



Title	Essays on Labor Migration, Education and Beliefs
Author(s)	山田, 大地
Citation	北海道大学. 博士(経済学) 甲第13372号
Issue Date	2018-12-25
DOI	10.14943/doctoral.k13372
Doc URL	<a href="http://hdl.handle.net/2115/91039">http://hdl.handle.net/2115/91039</a>
Type	theses (doctoral)
File Information	Yamada_Daichi.pdf



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# Essays on Labor Migration, Education and Beliefs

Daichi Yamada

Submitted to Graduate School of Economics  
and Business Administration  
in Partial Fulfillment of the Requirements for

the Degree of Doctor of Philosophy in  
Economics

at Hokkaido University

December 2018

## **Abstract**

This dissertation aims to examine the relationships between labor migration and individuals' and households' behaviors and beliefs with focus on education investment decisions, future migration prospects, remittances and political attitudes. Recently, labor migration across borders has accelerated. High-income developed countries attract labor from low- and middle-income developing countries, and international labor migration has become one of the main income sources for households in developing countries. The literature widely discusses how the money flow and the migration opportunities affect the behaviors of individuals and households in developing countries, which would ultimately related to development in these countries. The literature also pays attention to the roles of information flow associated with human mobility in forming individuals' beliefs, views and attitudes toward economy and politics.

In Chapter 2, the author focuses on labor migration and education investment for children in a migrant sending-country under the assumption of negative selection migration, a circumstance where the migration destination does not reward migrants' education highly and unskilled workers tend to migrate. The author constructs a theoretical model that simultaneously examines the roles of parental remittances and the prospects of children's future migration. Parental migration and remittances can encourage education investment in children in the home country, whereas the prospect of future migration can reduce education incentives in a negative selection circumstance. Simultaneous modeling of these two effects are necessary to derive implication of negative selection migration as they potentially have opposing effects. The author shows that the effect of future migration prospects would outweigh the effect of parental migration and make the overall effect negative if the quality of education is low, a condition which intuitively matches the circumstance in a developing country.

In Chapter 3, the author empirically examines the theoretical implications from Chapter 2, using data from Tajikistan, a former Soviet Union country located in Central Asia and one of the most migrant-dependent countries. Referencing the immigration policy change in Russia, the main migration destination for migrants from Tajikistan, the author aims to identify the effect of

migration prospects, which are unobservable, and the effect of parental migration, which can be endogenous. The levels of education investment are measured by education attainment among male in this chapter. The results show that parental migration encourages education investment; that the prospect reduces it; and that the overall effect of migration is negative. These findings support the pessimistic view in the theoretical discussion and exemplify the adverse consequences of labor migration.

Chapter 4 also examines the effects of labor migration on education investment in Tajikistan, but with focus on parental migration and educational gender gap. While remittances from migrating parents can encourage education investment, as is discussed above, parental migration can have side-effects that potentially reduce education investment. For example, parental absence during the migration episodes can reduce investment in children's education by compelling them to engage in household labor or reducing the level of home education. Moreover, because of gender division of labor and related discrimination, the degrees of these potentially positive and negative effects of parental migration — and the overall effect of parental migration as a consequence — can vary by children's gender. Using data from Tajikistan and focusing on non-compulsory secondary education, the author shows that parental migration does not affect enrollment among male children but reduces that among female children through the aforementioned side-effects. This contributes to the widening of gender gap in education, a problem that has been prevalent in Tajikistan since its independence.

Finally, Chapter 5 shifts the focus to political and economic transitions in former communist countries in Europe, the Caucasus and Central Asia, and examines the effects of sending emigrants and receiving immigrants on grass-root support for transition. Since the dissolution of the East Bloc, the progress in transitions and individual support for them have varied. The literature recognizes the roles of labor migration and associated information flow in promoting grass-root support for democracy in developing countries. However, these roles in transition countries have not been extensively explored. Using data covering 27 transition countries and three points of time, 2006, 2010 and 2016, the author shows that sending emigrants, particularly to Western Europe, fosters

support for a market economy, but that receiving immigrants impedes support for a market economy and democracy. The positive effect of emigration is consistent with the role of information flows from the West. On the other hand, the negative effect of immigration suggests that economic pressures by immigrants develop anti-immigrant views, the desire for governmental intervention, and support for authoritarian regimes.

