests that the positive feedback effect of brain drain on human capital formation in countries affected by ethnic cleansing and other types of forced migration is likely to be modest and lower than in the case of voluntary migration. Once matched with more severe rates of brain drain, this means that the net effect of ethnic cleansing on human capital formation in a country is most likely to be negative.

## ***Chapter 6: Conclusion and policy recommendations***

### ***Introduction***

#### ***6.1. Main conclusions***

##### ***6.1.1. Negative impact of ethnic cleansing***

##### ***6.1.2. Positive impact of ethnic cleansing***

##### ***6.1.3. Possible net effect***

#### ***6.2. Contributions of the thesis***

#### ***6.3. Policy recommendations***

#### ***6.4. Additional outcomes of the thesis***

##### ***6.4.1. Lessons learnt***

##### ***6.4.2. Limitations of the research***

##### ***6.4.3. Directions for further analysis of the topic***

## **Introduction**

The main aim of this thesis, as outlined in the introduction, is to analyse the impact of ethnic cleansing on the stock of human capital in the country. After in-depth investigation of the characteristics of ethnic cleansing, their incorporation into the theoretical model of migration resulting from ethnic cleansing, as well as four different empirical studies that, combined, represent a comprehensive overview of both negative and positive impacts of ethnic cleansing, it could be said that this thesis, despite minor limitations explained later, contains rich theoretical and empirical contribution to both the theories of migration and theories of conflict.

### **6.1. Main conclusions**

The thesis has provided for the first time a comprehensive analysis of the impact of ethnic cleansing on the stock of human capital in a country. First, it described the key features of ethnic cleansing using results from interviews with people who survived ethnic cleansing. Then, it incorporated insights arising from the analysis of interview data into a theoretical model of the impact of ethnic cleansing on the magnitude of brain drain from the country. This model differs from previous models of forced migration by incorporating the relative deprivation hypothesis and developing a new “restoration” hypothesis in order to better explain the emigration driven by ethnic cleansing, where the process of emigration is seen as a two-stage process, starting with forced evictions in the first stage and continuing with emigration in the second. Compared to previous models of conflict-induced migration, the model developed in this thesis predicts emigration of highly educated individuals after they have been forcibly evicted, as it is developed on the basis of the characteristics of ethnic cleansing and is not only incorporating risk as one of the push factors of migration. As some other types of mass forced migration, such as natural disasters induced and

development induced migration, share the key characteristics of the migration process with the ethnic cleansing induced migration, namely forced evictions and non-random targeting, the model used in this thesis for the purpose of analysis of ethnic cleansing could be, with minor amendments, used for the explanation of these other types of forced migration as well.

The set of hypotheses developed by the model, which should be tested by the empirical studies in the first part of the thesis, are:

- ethnic cleansing worsens economic situation in a country, which causes more emigration,
- people who were forcibly evicted during ethnic cleansing are more likely to emigrate, which means that the more severe ethnic cleansing is, the more emigration will it cause,
- the lower an individual's income and relative position in a community is, the more likely it is to migrate (relative deprivation hypothesis),
- people not only compare their current, but also their previous relative position in a community, which means that the more individual's income and relative position in a community is affected by ethnic cleansing, the more likely she is to migrate (restoration hypothesis),
- the more educated person is, the more negative impact of ethnic cleansing will be on her relative position within a community and therefore the more likely she is to emigrate (self-selection mechanism of emigration).
- a person's relative position decreases the more educated she is and if she was forcibly evicted, meaning that the more severe ethnic cleansing is, the more brain drain it will cause.

The methodological approach to the investigation of the impact of migration on the stock of human capital is also new, as previous studies were offering partial analysis of the phenomenon. On one side, there were studies analysing the negative impact of brain drain. On the other side, studies that were opposing this view of the negative impact of emigration were emphasizing the positive effect of such emigration on the stock of human capital. This thesis combines four different empirical studies into a single analysis of the net effect of ethnic cleansing induced migration on the

stock of human capital by measuring both negative and positive effects of migration on the stock of human capital in the country. Moreover, each of these two effects was measured at both the household and cross-country levels.

### **6.1.1. Negative impact of ethnic cleansing**

The theoretical model of the impact of ethnic cleansing on the magnitude of brain drain from the country was empirically tested by two different, but complementary, studies. In the first study, household level data were analysed in order to obtain empirical evidence on the self-selection mechanism of migration as a result of ethnic cleansing, developed in the theoretical model. After collecting the data that were already available, but also conducting own survey, the estimation of the empirical model was done by using the probit model with a set of interaction terms. The results from the empirical model suggest that there is a positive self-selection of migrants with regards to their education level, which is driven by the changes in absolute and relative income caused by forced evictions. This result confirms that ethnic cleansing, in general, produce increased brain drain, compared to the situation when there are no forced evictions associated with the process of ethnic cleansing. This outcome suggests that larger magnitude of forced evictions is associated with increased brain drain. Also, the decrease in economic activity and prospects that accompanies conflicts is a factor that has a positive impact on the increase of brain drain, as predicted by the theoretical model, namely via its “restoration” hypothesis. As the highly educated suffer larger losses in both absolute and relative income, they are more likely to migrate, which acts as a self-selection mechanism of ethnic cleansing. This is in line with the prediction of the model developed earlier in the thesis and used for development of the empirical model.

However, as these factors also increase emigration of the low educated, this feature does not reveal whether or not and to what extent is the percentage of highly educated in the case of forced



migration different from the voluntary migration. This question is answered by the second empirical study, which uses country level data in order to compare the skill distribution of emigrants in countries that experienced conflict compared to the countries with migration that is predominantly driven by economic motives. Findings from this empirical study suggest that having a history of conflict in the previous decade is positively associated with larger emigration rates of highly educated people in the current decade compared to the countries that did not experience conflict on its territory in the previous period. Therefore, it is possible to conclude from these results that countries which experienced a conflict, in general, produce more migrants with tertiary education, in total and in proportion of the total number of emigrants, thus losing the most valuable factor of economic growth. These two findings combined confirm the predictions of the theoretical model, that ethnic cleansing has more severe negative consequences for the stock of human capital in a country than does voluntary migration. These findings also suggest that conflict do not only leads to increased emigration, but may also increase the proportion of individuals with tertiary education among these emigrants as well.

This becomes more important if we take into account that conflicts, besides leading to the emigration of the highly educated that depletes the stock of human capital in the country, also produce large destruction of physical capital and other negative consequences for the level of economic activity in the country. Although the lack of human capital may not be so important during the immediate period after the conflict, as large destruction of physical capital makes marginal product of labour, both low and highly skilled, lower. This reduces the growth-enhancing potential of human capital. However, the post-war recovery brings much faster the reconstruction of physical than human capital, which increases the marginal product of labour and consequently raises the importance of the recovery of the stock of human capital in the country for its further economic growth.

### **6.1.2. Positive impact of ethnic cleansing**

In its attempt to provide a comprehensive and unbiased analysis of the net impact of ethnic cleansing on human capital in a country, by combining the analyses of both negative and positive impacts of such event, the thesis acknowledges the insights from the recent migration literature, which emphasizes the role of different channels of reverse impact of brain drain on the human capital formation in a country of emigration. This literature argues that the emigration of highly educated may bring positive impact on the stock of human capital and hence turn brain drain into the brain gain. In order to test these arguments against arguments of the brain drain literature and estimate the net effect of ethnic cleansing on the stock of human capital, two additional studies that analyze these reverse channels were conducted in this thesis. First, the cross-country study reveals the existence of the incentive effect of emigration of highly educated individuals on human capital formation, but only in countries that experienced voluntary migration. In the case of conflict induced migration, the effect does not exist. It can be explained by the fact that the opportunities for migration that will increase as a result of increased education is not observed in the case of forced migration by those remaining in the country, and therefore the incentive effect is weaker. Moreover, even with the same incentive effect, countries affected by a conflict may lack facilities for human capital formation and thus not be able to completely utilize the positive impact of this incentive on the interest in higher education. Second, the empirical evidence on the impact of receipt of remittances on educational investments by households suggests that the impact of remittances on educational attainment is positive, but not statistically significant. This may be expected in countries with similar context as Bosnia-Herzegovina as well. The explanation for negligible impact of remittances on human capital formation in a country would be the lack of capabilities of countries that were affected by a conflict to channel the inflows of remittances into productive use.

### 6.1.3. Possible net effect

The new evidence collected through the work on the thesis and presented here suggests that the positive feedback effect of brain drain on human capital formation in countries affected by ethnic cleansing and other types of forced migration does not exist. Once matched with more severe rates of brain drain, this means that the net effect of ethnic cleansing on human capital formation in a country is most likely to be negative.

The comparison of the estimated effect of ethnic cleansing and voluntary migration is presented in the summary table below:

*Table 6.1. Summary overview of the differences between the effects of voluntary migration and ethnic cleansing*

Effect	Voluntary migration	Ethnic cleansing
Brain drain	Ranges from modest to severe, depending on many factors	Usually more severe compared to voluntary migration ( <i>ceteris paribus</i> ), both in terms of numbers of migrants and selection rate (proportion of highly educated people in total number of emigrants)
Incentive effect	Positive, strong	Does not exist (confirmed by the results of the study in Ch. 4)
Remittances effect	Positive, usually weak	Positive, but weak.
Return migration effect	Positive	No evidence (left for further research)

## **6.2. Contributions of the thesis**

This thesis, in the investigation of the topic, has made important contributions to the theory, methodology and empirical evidence on the economic consequences of forced migration. It started with in-depth investigation of the process of ethnic cleansing which was used for mapping of the key differences of this type of migration compared to other types and for placing this type of migration on the right place within different typologies of migration developed previously. In that sense, ethnic cleansing in this thesis was placed in the intersection between forced and mass migration.

These insights were then used for the purpose of developing a theoretical model of ethnic cleansing, which is the first model of this type developed so far. The model is based on the relative deprivation models of voluntary migration, but is extended in order to capture the key characteristics of ethnic cleansing. This extension includes incorporation of additional hypothesis, called “restoration” hypothesis, which is a unique contribution of this thesis.

The thesis then contributes empirically by providing the evidence on both the negative and positive impacts of ethnic cleansing on the formation of human capital in Bosnia-Herzegovina, one of the most striking examples of ethnic cleansing in recent history. Moreover, it provides cross-country evidence on the differences in the impact of migration on human capital between different types of migration, voluntary or forced.

Methodologically, the thesis has drawn from own experience in research of other topics that was used for the purpose of this thesis. First, the combination of different qualitative data in order to capture some quantitative characteristics of migrants’ pre-displacement well-being can be a useful idea for the research of this topic, as most countries that suffered ethnic cleansing usually do not have any household level data about migrants’ situation immediately before the war. This lack of

data was one of the major obstacles for pursuing this type of research so far. Second, the use of interaction terms to model a relationship between the migration and the formation of human capital, which measure possibility of the incentive effect of migration, has clearly shown that, once we control for the type of migration, the incentive effect is even stronger in countries that experience voluntary migration, but does not exist in countries with forced emigration. Third, the use of equivalence scale for decomposition of the household level educational expenditures to the individual level is a new approach that has advantages over previous empirical studies in a way that the impact of remittances on educational investments is measured more appropriately by using more precise measure of household's educational expenditures per child, rather than overall expenditures. Fourth, the model of the relationship between remittances and education is tested by using two-stage Heckman's selection model, which gives us more precise and more informative estimates. Besides estimating the relationship more correctly by controlling for possible self-selection, the model also provides the information not only about the relationship between remittances and educational enrolment, but also about between remittances and educational investment. Finally, the model of the relationship between remittances and education is for the first time modeled in a way to capture the impact of the liquidity constraint on the educational investment. This is done by including the set of dummy variables for different quartiles of income distribution. The results confirmed the appropriateness of this approach, by showing that the impact of remittances on educational investments exists only in households at the second quartile, where the liquidity constraint is relaxed, as predicted by the theory.

### **6.3. Policy recommendations**

The results of four different studies presented in this thesis can be used for policy purposes in a number of ways. As one of the initial aims of this thesis was to point out to the importance of

brain drain as a result of conflict, it could be claimed that the thesis provided sufficient evidence on the severity of such cost for the country. The loss of highly educated people through forced emigration tends to be neglected in the estimates of costs of war so far. Politicians pursuing ideas of conflict, particularly of civil ones, should take these costs of war into account as well and hopefully realize, by using simple cost-benefit analysis, that wars generally do not bring benefits to any party. Besides conflicts, there are forced population transfers of different ethnic groups by ruling parties in many countries. It should be realized, as the results from this thesis suggest, that such displacement of people will induce large losses of human capital for the country.

The empirical evidence presented in this thesis suggests that the emigration of highly educated is generally even more severe in the case of conflicts compared to voluntary migration, thus significantly depleting the stock of human capital in the country. In addition, positive effects such as the incentive effect or the effect of remittance receipts do not exist or are weaker than in the case of voluntary migration. This causes the net effect of ethnic cleansing to be negative and to require a long period of time for positive feedback effect to offset the negative impact on emigration on the human capital in the country. Such a result emphasises the importance of management of the positive channels in order to improve their impact on the country's recovery and development. First, the incentive effect is possibly weaker because countries in the post-war period do not have capacities of educational institution developed to the level that will allow the possibility of the incentive effect to be utilized to the best extent. Second, the evidence on the use of remittances in countries such as Bosnia-Herzegovina suggests that the largest proportion of the amount of remittances received is spent on current consumption. As the evidence presented here suggests, there is not much positive impact of remittances receipts on the educational investments. A significant amount of the consumption is actually consumption of imported goods. In Bosnia-Herzegovina, for example, inflows of remittances that represented more than 20% of the country's GDP made a huge trade deficit and a double-digit current account deficit sustainable for a decade.

Policy decision makers should be aware of the potential of remittances for economic development, if they are redirected from consumption into productive investments. In order to see it happening, the country's institutions should have a strategy for developing financial and other institutional support to investor from Bosnian diaspora community, improve investments climate and offer fiscal and other incentives that will increase the proportion of the remittances spent on productive investments. Besides that, it is well known that remittances inflows decrease with time and their amount depend very much on the strength of links between migrants and their home countries. Policy makers should be aware of this and work on maintaining close relations with its diaspora community. Third, as the depletion of human capital is particularly high in the case of ethnic cleansing, countries that suffered such severe brain drain should develop policies that will promote return migration of highly educated individuals, as this channel can to a large extent offset negative impact of brain drain. Moreover, return migrants bring back repatriated savings that can be used for productive investments, as well as new skills they acquired while abroad. Policy decision makers should be aware of all these opportunities and create an environment that will increase positive impact of the emigration of highly educated on the country's development, through different channels discussed in this thesis.

Bosnia-Herzegovina, which does not have any direct institutions that deal with its diaspora, such as Ministries that other countries with significant outmigration have, despite continuous efforts by the diaspora community on promoting such an idea, with no policy on investments incentives to our emigrants and return migrants, with barriers to return of highly educated through the complicated regulation on recognition of degrees from best universities from around the world, could possibly learn a lot from the findings of this thesis and its policy recommendations.

## **6.4. Additional outcomes of the thesis**

Besides contribution to the theory, to the methodology and to the empirical evidence, this thesis has also produced additional outcomes which should be acknowledged at this point. It significantly improved author's research skills, but also helped him to identify areas for further improvements in researching this topic. The contributions to the author are described in the lessons learned section, while the areas for improvement are identified in the limitations of research section and possible solutions offered in the directions for future research section.

### **6.4.1. Lessons learnt**

This research was the author's first research of this scale. The transfer of knowledge and research skills from his supervisors was enormous. This is particularly valuable for researchers from Bosnia-Herzegovina, a country with underdeveloped research community.

The thesis was the author's first work on this topic. The knowledge acquired in the four-year period was considerable and helped him to work on other projects that required such knowledge. In addition, research experience of the author has been enriched considerably during the work on the thesis. The importance of good literature review, detailed check of data entries, analysis of all the assumptions of a specific econometric method has proven many times during this period. This improved understanding and skills of the author and prepared him to conduct research projects even before completion of the thesis.