## **Acknowledgements**

First of all, I express great appreciation to my advisor, Masato Hiwatari. Without his advices, supervision and guidance, I would not be able to accomplish this dissertation. He is also my coauthor in some of the works, and Chapter 5 of this dissertation is based on one of them.

I am also grateful to Yukiko Abe and Jun-ichi Itaya, the two other supervisors of mine, and Atsushi Ohyama, who had also been one of my supervisors until his move. Their views and disciplines as well as critical but constructive comments are always helpful for shaping and reshaping my idea.

My work received great benefits from presentation opportunities in the conferences of Japanese Economic Association and Japan Association for Comparative Economics Studies as well as in various formal and informal seminars at Hokkaido University and Hitotsubashi University. I appreciate comments from Susumu Imai, Bakhtiyor Islamov, Ichiro Iwasaki, Kazuhiro Kumo, and other participants and discussants in these opportunities. My appreciation also extends to my fellow students in Hokkaido University, some of whom have already completed their courses. Discussions with Xuelong Wang and Somsay Ouanphilalay were helpful for shaping my idea.

Last but not least, I appreciate the Graduate School of Economics and Business Administration of Hokkaido University for administrating my Ph. D. course.

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# Chapter 1 Introduction

Since the dawning of human history, we human beings have moved all over the world. Humans have traversed the deserts, forests, mountains and oceans, seeking places of residence, commercial opportunities, shelters, resources, repose and liberty. The freedom of movement has been recognized as a basic human right that must be respected (United Nations General Assembly 1996, Article 12).

Recently, human mobility across borders has accelerated. As of 2015, the stock of international migrants is estimated to be 3.3% of the world population. This rate among OECD countries increased from 6.0% in 1990 to 10.1% in 2015. In the meantime, the value of personal remittance receipt as the percentage of the world GDP also increased from 0.4% to 0.8%, and in certain migrant-sending countries, the figure amounts up to 10-50% (The World Bank 2018). High-income developed countries attract labor from low and middle-income developing countries. International labor migration has become a key economic activity and one of the main income sources for households in migrant-sending developing countries.

With labor migration becoming increasingly common, its consequences for migrant-sending countries have also begun receiving attention. The flow of physical and human capital associated with human flow, for example, *brain drain*, has been discussed since the 1960s (Bhagwati & Hamada 1974; Grubel & Scott 1966; Kwok & Leland 1982; Miyagiwa 1991). The opportunities for international labor migration and remittances from abroad affect the incentives for human capital investment in migrant-sending countries (Mountford 1997; Docquier et al. 2008). Remittances from abroad often, albeit not always, help reduce poverty and related problems in developing countries, such as school dropout and infant mortality (Acosta et al. 2008; Adams & Cuecuecha 2010, 2013; López-Córdova 2005; for a review, see Adams 2011). The flows of information, senses of values, and political, social and economic perspectives associated with human mobility, referred to as *cultural remittances* (Levitt 1998), also play roles in shaping people's attitudes and behaviors.

This dissertation focuses on the relationships between labor migration and individual's and households' behaviors and beliefs with focus on education investment decisions, future migra-

tion prospects, remittances and political attitudes. In Chapter 2, the author theoretically examines the effects of labor migration on education investment for children in a migrant-sending country. Chapters 3 and 4 empirically examine the effect of labor migration on education investment using data from Tajikistan, one of the most migration-dependent countries. In Chapter 5, the author focuses on the transitions to market-based and democratic regimes in the former communist countries and empirically explores the effects of receiving and sending migrants at the macro level on individuals' beliefs, support and preference regarding a market economy and democracy.