### **6.4.2. Limitations of the research**



Additional outcome of the thesis and experience gained through the period of work on it is identification of different limitations of research in this area that can offer a pathway for future research and initiate discussions on improvements necessary for successful completion of future projects in this field.

The data availability is one of the major issues in the migration research. This problem is even more emphasized in the context of ethnic cleansing. Conflicts are usually associated with large destruction of physical capital, dissolution of institutions and other negative consequences that have impact on the availability of the data. For obvious reasons, it is generally impossible to conduct a census or any type of household survey during the war. Bosnia-Herzegovina for example did not conduct census in the last 20 years. Moreover, administrative data are usually collected only partially and they are usually not reliable at all. Quite often the data stored in these countries were destroyed during a conflict. In many cases, conflicts are associated with dissolutions of entire states. It makes comparison of the country level data before and after the war impossible.

Data on the pre-war situation of migrants, important for studies of determinants of migration, is generally lacking in all countries, as surveys conducted after the war did not ask respondents such questions, whereas the economic situation of most of them has changed significantly as a result of war. The household level data used for the study on the impact of ethnic cleansing on the brain drain from Bosnia-Herzegovina during the war did not contain the information about household's absolute and relative income immediately before the war. This did not allow precise estimation of the impact of these two factors, but qualitative proxy variables were used. Availability of such a data would considerably improve the quality of the estimation of such models.

The cross-country analysis conducted in this thesis emphasizes additional data limitation, the one of comparability of the data across countries. The EU Commission has passed a new regulation on migration statistics for its member states in 2008, but the data is not yet harmonized

between all the member states. Differences in the data between countries from different continents are even more significant.

The data on the impact of remittances on educational expenditures did not contain information about the sender of remittances. Such information would improve the quality of the research, as it would allow controlling for additional factors influencing educational attainment, such as absence of parent and his support to the family while absent.

### **6.4.3. Directions for further analysis of the topic**

This thesis is the first work on the impact of ethnic cleansing on the economic development of a country affected. For that reason, it is expected to motivate further research on the related topics, in several directions. The theoretical model is the first attempt to incorporate specific features of ethnic cleansing into the models of migration. This research should be the first step in future works on this topic that will produce even more developed theoretical models. Moreover, the model presented in this thesis can serve as a motivation and direction for further work on adjusting this model in order to better match the characteristics of natural disasters induced and development projects induced migration. This way, specific models for different types of migration would be developed. These models, by capturing the specific characteristics of each type of migration, should have better predictive power compared to simple application of voluntary migration model into the context of forced migration. Then, separate empirical studies of the impact of such migration on the stock of human capita for each type of migration could be conducted, in a similar manner as it was done in this thesis. This way empirical evidence would be provided for better estimation of the overall costs of events such as natural disasters and some development projects.

Theoretical discussion of the channels of brain gain has emphasized the role of return migration for the formation of human capital in the country. However, empirical analysis of this channel was beyond the scope of this thesis. Consequently, investigating the impact of this channel

is a natural direction for further research that arises from this thesis. By including results from that research, we could get even clearer picture of the possible net effect of ethnic cleansing on the stock of human capital in the country.

The thesis has provided sufficient arguments for justification of separate analysis of different migration topics in the context of ethnic cleansing, as findings from voluntary migration research are not always applicable in the case of forced migration. This should induce further research of forced migration. For instance, it would be interesting to analyse the impact of remittances receipts on the supply of labour in countries which experiences war, as their post-war situation is usually characterized by increased social transfers, such as transfers to war veterans, widows of killed soldiers and civilian victims of war. As remittances and social transfers usually go together, it is interesting to see the relationship between the two, measuring the extent of the “crowding out” effect.

The impact of forced migration on other topics of economic development in the country is another possible direction for research. Possible topics include, but are not limited to, the impact of migration and remittances on poverty and inequality, impact on the quality of institutions, impact of diaspora on the international trade and FDI and impact of remittances on the development of financial institutions. There is significant number of studies done in the context of voluntary migration for all the topics mentioned, but it would be worth investigating these effects in the context of forced migration as well. The empirical evidence from this thesis, which reveals the difference in the effects of ethnic cleansing on human capital stock between countries experiencing voluntary and those experiencing forced migration could serve as a motivation for such studies.

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# APPENDICES

## List of appendices:

Appendix 3.1. Questionnaires used for semi-structured interviews

Appendix 3.2. Questionnaire used for the survey of refugees – addition to the LSMS.

Appendix 4.1. List of municipalities from the LSMS dataset and their distinction into different types (urban, mixed or rural)

Appendix 4.2. Detailed results of micro-level model estimation and post-estimation

Appendix 4.3. Detailed results of the fixed effects estimation of the macro model

Appendix 5.1. Detailed results of the OLS estimation of the Beine *et al.* (2006) model

Appendix 5.2. Detailed results of the OLS estimation of the model with one conflict dummy variable (cdv90)

Appendix 5.3. Detailed results of the OLS estimation of the model with two conflict dummy variables (cdv90 and cdv 00)

Appendix 5.4. Detailed results of the OLS estimation of the model with interaction term between p90 and CDV90

Appendix 5.5. Detailed results of the instrumental variable approach (2SLS) to estimation of the Model 2

Appendix 5.6. Detailed results of the OLS estimation of the Model 2 with the poverty dummy (*gnid*) and interaction term between conflict and poverty (*cdvgnid*) included

Appendix 5.7. Detailed results of the OLS estimation of the Model 2 with the variable on the ratio between migration of highly and low educated included

Appendix 5.8. Detailed results of the OLS estimation of the Model 2 without variable on the initial stock of human capital

Appendix 5.9. Summary table of empirical studies on the relationship between remittances and education

Appendix 5.10. Questionnaire used in the author's survey

Appendix 5.11. Detailed results of the the two-stage Heckman's estimation of the LBiH data

Appendix 5.12. Detailed results of the the two-stage Heckman's estimation of the ASO data

### Appendix 3.1. Questionnaires used for semi-structured interviews

#### A. QUESTIONNAIRE FOR SEMI-STRUCTURED INTERVIEWS WITH IDPS

1. Basic information about the interviewee:
  - a. Name: \_\_\_\_\_
  - b. Gender:        M                    F \_\_\_\_\_
  - c. Age: \_\_\_\_\_
  - d. Nationality: \_\_\_\_\_
  - e. Place of birth: \_\_\_\_\_
  - f. Current place of living: \_\_\_\_\_
  - g. Employed?: \_\_\_\_\_
  - h. Your family? Living with you: \_\_\_\_\_. Living abroad: \_\_\_\_\_
  - i. Education: \_\_\_\_\_
  - j. Where last diploma has been obtained: \_\_\_\_\_
  
2. Reasons for displacement: \_\_\_\_\_
3. Conditions under which it happened: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  
4. Property lost due to displacement: \_\_\_\_\_
5. Pattern of displacement (sites changed): \_\_\_\_\_  
\_\_\_\_\_
  
6. Reasons for choosing that place of displacement: \_\_\_\_\_  
\_\_\_\_\_
  
7. Process of assimilation/return (personal experience): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  
8. Do you plan to return? \_\_\_\_\_ When? \_\_\_\_\_  
For which reasons? \_\_\_\_\_
  
9. Any other issue you would like to raise? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## B. QUESTIONNAIRE FOR SEMI-STRUCTURED INTERVIEWS WITH REFUGEES

1. Basic information about the interviewee:
  - a. Name: \_\_\_\_\_
  - b. Gender:        M                    F
  - c. Age: \_\_\_\_\_
  - d. Nationality: \_\_\_\_\_
  - e. Education: \_\_\_\_\_
  - f. When last diploma has been obtained: \_\_\_\_\_
  - g. Place of birth (name and type): \_\_\_\_\_
  - h. Current place of living: \_\_\_\_\_
  - i. Your family? Living with you: \_\_\_\_\_  
Living in Bosnia: \_\_\_\_\_
2. Reasons for displacement: \_\_\_\_\_
3. Conditions under which it happened: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. Assistance received from humanitarian agencies or government during displacement:  
\_\_\_\_\_
5. Property lost due to displacement: \_\_\_\_\_
6. Pattern of displacement (sites changed): \_\_\_\_\_  
\_\_\_\_\_
7. Reasons for choosing first place of displacement: \_\_\_\_\_  
\_\_\_\_\_
8. Reasons for choosing final place of refuge abroad (if different from first): \_\_\_\_\_  
\_\_\_\_\_
9. Process of repatriation/getting asylum status (personal experience): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
10. Aid received from BiH government: \_\_\_\_\_
11. Do you remit money back to Bosnia? How much? \_\_\_\_\_. To whom? \_\_\_\_\_
12. In what are your remittances spent in Bosnia?  
\_\_\_\_\_
13. Do you plan to return? When? \_\_\_\_\_ For which reasons? \_\_\_\_\_

C. QUESTIONNAIRE FOR SEMI-STRUCTURED INTERVIEWS WITH RETURN IDPS

- 1. Basic information about the interviewee:
  - a. Name: \_\_\_\_\_
  - b. Gender:        M                    F
  - c. Age: \_\_\_\_\_
  - d. Nationality: \_\_\_\_\_
  - e. Education: \_\_\_\_\_
  - f. Where last diploma has been obtained: \_\_\_\_\_
  - g. Place of birth: \_\_\_\_\_
  - h. Current place of living: \_\_\_\_\_
  - i. Current job: \_\_\_\_\_
  - j. Your family? Living with you: \_\_\_\_\_. Living abroad: \_\_\_\_\_
- 2. Reasons for displacement: \_\_\_\_\_
- 3. Conditions under which it happened: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 4. Property lost due to displacement: \_\_\_\_\_
- 5. Pattern of displacement (sites changed): \_\_\_\_\_  
\_\_\_\_\_
- 6. Reasons for choosing that place of displacement: \_\_\_\_\_  
\_\_\_\_\_
- 7. Process of assimilation/return (personal experience): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 8. When you returned? \_\_\_\_\_ Where? \_\_\_\_\_  
For which reasons? \_\_\_\_\_

#### D. QUESTIONNAIRE FOR SEMI-STRUCTURED INTERVIEWS WITH RETURNEES

1. Basic information about the interviewee:
  - a. Name: \_\_\_\_\_
  - b. Gender:        M                    F
  - c. Age: \_\_\_\_\_
  - d. Nationality: \_\_\_\_\_
  - e. Place of birth: \_\_\_\_\_
  - f. Current place of living: \_\_\_\_\_
  - g. Employed?: \_\_\_\_\_
  - h. Your family? Living with you: \_\_\_\_\_. Living abroad: \_\_\_\_\_
  - i. Education: \_\_\_\_\_
  - j. Where last diploma has been obtained: \_\_\_\_\_
  
2. Reasons for displacement: \_\_\_\_\_
3. Conditions under which it happened: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. Assistance received from humanitarian agencies or government during displacement:  
\_\_\_\_\_  
\_\_\_\_\_
5. Property lost due to displacement: \_\_\_\_\_
6. Pattern of displacement (sites changed): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
7. Reasons for choosing first place of displacement: \_\_\_\_\_  
\_\_\_\_\_
8. Reasons for choosing first place of refuge abroad (if different from first): \_\_\_\_\_  
\_\_\_\_\_
9. Process of repatriation/getting asylum status (personal experience): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
10. When you returned? \_\_\_\_\_ Where? \_\_\_\_\_  
For which reasons? \_\_\_\_\_
11. Aid received from BiH government upon return: \_\_\_\_\_
12. Do you remit (bring) money back to Bosnia? How much? \_\_\_\_\_.
13. In what you spent than money? \_\_\_\_\_
14. Any other issues you would like to raise? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



14. Where did you emigrate the first time out of BiH?

---

15. When did you emigrate the first time out of BiH?

---

16. Type of that place is:

VILLAGE .....1

TOWN .....2

SUBURB ...3

17. What was your reason of first migration out of BiH?

WAR .....1

PROPERTY OCCUPIED .....2

PROPERTY DESTROYED .....3

SECURITY .....4

WORSENERD LIVING CONDITIONS...5

FAMIL REASONS .....6

JOB .....7

HEALTH .....8

OTHER REASON .....

18. You left BiH? a) Arranged individually

b) Humanitarian convoy

c)

Other: \_\_\_\_\_

19. In that place (or country), did you already have family and/or relatives who helped you during/after displacement to that country? YES NO

**Thank you!**

**Appendix 4.1. List of municipalities from the LSMS dataset and their distinction into different types (urban, mixed or rural)**

<b>No.</b>	<b>Municipality</b>	<b>Type</b>
1	Novi Grad Sarajevo	Urban
2	Centar Sarajevo	Urban
3	Novo Sarajevo	Urban
4	Zenica	Urban
5	Tuzla	Urban
6	East Ilidza	Urban
7	Banja Luka	Urban
8	Vogosca	Mixed
9	Travnik	Mixed
10	Visoko	Mixed
11	Breza	Mixed
12	Cajnice	Mixed
13	Novi Grad	Mixed
14	Prijedor	Mixed
15	Modrica	Mixed
16	Visegrad	Mixed
17	Zavidovici	Rural
18	Gradacac	Rural
19	Posušje	Rural
20	Kakanj	Rural
21	Grude	Rural
22	Knezevo	Rural
23	Samac	Rural
24	Zvornik	Rural
25	Srbac	Rural

*Source: LSMS BiH Basic Information Document*

## Appendix 4.2. Detailed results of micro-level model estimation and post-estimation

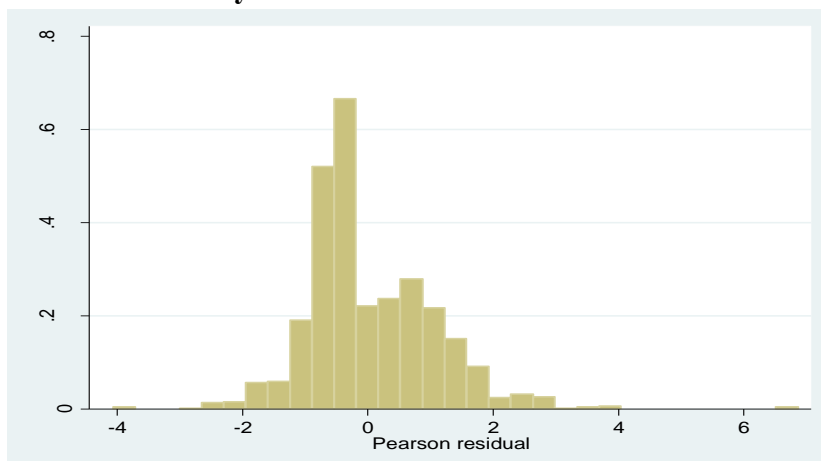
### a. Regression results

y	Coef.	Std. Err.	Odds Ratio	Std. Err.	z	P> z
fhh	0.879024	0.149337	2.408547	0.359686	5.89	0.000
age	-0.04167	0.006762	0.9591829	0.006486	-6.16	0.000
edu	2.073751	0.53746	7.954605	4.275285	3.86	0.000
urb	1.502566	0.25114	4.493204	1.128422	5.98	0.000
fe	1.702725	0.287919	5.488884	1.580352	5.91	0.000
me	-1.57941	0.154367	0.2060977	0.031815	-10.23	0.000
eduurb	-0.52862	0.57201	0.5894199	0.337154	-0.92	0.355
edufe	0.492463	1.005422	1.636342	1.645214	0.49	0.624
urbfe	0.181815	0.360993	1.199392	0.432972	0.5	0.615
eduurbfe	0.051889	1.074155	1.053258	1.131362	0.05	0.961
_cons	-0.75861	0.336295			-2.26	0.024
Number of observations						1575
Pseudo R <sup>2</sup>						0.3425

### b. Results of diagnostic tests

Test	Computed value of test statistics	Probability
Likelihood ratio (chi2)	680.34	0.000
Pearson's goodness of fit test (chi2)	703.71	0.2481
Correctly classified		79.87
Sensitivity		62.11
Specificity		88.43