## **Summary of Chapter 2**

To elaborate, in Chapter 2, the author constructs a theoretical model to examine the relationship between migration and education investment in the home country, and discusses the roles of children's future migration prospects and migrating parents' remittances. The literature has addressed the possibility that labor migration affects education investment in migrant-sending developing countries. The most intensively discussed topic in the theoretical literature is the role of future migration prospects. Under the assumption of positive selection (or with focus on such cases), a circumstance where migration destinations boast higher returns to education than the home countries and high-skilled workers tend to migrate, the *brain gain* literature shows that the prospects of becoming skilled migrants promote education investment (Beine et al. 2001; Mountford 1997, Stark et al. 1997). However, this assumption does not hold universally, and in certain countries, the migrants' selectivity is the converse, negative selection (Borjas 1987, 2014), wherein migration destinations do not reward migrants' human capital and unskilled workers tend to migrate. Stark and Byra (2012) show that future migration prospects under negative selection reduce education investment. Nevertheless, focusing solely on the prospects could lead to biased conclusions since it does not account for the effects of parental migration. Parents often migrate, leaving their children behind, and share their earnings in migration destinations through remittances. Empirics have found that the increased income or remittances encourage education investment by relaxing the households' constraints (Adams & Cuecuecha 2010, 2013; Alcaraz et al. 2012; Yang 2008). To

discuss whether negative selection migration overall encourages or discourages education investment, these two oppositely directed effects need to be examined simultaneously.

The author constructs a model that simultaneously examines the effects of future migration prospects and parental remittances in a negative selection circumstance, where these effects are referred to as the prospect effect and the remittance effect hereafter. The model incorporates an intergenerational aspect of education investment, which is related to the models of purely or impurely altruistic decision makings in Becker and Barro (1988), Becker and Lewis (1973) and Galor and Weil (2000). More specifically, parents make education investment for their children out of their incomes, considering children's future incomes. This allows both the prospects of children's future migration and parental migration to affect the education investment decisions. In addition, the model incorporates the risk of failing to migrate following the common framework in the *brain gain* literature.

The results first show that the prospect effect can work even if we account the remittance effect and the risk of migration failure. However, regarding whether migration overall raises or reduces education investment, the results present two scenarios. In the optimistic scenario, the overall effect of migration can be positive. Migrating parents are willing to spend their increased income in education. Either the remittance effect outweighs the prospect effect, or parents ignore children's migration opportunities and make large education investment so that children will become skilled workers in the home country. Clearly, if parents fail to migrate, then only the prospect effect plays a role and the overall effect of migration is negative. Conversely, in the pessimistic scenario, the prospect effect is strongly and widely observed and the overall effect of migration is negative. Even parents succeeding to increase their incomes by migration and those with sufficiently high education levels that they do not wish to migrate by themselves prefer reducing education investment to making large education investment, knowing that their children can earn decent incomes if succeeding to migrate. Comparative statics suggest that the pessimistic scenario is likely to occur if the quality of education is low or the costs to obtain high levels of education are large, the conditions which would generally match the circumstances in developing countries.

## Summary of Chapters 3 and 4

Chapters 3 and 4 empirically examine the effects of migration on education investment, using household survey data from Tajikistan, a former Soviet Union country in Central Asia. In Tajikistan, the increased education costs and decreasing education investment have been problems since its independence. Meanwhile, Tajikistan experienced a rapid increase of labor migration in the second half of the 2000s and became one of the most migration-dependent countries in the world. Migration selectivity appears to be more negative than positive, and workers with a relatively low education level tend to migrate.

Chapter 3 examines the theoretical implication in Chapter 2. To identify the prospect of children's future migration, which is basically unobservable, the analysis utilizes the Russia's immigration policy change that began liberalizing immigration around 2005. The author first measures the overall effect of migration, including the prospect effect, as the difference in the final education levels of male children between two generations; those who made education investment before the policy change versus those doing so after. Since the former generation is likely to be less affected by parental migration and to have future migration prospect less than the latter, examining the difference will allow us to discuss the overall effect of migration. Then, the prospect effect and the effect of parental migration are separately extracted by controlling parental migration directly. To deal with the potential endogeneity of parental migration, the author utilizes the differential reactions of parental migration to the policy change by age as an instrument.

The results show that the overall effect of migration is negative. Although parental migration encourages education investment, the prospect reduces it and outweighs the effect of parental migration at the aggregate level. Moreover, while a before-after analysis could be biased by time-variant macro-level factors, controlling these factors further strengthens the results. The analysis contributes to the literature as a unique study that focuses on the role of future migration prospects under negative selection. The previous empirics have examined the prospects under positive selection (Batista et al. 2012; Beine et al. 2008; Shrestha 2017) or discussed the role of the prospects under negative selection as a side-effect of parental migration (Kandel & Kao 2001; McKenzie &

Rapoport 2011).

Meanwhile, Chapter 4 focuses on examining the roles of parental migration with focus on its gender heterogeneity. The previous empirics point out that parental migration can have various side-effects that discourage investment for children's education (Acosta 2011; Amuedo-Dorantes & Pozo 2010; Kandel & Kao 2001; McKenzie & Rapoport 2011). A notable example is parental absence due to migration. Parental absence can reduce the household labor supply for housework, running or maintaining household businesses or farms, or child care. Children, particularly elder ones, may need to supply labor for the absent parents, but this could reduce their school attendance or force them to leave school. The author estimates the probability of secondary education enrollment — education below that level is compulsory and almost universal in Tajikistan — using data for both male and female children. The results show that parental migration does not affect the male enrollment but reduces the female enrollment probability, particularly when parents have low education levels. This suggests that parental migration widened the educational gender gap in Tajikistan. A supplementary analysis shows that female children who drop out of school and whose parents are migrants engage in unpaid family works, which suggests that the negative effect on female education can be attributed to the aforementioned side-effect of parental absence.

## **Summary of Chapter 5**

Chapter 5 shifts the focus to the politico-economic transition in former communist countries and sheds light on the roles of migration in forming individuals' beliefs, support and preference regarding a market economy and democracy. Three decades after the dissolution of the East Bloc, contrary to the remark by West right after that event (e.g. Fukuyama 1989), the transition to market-based democratic regimes has not been completed universally. While some of the Central and Eastern European countries joined the party of their former western counterpart, authoritarian regimes and Soviet-style institutions continue to exist in certain other countries.

Meanwhile, generally in transition countries, not only between Tajikistan and Russia, migration became increasingly common in the 2000s. The EU expansions and economic integration

stimulated the human flow within, from, and even to transition countries.

The recent literature has begun recognizing the role of emigration in fostering support for democracy in developing countries (Docquier et al. 2016). Migrants' experience and the information, knowledge and sense of values they obtain in migration destinations can affect their ways to view their home countries, governments and economies. Migrants who maintain their relationships to the home countries also provide *cultural remittances*, that is, they diffuse their views to those remaining in the home countries, and migration can alter the politico-economic views of those who do not migrate by themselves (Levitt 1998). In addition, the flow of monetary remittances and that certain households do send emigrants can also contribute toward support for the liberty of choices.

Transition countries provide an interesting framework to examine the relationship between migration and politico-economic views of individuals. Whether individuals support a market economy and democracy cannot be more relevant a topic in transition countries than in any other region. These countries share the same turning point for their regimes, albeit differences in the background, but diverse in their current politico-economic status and intensities of migration. In addition, under the multi-directed flows of migration in this region, receiving immigrants can also help shape individuals' politico-economic views. Receiving immigrants can either promote mutual understanding, trust and respect between people or, conversely, lead to hostility and search for power over minority and foster support for anti-liberal, restrictive policies.

The author examines how sending emigrants and receiving immigrants at the macro level affect support for economic and political systems at the individual level in a multi-level regression framework. The analysis uses the survey data that cover 27 transition countries in Europe, the Caucasus and Central Asia and three points of time, 2006, 2010 and 2016, and that collect individual-level preference for a market economy over a planned economy and that for democracy over authoritarianism. The results show that sending emigrants promotes support for a market economy, but that receiving immigrants reduces support for both a market economy and democracy. Supplementary analyses suggest that the positive effect of emigration is attributable to the role of *cultural remittances* from Western Europe, but that the negative effect of immigration is attributable to the

pressure that immigrants provide to the natives, which forms anti-immigrants views. Although individuals do not seem to completely lose trust in the fundamental values of a market economy, the declining support for democracy is associated with the loss of value for the fundamentals of democracy.