### Test for normality of the Pearson's residual



### Appendix 4.3 Detailed results of the fixed effects estimation of the macro model

#### a. OLS model

erhl	Coef.	Std. Err.	t	P> t
gdpc	-0.22462	0.157204	-1.43	0.155
gini	0.086134	0.129054	0.67	0.505
pop	-0.02068	0.008143	-2.54	0.012
wardv	1.696409	2.58698	0.66	0.513
t2	1.655909	2.40543	0.69	0.492
_cons	14.26031	6.253512	2.28	0.024
Number of obs.				217
R2				0.0596
Adj R2				0.0373
Root MSE				17.284

#### b. Fixed effects model

erh	Coef.	Robust Std. Err.	t	P> t
gdpc	-0.00356	0.002077	-1.72	0.089
gini	-0.00117	0.000867	-1.35	0.178
pop	0.000108	9.74E-05	1.11	0.27
wardv	0.039488	0.017218	2.29	0.024
t2	0.002655	0.009619	0.28	0.783
_cons	0.219938	0.03339	6.59	0
sigma_u	0.189724			
sigma_e	0.04511			
rho	0.946492			
No. of obs.				217
No. of groups				117
R2 (within)				0.1050
R2 (between)				0.0001
R2 (overall)				0.0021



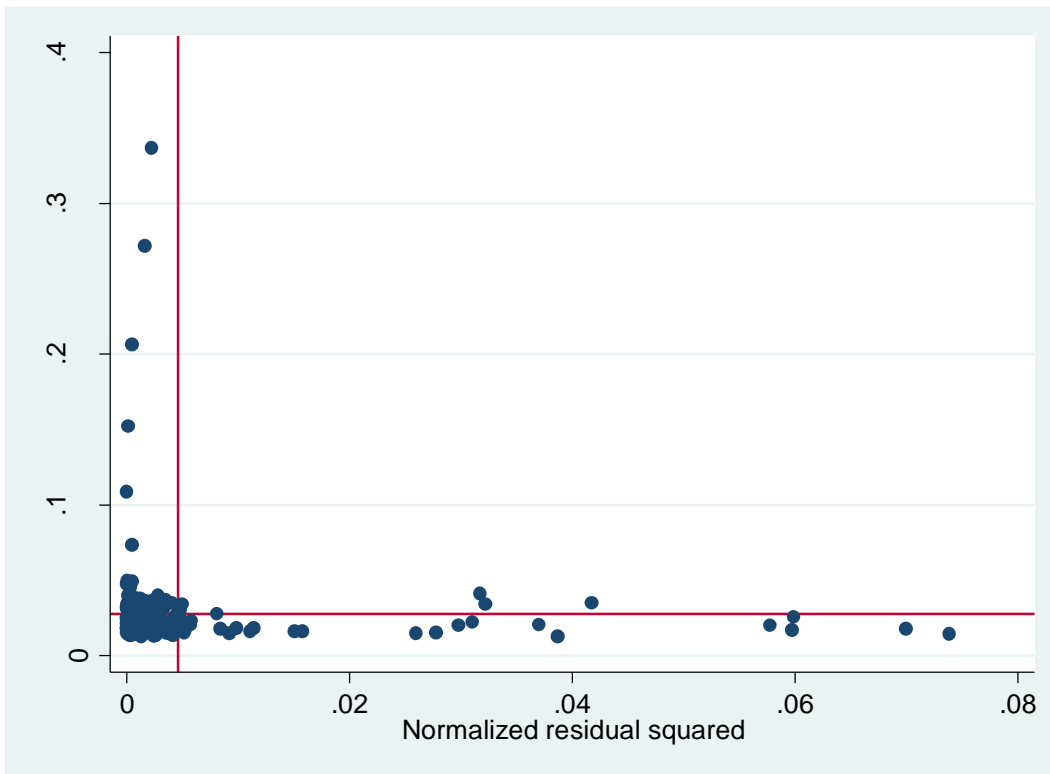
### c. Random effects model

erhl	Coef.	Robust Std. Err.	z	P> z
gdpc	-0.30069	0.100945	-2.98	0.003
gini	-0.0651	0.080234	-0.81	0.417
pop	-0.02034	0.006395	-3.18	0.001
wardv	3.542526	1.593774	2.22	0.026
t2	0.491892	0.750733	0.66	0.512
_cons	21.79268	3.697037	5.89	0
sigma_u	17.82271			
sigma_e	4.510998			
rho	0.939795			
No. of obs.				217
No. of groups				117
R2 (within)				0.0910
R2 (between)				0.0408
R2 (overall)				0.0503

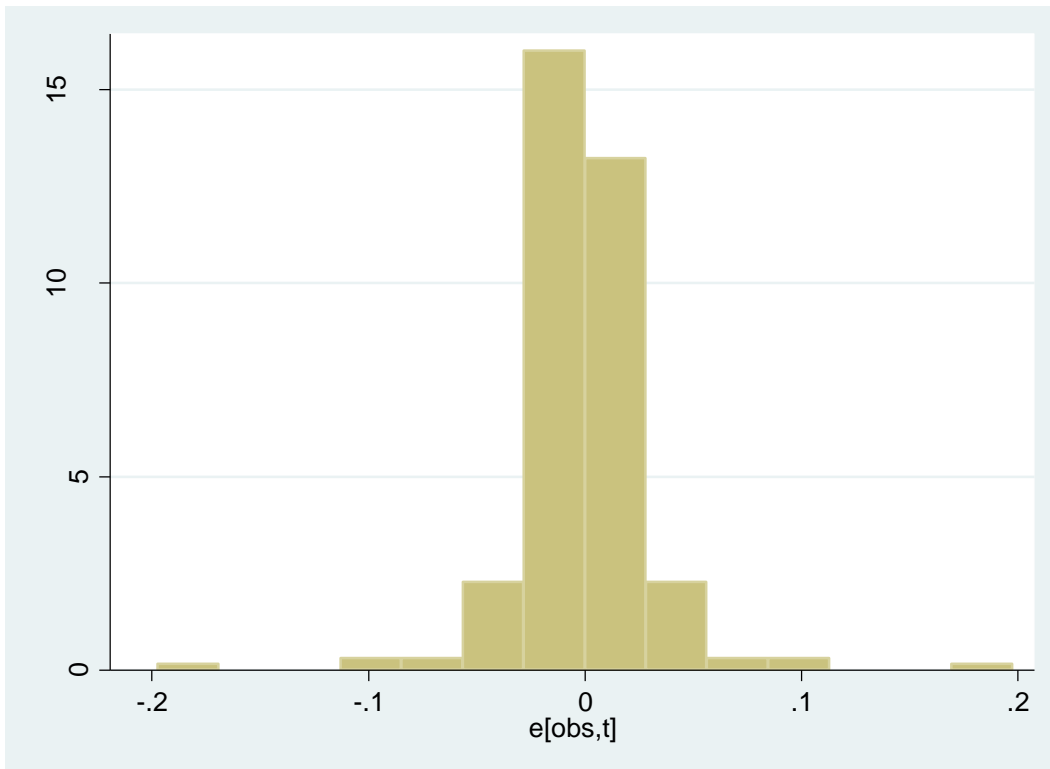
### d. Results of diagnostic tests

Test	Computed value of test statistics	Probability
OLS F test (5, 211)	2.67	0.0229
FE F test (5, 116)	4.26	
RE F test (5, 211)	22.64	0.0004
Hausman test	62.260	0.0000
Breusch and Pagan Lagrangian multiplier test for random effects	58.50	0.0000
Modified Wald test for groupwise heteroskedasticity in fixed effect regression model	5.6e+34	0.0000
Test for significance of fixed effects	25.88	0.0000
Test for normality of residuals	49.68	0.0000
Test for serial correlation in residuals	117.72	0.0000

**Leverage-versus-squared-residual plot**



**Histogram of residuals from the fixed effects model**



## Appendix 5.1. Detailed results of the OLS estimation of the Beine *et al.* (2006) model

### a) Regression results, default standard errors

dluha	Coef.	Robust Std. Err.	t	P> t
lnha90	-0.23687	0.035646	-6.65	0
lnp90	0.048104	0.020326	2.37	0.02
densm	-0.06315	0.143395	-0.44	0.66
ssad	-0.37504	0.083529	-4.49	0
latd	0.028072	0.056625	0.5	0.621
_cons	-0.09232	0.075693	-1.22	0.225
No. of obs				122
R2				0.4153
Root MSE				0.25392

### b) Results of diagnostic tests

Test	Computed value of test statistics	Probability
F test (5, 116)	9.19	0.000
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity (chi2)	34.81	0.000
White's test for heteroskedasticity (chi2)	31.32	0.0183
Ramsey RESET test for omitted variables	2.65	0.0520
Mean VIF	1.41	

### c) Matrix of correlation coefficients

e(V)	lnha90	lnp90	dens90	Ssad	latd
lnha90	1				
lnp90	-0.3184	1			
dens90	0.1076	0.2097	1		
ssad	0.7918	-0.0614	0.3214	1	
latd	-0.0317	0.3389	0.3954	0.2848	1

**Appendix 5.2. Detailed results of the OLS estimation of the model with one conflict dummy variable (cdv90)**

**a) Regression results, robust standard errors**

dluha	Coef.	Robust Std. Err.	t	P> t
lnha90	-0.24765	0.036902	-6.71	0
lnp90	0.050376	0.019749	2.55	0.012
densm	-0.06495	0.131029	-0.5	0.621
ssad	-0.39331	0.083581	-4.71	0
latd	0.028843	0.063979	0.45	0.653
cdv90	-0.10832	0.049378	-2.19	0.03
_cons	-0.07409	0.073657	-1.01	0.317
No. of obs				122
R2				0.4407
Root MSE				0.24942

**b) Results of diagnostic tests**

Test	Computed value of test statistics	Probability
F test (5, 116)	8.05	0.0000
Ramsey RESET test for omitted variables	5.46	0.0015
Mean VIF	1.36	

**c) Matrix of correlation coefficients**

e(V)	lnha90	lnp90	dens90	ssad	latd	cdv90
lnha90	1					
lnp90	-0.3166	1				
dens90	0.1003	0.2476	1			
ssad	0.7912	-0.0652	0.3316	1		
latd	-0.0281	0.2768	0.3493	0.2435	1	
cdv90	0.5263	-0.1506	0.025	0.4959	0.1427	1

**Appendix 5.3. Detailed results of the OLS estimation of the model with two conflict dummy variables (cdv90 and cdv 00)**

**a) Regression results, robust standard errors**

dluha	Coef.	Robust Std. Err.	t	P> t
lnha90	-0.25745	0.038794	-6.64	0
lnp90	0.049815	0.019489	2.56	0.012
densm	-0.05236	0.127808	-0.41	0.683
ssad	-0.39603	0.083448	-4.75	0
latd	0.032303	0.065932	0.49	0.625
cdv90	-0.08312	0.046419	-1.79	0.076
cdv00	-0.06599	0.050854	-1.3	0.197
_cons	-0.09253	0.07491	-1.24	0.219
No. of obs				122
R2				0.4477
Root MSE				0.24894

**b) Results of diagnostic tests**

Test	Computed value of test statistics	Probability
F test (5, 116)	7.13	0.0000
Ramsey RESET test for omitted variables	6.59	0.0004
Mean VIF	1.42	

**c) Matrix of correlation coefficients**

e(V)	lnha90	lnp90	dens90	ssad	latd	cdv90	cdv00
lnha90	1						
lnp90	-0.3053	1					
dens90	0.078	0.267	1				
ssad	0.8008	-0.0474	0.3072	1			
latd	-0.0293	0.2672	0.3361	0.2148	1		
cdv90	0.426	-0.0978	-0.0385	0.3815	0.083	1	
cdv00	0.4059	-0.1084	0.0818	0.3424	0.0785	-0.0614	1

**Appendix 5.4. Detailed results of the OLS estimation of the model with interaction term between p90 and CDV90**

**a) Regression results, robust standard errors**

dluha	Coef.	Robust Std. Err.	t	P> t
lnha90	-0.24781	0.037072	-6.68	0
lnp90	0.054409	0.025112	2.17	0.032
densm	-0.06933	0.132887	-0.52	0.603
ssad	-0.39185	0.083878	-4.67	0
latd	0.028851	0.063616	0.45	0.651
cdv90	-0.14888	0.093323	-1.6	0.113
lnp90cdv90	-0.01755	0.034682	-0.51	0.614
_cons	-0.0649	0.07738	-0.84	0.403
No. of obs				122
R2				0.4416
Root MSE				0.25029

**b) Results of diagnostic tests**

Test	Computed value of test statistics	Probability
F test (5, 116)	6.96	0.0000
Ramsey RESET test for omitted variables	6.12	0.0007
Mean VIF	2.46	

**c) Matrix of correlation coefficients**

e(V)	lnha90	lnp90	densm	ssad	latd	cdv90	lnp90cdv90
lnha90	1						
lnp90	-0.3	1					
densm	0.1034	0.2219	1				
ssad	0.779	-0.0031	0.3298	1			
latd	-0.0382	0.3364	0.336	0.2567	1		
cdv90	0.4057	-0.6783	-0.1394	0.1885	-0.1924	1	
lnp90cdv90	0.1506	-0.7239	-0.1819	-0.0869	-0.3101	0.8482	1

**Appendix 5.5. Detailed results of the instrumental variable approach (2SLS) to estimation of the Model 2**

**a) Regression results, robust standard errors**

dluha	Coef.	Robust Std. Err.	z	P> z
lnp90	0.157225	0.038455	4.09	0
lnha90	-0.25367	0.034238	-7.41	0
densm	-0.08856	0.199154	-0.44	0.657
ssad	-0.35481	0.080611	-4.4	0
latd	0.094356	0.083286	1.13	0.257
cdv90	-0.12666	0.05404	-2.34	0.019
_cons	0.149434	0.107118	1.4	0.163
No. of obs				122
R2				0.2384
Root MSE				0.28258
First stage R2				0.2687
First stage adjusted R2				0.2238

**b) Results of diagnostic tests**

Test	Computed value of test statistics	Probability
Wald test (6)	58.77	0.0000
Test for endogeneity of variables (F)	12.429	0.0006
Test for endogeneity of variables (chi2)	10.1075	0.0015
Test for overidentification of instruments	2.22521	0.1358
Test for weak identification of the instruments	28.0881	0.0000

**Appendix 5.6. Detailed results of the OLS estimation of the Model 2 with the poverty dummy (*gnid*) and interaction term between conflict and poverty (*cdvgnid*) included**

**a) Regression results, robust standard errors**

dluha	Coef.	Robust Std. Err.	t	P> t
lnha90	-0.28344	0.04021	-7.05	0
lnp90	0.054553	0.019727	2.77	0.007
densm	-0.01659	0.127471	-0.13	0.897
ssad	-0.34905	0.0762	-4.58	0
latd	0.051835	0.067425	0.77	0.444
cdv90	-0.03918	0.072072	-0.54	0.588
gnid	0.225727	0.088048	2.56	0.012
cdvgnid	-0.07101	0.093692	-0.76	0.45
_cons	-0.3705	0.133266	-2.78	0.006
No. of obs				122
R2				0.4882
Root MSE				0.24068

**b) Results of diagnostic tests**

Test	Computed value of test statistics	Probability
F test (5, 116)	6.78	0.0000
Ramsey RESET test for omitted variables	4.98	0.0028
Mean VIF	2.17	

**c) Matrix of correlation coefficients**

e(V)	lnha90	lnp90	dens90	ssad	latd	cdv90	gnid	cdvgnid
lnha90	1							
lnp90	-0.3686	1						
dens90	0.1144	0.3479	1					
ssad	0.6921	-0.0102	0.4041	1				
latd	-0.0919	0.321	0.3339	0.1964	1			
cdv90	-0.0025	-0.0362	-0.2291	0.0703	0.0576	1		
gnid	-0.5302	0.2255	-0.1349	-0.2035	0.061	0.6972	1	
cdvgnid	0.2534	-0.0411	0.2388	0.2432	-0.0113	-0.756	-0.7445	1