## **Overall summary**

Throughout this dissertation, the author sheds light on the consequences of labor migration with focus on both the monetary and non-monetary channels of the effects of migration and on both positive and negative aspects of its effects. The results present views that have not been extensively examined in the literature. The findings in Chapters 2 to 4 suggest that negative selection migration can be detrimental to development of migrant-sending countries even when accounting for the roles of remittances. The analysis in Chapter 5 sheds light on the roles of emigration and immigration on grass-root support for a market economy and democracy in transition countries, which has received little attention despite the prevalence of migration and the relevance of this issue in that region. Clearly, the discussions do not intend to draw decisive conclusions that are immediately applicable to other cases. Nevertheless, the discussions aim to offer benchmark results and case studies that can be critically examined with theoretical and empirical evidence from other cases and frameworks in further research.

The structure of this dissertation follows the chapters described above. Chapter 2 constructs a theoretical model to examine the prospect and remittance effect on education investment under a negative selection circumstance. Chapter 3 empirically examines the theoretical implications in Chapter 2, using data from Tajikistan. Chapter 4 revisits migration and education investment in Tajikistan with focus on the role of parental migration and its gender-heterogeneous effect. Chapter 5 explores the effects of sending emigrants and receiving immigrants on the individual-level support for a market economy and democracy, using data from 27 transition countries. Finally, Chapter 6 concludes. The appendices containing supplementary information are provided at the end of each chapter. The references are cited at the end of the dissertation.



**Chapter 2 The effect of labor migration on education investment in a negative selection circumstance: a theoretical investigation**

## 2.1 Introduction

The roles of labor migration on economic development have been widely discussed over the last decades.<sup>1</sup> How migration affects education investment, or the level of human capital, in migrant-sending developing countries is one of the central topics. *Brain drain* is the seminal concept on this issue: high-skilled workers migrate and human capital is lost in migrant-sending countries (Bénassy & Brezis 2013; Bhagwati & Hamada 1974; Kwok & Leland 1982; Miyagiwa 1991). Meanwhile, the *brain gain* literature insists a positive consequence (Beine et al. 2001; Mountford 1997; Stark et al. 1997, 1998). Individuals with future migration prospects would make large education investment to become high-skilled migrants. This could contribute to the increased human capital in the migrant-sending countries since not all of those having raised education investment do migrate.

An underlying assumption in these discussions is positive selection of migrants: the labor market in migration destinations rewards human capital more highly than that in the home country, and high-skilled workers tend to migrate. This chapter, on the contrary, focuses on negative selection migration, where unskilled workers tend to migrate (Borjas 1987, 2014). While positive selection is widely recognized (Grogger & Hanson 2011), negative selection is also observed in certain migration corridors. With relatively equal income distribution in developed countries, asymmetric information on migrants' skills (Katz & Stark 1987), or regulations that limit migrants' jobs to unskilled ones, migrants' education may not be highly rewarded but low-skilled migrants may earn decent incomes. This leads to migration of relatively low-skilled workers.

This chapter theoretically examines the effects of negative selection labor migration on education investment in a migrant-sending country. The author addresses two effects of negative selection migration. The first one is the prospect effect. Contrary to positive selection, the possibility of future migration as an unskilled worker provides the opportunities to earn a decent income without high education. Then, children with future migration prospects may reduce education investment, choosing to be unskilled migrants instead of skilled workers in the home country. The

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<sup>1</sup>The theoretical model in this chapter is a generalized version of the one in Yamada (2018).

second effect is the remittance effect. Parents often migrate, leaving their children behind, and share their incomes through remittances. Their remittances or the income effect of their migration are found to encourage education investment for children in the home countries in some empirics (Adams & Cuecuecha 2010, 2013; Yang 2008). Since both these two oppositely directed effects can play roles, whether migration overall encourages or discourages education investment is not clear *a priori*. Answering this question requires a model that simultaneously examines these two effects.

The basic model structure is that a parent makes education investment for the child. The parent has impurely altruistic preference and derives utility from both her own consumption and the child's future income. While that the parent cares about the child's future income provides the parent motivations for making education investment as in standard models of human capital investment by Becker and Barro (1988), Becker and Lewis (1973), and Galor and Weil (2000), it also allows us to examine the role of future migration prospects. In the meantime, the model assumes that the parent finances the education investment out of their own income, and parental migration and the resulting increase in parental income also affect the level of education investment. In addition, migration is assumed to be a risky choice such that individuals wishing to migrate do not always succeed to migrate. This assumption is common in the literature and reflects the realistic circumstances: that is, for example, those applying for migration may fail to obtain visas or work permits.

The framework contributes to the literature by shedding light on negative selection, constructing a model that simultaneously examines the two effects of migration, and providing theoretical predictions on the overall effect of negative selection migration on education investment. Compared to positive selection, the previous theoretical discussions have paid relatively little attention to negative selection. Stark and Byra (2012), one of few discussions, apply the *brain gain* framework to negative selection and point out the negative effect of migration prospects. Yet, they abstract the remittance effect as the *brain gain* literature often does. By incorporating the two effects simultaneously, the model in this chapter allows us to examine implications of the over-

all effect of negative selection migration and discuss whether the negative educational outcome remains observed even when we take into account the remittance effect.

The results first show that the prospect effect can work even if we account the remittance effect and the risk of migration failure. However, regarding the overall implications of migration, the results present two scenarios. In the optimistic scenario, the overall effect of migration can be positive. Migrating parents are willing to spend their increased income in education. Either the remittance effect outweighs the prospect effect, or parents ignore children's migration opportunities and make large education investment so that children will become skilled workers in the home country. Clearly, if parents fail to migrate, then only the prospect effect plays a role and the overall effect of migration is negative. Conversely, in the pessimistic scenario, the prospect effect plays the main role. Even parents succeeding to increase their incomes by migration and those with sufficiently high education levels that they do not wish to migrate by themselves prefer reducing education investment to making large education investment, knowing that their children with the reduced education levels can earn decent incomes if succeeding to migrate. Comparative statics suggest that the pessimistic scenario is likely to occur if the quality of education is low or the costs to obtain high levels of education are large, the conditions which would generally match the circumstances in developing countries. This conversely implies that improving education quality or reducing education costs would be potential policies to avoid the pessimistic scenario. However, it could be noted that migration overall can reduce education investment at the aggregate level even in the optimistic scenario if only small proportion of parents succeed to migrate.

The remainder of this chapter proceeds as follows. Chapter 2.2 presents the model setting. In Chapter 2.3, the author examines the optimal education investment decisions, holding parental income constant, which effectively allows us to focus on the role of the prospect effect. Chapter 2.4 incorporates the remittance effect and discusses the overall effect of migration and the implications of the theoretical analysis. Proofs for lemmas and a proposition are provided in the appendix of this chapter.

## 2.2 The model setting

Consider a parent in a migrant-sending country who earns income and makes investment in her child's human capital. She derives utility from her own consumption but cares the future income of her child as well. She also chooses either to work in the home country or to migrate to the foreign country, leaving her child at home. To ignore issues such as husband-wife bargaining and quantity-quality tradeoff, assume that a household comprises only a parent and a child.

Let  $h_p$  be the human capital level of the parent, which is given. The income in the home country is normalized to  $h_p$  whereas the net income after migration costs in the foreign country is  $\alpha h_p + \mu$ . The marginal return to human capital is 1 in the home country and  $\alpha$  in the foreign country. Assume  $\alpha \in (0, 1)$  so that human capital is not highly rewarded in the foreign country. Assume also  $\mu > 0$ , which could be regarded as the net base income or the net reward for the migrant's physical labor supply. Then, in the foreign country, a worker can earn decent income even if her human capital level is not high.<sup>2</sup> Migration costs do not only refer to the initial transportation costs, but also include various opportunity costs, such as loss of working time during the period of moving and loss of scale-economy of household consumption.

Given income,  $y_p = h_p$  or  $\alpha h_p + \mu$ , the parent makes the education investment of  $e$  for her child. The human capital of the child is produced according to

$$h_c = Ah(e), \quad (2.1)$$

where  $h' > 0$ ,  $h'' < 0$ ,  $h(0) = 0$ ,  $h'(0) = +\infty$  and  $h(e) \rightarrow +\infty$  as  $e \rightarrow +\infty$ . The concavity of  $h(e)$  is equivalent to the convexity of the education costs to realize a certain level of  $h_c$ .  $A$  is the productivity parameter of human capital production. It could be regarded as the quality of