**Appendix 5.7. Detailed results of the OLS estimation of the Model 2 with the variable on the ratio between migration of highly and low educated included**

**a) Regression results, robust standard errors**

dluha	Coef.	Robust Std. Err.	t	P> t
lnha90	-0.22224	0.040406	-5.5	0
lnp90	0.040854	0.022763	1.79	0.076
densm	-0.05308	0.115263	-0.46	0.646
ssad	-0.34109	0.077117	-4.42	0
latd	0.040468	0.063233	0.64	0.524
cdv90	-0.08041	0.045402	-1.77	0.079
ps90pu90	0.001151	0.001336	0.86	0.391
_cons	-0.07526	0.084631	-0.89	0.376
No. of obs				111
R2				0.4151
Root MSE				0.22337

**b) Results of diagnostic tests**

Test	Computed value of test statistics	Probability
F test (5, 116)	6.51	0.0000
Ramsey RESET test for omitted variables	3.02	0.0334
Mean VIF	1.55	

**c) Matrix of correlation coefficients**

e(V)	lnha90	lnp90	dens90	ssad	latd	cdv90	ps90pu90
lnha90	1						
lnp90	-0.2659	1					
dens90	0.0775	0.3198	1				
ssad	0.6158	0.1529	0.3698	1			
latd	-0.107	0.4027	0.4033	0.2787	1		
cdv90	0.2806	0.023	0.0076	0.3432	0.1474	1	
ps90pu90	0.4297	-0.2851	0.0282	-0.1057	-0.1429	-0.1821	1

**Appendix 5.8. Detailed results of the OLS estimation of the Model 2 without variable on the initial stock of human capital**

**a) Regression results, robust standard errors**

dluha	Coef.	Std. Err.	t	P> t
lnp90	0.045431	0.02305	1.97	0.051
densm	-0.11576	0.186182	-0.62	0.535
ssad	-0.0304	0.068653	-0.44	0.659
latd	-0.11529	0.066419	-1.74	0.085
cdv90	-0.03671	0.058099	-0.63	0.529
_cons	0.571676	0.086261	6.63	0
No. of obs				122
R2				0.0549
Root MSE				0.32282

**b) Results of diagnostic tests**

Test	Computed value of test statistics	Probability
F test (5, 116)	1.59	0.1697
Ramsey RESET test for omitted variables	2.22	0.0899
Mean VIF	1.08	

**c) Matrix of correlation coefficients**

e(V)	lnp90	dens90	ssad	latd	cdv90
lnp90	1				
dens90	0.1884	1			
ssad	0.1001	0.3958	1		
latd	0.0932	0.4907	0.5565	1	
cdv90	-0.148	0.0645	0.3348	0.3162	1

### Appendix 5.9. Summary table of empirical studies on the relationship between remittances and education

Author	Technique	Dependent variable	Independent variables	Special features	Year	Data source	Country	Results
Acosta, 2006	2SLS, IV probit, Propensity score matching	whether a school-age child is currently enrolled in school	household demographic and socio-economic characteristics, geographic location of the household, child age and gender, number of children and adults in the household, and whether the child in question is the oldest child in the household	Controls for gender of children	1998	National household (HH) survey	Mexico	Positive impact for children 11-14, but for girls 15'17 only
Amuendo-Dorantes and Pozo, 2006	probit model with endogenous regressors via maximum likelihood	likelihood that a school-aged child has an age-appropriate education	dummy variable denoting whether the household receives remittances, information on children's gender and family affiliation, age and birth order, educational attainment of the female spouse, urban dummy	Controls for gender of children	2000	HH survey (LAMP project)	Dominican Republic	girls seem to benefit significantly more than boys from the receipt of remittances by the household
Borraz, 2005	OLS	Highest Grade Completed,	Remittance receipt dummy, amount of remittances and the remittances income share , Absent headed household, Non-Spanish language, Marital Status of the Mother, Number of children under 6, Indicator variable if the child is the oldest, Indicator variable for more than 6 children in the household, Indicator variables for electricity, sanitation and water services, Indicator variable for home ownership, Indicator variable if the household participates in a social program	Instrumental variable analysis: historical migration rate and geographic distance as instrumental variables, the interaction of the instrumental variables with mother and households characteristics,	2000	Census (10% sample)	Mexico	positive and small and statistically significant effect of remittances on schooling only for children living in cities with fewer than 2,500 inhabitants with mothers who have a very low level of education

Author	Technique	Dependent variable	Independent variables	Special features	Year	Data source	Country	Results
Cox-Edwards and Ureta, 2003	Cox proportional hazard model	The hazard of leaving school	Remittances, household income, parental education, ...	They investigate the impact of remittances on the probability to drop out of school		1997 National Household Survey of 14,286 individuals aged 6 to 24.	El Salvador	Negative impact on hazard of drop-out, significant only in rural areas.
Cuecuecha, 2008	Lee (1983) two-stage method: 1. multinomial logit, 2. average treatment effect	1. Probability that a household will be of a particular type (if has migrant and if receives remittances); 2. standardized education years	1. Age, Sex, Family Income, Migration rate in municipality, remittances a % of municipality income, capital/labour ratio in municipality; 2. Age, Sex, Family Income ... (different estimation for each type of household)	Disentangling migration and remittances effects	2000	Census (9,1% sample)	Mexico	combined effect of migration and remittances is found to be positive for males and non-negative for females
Hanson and Woodruff, 2003	Instrumental Variable equation	Number of school grades completed	Individual, household and regional characteristics	They use number of school grades completed	2000	Census (10% sample)	Mexico	Positive impact of migration on accumulated schooling
McKenzie and Rapoport, 2006	IV-Censored Ordered Probit	years of schooling attained by child	being in a migrant household, age, age squared, Mother's Years of Schooling, Proportion of rural households owning land in 1910, Male School Attendance in 1930, Gini of Income in 1960, Number of Schools per 1000 population in 1930, Gini of Male Years of Schooling for 15-20 year olds in 1960, Average Male Years of Schooling in 1960 for 15-20 year olds	Migration instrument through historical migration rates from a municipality (since 1920)	1997	National Survey of Demographic Dynamics	Mexico	Negative impact on (the probability of boys completing junior high school, and of boys and girls completing high school) educational attainment; the effect is strongest among 16-18 year olds.

Author	Technique	Dependent variable	Independent variables	Special features	Year	Data source	Country	Results
Leon et al., 2007	IV probit, first-stage equation as tobit	probability of being enrolled in school	absolute amount of remittances received per capita during the last year, children age and gender, head of household's gender and marital status, education level of highest educated males and females, household size and living conditions	Migration instrument through historical migration rates	2006	HH survey	Ecuador	Remittances increase school enrolment, in particular for girls and in rural areas

**Appendix 5.10. Questionnaire used in the author's survey**

	A1. Relationship with the HH: 1. HH 2. Parent 3. Spouse 4. Child 5. Grandchild 6. Brother/Sister 9. Other	A2. Gender 1. Female 2. Male	A3. Age	A4. Ethnic background: 1. Bosnian 2. Serb 3. Croat 9. Other (specify)	A5. Marital status 1. Married 2. Single 3. Widowed 4. Divorced 5. Civic partnership 9. Other	A6. Place of birth	A7. Did you live abroad before? 1. Yes 2. No (>>> A11)	A8. Year of emigration	A9. Reason for emigration: 1. Study 2. Earn better wages 3. Bad household economic situation 4. Dissatisfaction with the political situation 5. Family reunion 9. Other	A10. Migration duration (from 8. Till today, in years)	A11. Level of education 1. Less than primary 2. Primary 3. Secondary 4. College 5. Faculty 6. Master degree 7. PhD	A12. Do you still attend the school? 1. Yes 2. No (>>> A18)
1												
2												
3												
4												
5												

	A13. Which? 1. Primary 2. Secondary 3. College 4. Faculty 5. MSc 6. PhD	A14. Distance to school (km)?	A15. Do you use public transport? 1. Yes 2. No	A16. Reasons for continuing with higher education 1. Better chance of getting a job 2. Pressure by parents 3. Friends did the same 9. Other	A17. Success at school? (>>>A20) 1. Distinction 2. Merit 3. Pass	A18. At what age did you start the latest education level (if higher than primary)?	A19. Reason for drop out? 1. Completed studies 2. Too expensive 3. No interest/unsuccessful 4. Agricultural work 5. Family business 6. School too far 7. Poor facilities 8. Own illness 9. Family illness-death 10. Emigration 11. Safety 12. Got married	A20. Do you work? 1. Yes (>>> A22) 2. No	A21. Why not? (>>> B1) 1. Cannot find job 2. Unable to work 3. Housework 4. Pensioner 5. Student 6. Enough household income 9. Other	A22. Type of job? 1. Part-time 2. Full-time 3. Seasonal job 9. Other	A23. What is your job position? 1. Business owner 2. Manager 3. Administrator 4. Employee 9. Other (specify)	A24. Type of organization? 1. Private 2. Public 3. International
1												
2												
3												
4												
5												

## B. TO BE ANSWERED BY HOUSEHOLD HEAD ONLY

B1. What is your profession?