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<sup>2</sup>A simple rationale for this type of the income structure is that developed countries tend to have relatively equal income distribution or pro-poor redistribution (Borjas 1987; Chiquiar & Hanson 2005). In the latter case,  $\mu$  could be regarded as the value of lump-sum transfer. Moreover, even if the marginal return in the destination is greater than 1 for the destination natives, it could be smaller than 1 for migrants. Employers in the destination would offer wages fixed to some extent, expressed by  $\mu$ , in the presence of asymmetric information on migrants' human capital levels (Katz & Stark 1987). If migrants fail to utilize their human capital fully due to cultural and language differences, or regulations, stereotypes and discrimination limit migrants' jobs to unskilled ones, then migrants incomes can reward human capital less but physical labor supply more.

education in the sense that an increase in  $A$  raises the level of  $h_c$  produced from the same  $e$ . Large  $A$  also reduces the cost to obtain large  $h_c$  or the relative price of education. Assume that the credit market for education investment is absent and that the parent cannot invest more than her income. After making education investment, the parent consumes the remainder of her income,  $y_p - e$ .

Similarly to the parent, the child also decides whether to migrate when she becomes an adult. At this decision stage, she treats  $h_c$  as given since it has already determined by her parent. She faces the same income profile as her parent does.

Regarding the migration decisions of the parent and child, assume that each wishes to migrate if migration strictly increases the income or, equivalently,  $h_p, h_c < \mu/(1 - \alpha)$ . However, assume also that each faces the risk of failing to migrate: namely that the parent succeeds to migrate with the probability of  $m_p \in (0, 1]$  and that the child with  $m_c \in (0, 1]$ , where  $m_p$  could be the same as, larger or smaller than  $m_c$ . Migrant-receiving countries may refuse a certain proportion of applications for immigration, visa or working permits to control the number of immigrants. Moreover, the child may face the risk that the destination country stops receiving immigrants in the future. We assume these probabilities to be constant throughout the main model. Such a lottery-like migration probability is commonly found in the *brain gain* literature (e.g. Beine et al. 2001; Mountford 1997).<sup>3</sup>

To examine the optimal education investment decision, we could focus on her utility maximization after receiving  $y_p$ . Her preference given  $y_p$  is described by the following utility function;

$$U = \begin{cases} u(y_p - e) + v(h_c) & \text{if } Ah(e) \geq \mu/(1 - \alpha) \\ u(y_p - e) + (1 - m_c)v(h_c) + m_c v(\alpha h_c + \mu) & \text{if } Ah(e) < \mu/(1 - \alpha) \end{cases} \quad (2.2)$$

where  $u' > 0$ ,  $u'' < 0$ ,  $u'(0) = +\infty$ ,  $v' > 0$ ,  $v'' < 0$ , and  $v'(0) = +\infty$ . The parent does not only derive utility from her own consumption expressed by  $u(\cdot)$ , but also cares the child's income expressed by  $v(\cdot)$ . As long as  $Ah(e) \geq \mu/(1 - \alpha)$ , the parent knows that the child will not wish to migrate.

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<sup>3</sup>We could assume alternatively that the probability of migration is either increasing or decreasing in the human capital level. The author examined such models but, while this affects education investment incentives and the resulting optimal education investment decisions, the main conclusions are the same as ones in the current model setting.

She can assume that her child earns  $y_c = h_c$  for certainty and the utility from the child's income is expressed by  $v(h_c)$ . However, for  $e$  such that  $Ah(e) < \mu/(1 - \alpha)$ , the parent knows that the child will wish to migrate, but is not certain whether the child will succeed to migrate. Therefore, the utility from the child's income is expressed as the expected utility. Note that the assumption that the parent migrates if  $h_p < \mu/(1 - \alpha)$  matches her utility maximizing behavior since, with an optimal education investment, her utility is increasing in  $y_p$  by the envelope theorem.