1. Teacher (at any level of education)
2. Economist
3. Lawyer
4. Engineer
5. Doctor
6. Farmer
7. Salaried worker
8. Worker qualified for production
9. Other (specify) \_\_\_\_\_

B2. Which is your housing status?

1. Private apartment/ house
2. Rented apartment/ house
3. Apartment/ house without paying (rent)
4. Temporary sheltering (collective sheltering, etc.)

B3. If you own a business, what type is it?

1. Trade
2. Manufacturing
3. Agriculture
9. Other

B4. How many people are employed in the business? \_\_\_\_\_

B5. Out of them, how many **family members**? \_\_\_\_\_

B6. Do you own any other household assets?

1. Land
2. Shares
3. Savings
9. Other, specify

B7. Can you please tell whether you expect the household situation in the **NEXT YEAR** to be:

1. Much better
2. Better
3. The same
4. Worse
5. Much worse
6. Do not know

B8. The sources of household average monthly income (Euro) and the household average monthly expenditure structure (Euro)

Household Income Sources		
No.	Description	Euro
	Salary	
	Agriculture	
	Sales from the open market	
	Daily jobs of household members	
	Pension (Kosova/ Bosnia)	
	Social assistance	
	Rent	
	Sales of household real estates	
	Foods, services or clothes from abroad	
	Remittances	
	Other	
	Total	

Household expenditure		
No	Description	Euro
	Food	
	Non-food expenditure (clothing, toiletries, entertainment, health care, education)	
	Rent	
	Public utilities (water, waste)	
	Electricity/ Gas	
	Telephone	
	Taxes	
	Savings	
	Children's education	

## C. TO BE ANSWERED ONLY BY HOUSEHOLDS THAT HAVE FAMILY MEMBERS ABROAD

C1. Whom do you have abroad?

1. Household member
2. Relatives

C2. Does your family receive remittances (money) from family members living abroad?

1. Yes
2. No [Survey ends here]

C3. How often does your family receive remittances from family members living abroad?

1. A few times a month
2. At least once a month
3. \_\_\_ times a year
4. Once a year

C4. Through which channel they are sent:

1. Bank (Western Union, etc.)
2. Personally from sender
3. Informal channels (bus, couriers, etc.)

C5. Are remittances sent for any specific purpose?

1. Yes
2. No (>>> C7)

C6. What is this purpose?

1. Business investment
2. Education of children
3. Medical needs
4. Buy land
5. House reconstruction/purchase

C7. Except remittances do you receive in-kind remittances (Automobiles, Cloths, Electric devices, medicine?)

1. Yes
2. No (>>> C9)

C8. What is the approximate value of in-kind remittances per **YEAR** (please specify)? \_\_\_\_\_

C9. Your opinion on the future trend of remittances:

1. Will increase
2. Will decrease
3. Will remain constant

**Appendix 5.11. Detailed results of the two-stage Heckman's estimation of the LBiH data**

**a) First stage estimation**

cenr	Coef.	Std. Err.	z	P> z
hincpc	0.035927	0.016545	2.17	0.03
hrem	-0.02208	0.082004	-0.27	0.788
hfh	0.155896	0.333253	0.47	0.64
cage	-0.28567	0.01748	-16.34	0
hurb	0.257502	0.089875	2.87	0.004
hhsz	-0.03513	0.052193	-0.67	0.501
hhemp	-1.41549	0.15865	-8.92	0
hnoc	-0.10843	0.068167	-1.59	0.112
hnoc624	-0.12383	0.090956	-1.36	0.173
cmale	-0.29599	0.086148	-3.44	0.001
q1	-0.94508	0.15176	-6.23	0
q2	-0.78185	0.145566	-5.37	0
q3	-0.58622	0.137616	-4.26	0
q4	-0.46208	0.137621	-3.36	0.001
q1rem1	0.158825	0.244437	0.65	0.516
q2rem1	1.776704	0.801119	2.22	0.027
q3rem1	0.065272	0.177075	0.37	0.712
q4rem1	0.014786	0.196483	0.08	0.94
_cons	6.653412	0.42081	15.81	0
No. of obs.				1293
Pseudo R2				0.3545

**b) Second stage estimation**

heepc	Coef.	Std. Err.	z	P> z
hincpc	-10.8252	51.62109	-0.21	0.834
hrem	0.962551	179.0882	0.01	0.996
hurb	-775.657	280.7952	-2.76	0.006
hhemp	2486.19	1099.3	2.26	0.024
hhsz	919.8665	176.9841	5.2	0
cage	492.6324	98.77155	4.99	0
hnoc	-937.61	223.93	-4.19	0
_cons	-8109.14	1720.383	-4.71	0
Mills lambda	-2308.1253	658.8752	-3.50	0.000
Rho	-0.69787			
Sigma	3307.85			
No. of obs.				1293
Censored obs.				668



**c) Results of diagnostic tests**

Test	Computed value of test statistics	Probability
First stage Likelihood ratio test	634.99	0.0000
Second stage Wald test (chi2)	60.23	0.0000
Pearson's goodness-of-fit test	1777.13	0.0000
Percentage of correctly classified	78.89%	

**Appendix 5.12. Detailed results of the two-stage Heckman's estimation of the ASO data**

**a) First stage estimation**

cenr	Coef.	Std. Err.	z	P> z
hincpc	1.953385	0.65292	2.99	0.003
hrem	167.3851	424.8139	0.39	0.694
hfh	1.168744	0.627474	1.86	0.063
cage	-0.3818	0.069391	-5.5	0
hurb	0.250284	0.291075	0.86	0.39
hysize	0.246555	0.260881	0.95	0.345
hhemp	0.235277	0.423765	0.56	0.579
hpa	0.565078	0.514994	1.1	0.273
hnoc	0.0912	0.379168	0.24	0.81
hnoc624	-0.47891	0.431723	-1.11	0.267
cmale	0.221209	0.26386	0.84	0.402
_cons	6.449686	1.52051	4.24	0
No. of obs.				160
Pseudo R2				0.2944

**b) Second stage estimation**

heepc	Coef.	Std. Err.	z	P> z
hincpc	42.13132	97.14312	0.43	0.665
hrem	-54.2223	61.67354	-0.88	0.379
hurb	14.94108	49.61757	0.3	0.763
hhemp	-37.3863	68.06397	-0.55	0.583
hysize	-10.35	54.2403	-0.19	0.849
hfin1b	-9.24267	42.18346	-0.22	0.827
hfin1w	-7.77368	46.75209	-0.17	0.868
cage	39.0963	21.34435	1.83	0.067
hnoc	32.66536	58.03642	0.56	0.574
_cons	-540.55	322.5235	-1.68	0.094
Mills lambda	-149.3886	82.80224	-1.80	0.071
Rho	-1.195862			
Sigma	124.92127			
No. of obs.				160
Censored obs.				69

**c) Results of diagnostic tests**

Test	Computed value of test statistics	Probability
First stage Likelihood ratio test	64.56	0.0000
Second stage Wald test (chi2)	18.41	0.0307
Pearson's goodness-of-fit test	141.00	0.5551
Percentage of correctly classified	75.00%	