Regarding the model setting, there are three points to be noted. First, the non-linear preference and the absence of the credit market for education investment allow the parent's income to affect education investment. This is vital for incorporating the remittance effect. The framework in the *brain gain* literature and its application to negative selection by Stark and Byra (2012) assume that children make education investment for themselves, financing education costs by loan from perfect credit market. This rules out the possibility that parental remittances play any role. Second, that the parent cares about the child's income allows the prospect of the child's future migration to play a role. That preference is related to non-dynastic impure altruism or warm-glow preference, especially to the one in Galor and Weil (2000), as opposed to pure dynastic altruism in Becker and Barro (1988).<sup>4</sup> Although it is common to assume that a warm-glow parent cares about how much to spend in the child's education, it would be reasonable that the parent deriving joy from giving education also cares about how highly their gift will be rewarded, particularly if education investment serves as a non-monetary form of bequests. Third, the model focuses on a single pair of a parent and a child since it does not involve any inter-household interaction. We proceed as if we were focusing on a single representative household. Yet, the discussion is directly applicable to the cases where the economy comprises various households with heterogeneous levels of  $h_p$ . We take this view when we interpret the results.

For the clarity of the discussion, the author throughout this chapter defines the prospect and remittance effects as follows. The prospect effect is the difference between the optimal education

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<sup>4</sup>Alternatively, we could assume that the child makes transfers to the parent in the future as an informal pension and that the parent cares about the amount of the transfers that are dependent on  $y_c$ . This view, where giving education is literally investment, is noted in Galor and Weil (2000) and close to the models by Cox (1987) and Cox et al. (1998).

investment levels when the parent considers the child's future migration and when migration is impossible, holding the parental income constant. The remittance effect is the income effect of the parental migration on the optimal education investment. The sum of these two effects is referred to as the overall effect throughout the theoretical discussions.<sup>5</sup>

## 2.3 Optimization and the prospect effect

Let us begin with examining the education investment a parent will make after realizing the income of  $y_p$ . This allows us to focus on examining the prospect effect while setting up the stage for examining the remittance effect. The optimal education investment maximizes

$$U = u(y_p - e) + (1 - \mathbb{I})v[Ah(e)] + \mathbb{I}\{(1 - m_c)v[Ah(e)] + m_c v[\alpha Ah(e) + \mu]\}, \quad (2.3)$$

where  $\mathbb{I}$  is the indicator function giving 1 if  $Ah(e) \leq \mu/(1 - \alpha)$ , and 0 otherwise. The parent considers the possibility of the child's future migration if  $Ah(e) < \mu/(1 - \alpha)$ , but ignores that possibility once she decides to choose  $e$  such that  $Ah(e) \geq \mu/(1 - \alpha)$ , since the child will not wish to migrate. This conversely implies that the parent can control the child's migration decision by choosing  $e$ . Effectively, the parent chooses either; (i)  $e = e_M$  that satisfies  $Ah(e) < \mu/(1 - \alpha)$  and maximizes (2.3) with  $\mathbb{I} = 1$  or: (ii)  $e = e_N$  that satisfies  $Ah(e) \geq \mu/(1 - \alpha)$  and maximizes (2.3) with  $\mathbb{I} = 0$ . With this setting, the maximization problem can be solved in two steps: derive  $e_M$  and  $e_N$  first and then choose the one that gives higher utility.

In the case (i),  $e_M$  maximizes  $u(y_p - e) + (1 - m_c)v[Ah(e)] + m_c v[\alpha Ah(e) + \mu]$  subject to  $Ah(e) < \mu/(1 - \alpha)$ . The concavity of the problem implies that the unique interior solution,  $e^* = e^*(y_p, m_c)$ ,

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<sup>5</sup>As suggested in the empirical literature (e.g. McKenzie & Rapoport 2011), parental migration can have additional side-effects on children's education. The parental absence may reduce children's school attendance by forcing them to do housework or through some psychological effects. Parents may provide connection in the destination and this could reduce the costs of children's future migration and affect their migration decisions. Throughout this chapter, the author does not consider these side-effects and focuses on the remittance and prospect effects. The empirical analyses in Chapters 3 and 4 account these side-effects.



is defined by the first-order condition of

$$\frac{dU}{de} = -u'(y_p - e^*) + Ah'(e^*) \{(1 - m_c)v'[Ah(e^*)] + m_c\alpha v'[\alpha Ah(e^*) + \mu]\} = 0. \quad (2.4)$$

The properties of  $u$ ,  $v$  and  $h$  assures  $0 \leq e^* \leq y_p$  for any  $y_p$  with the equalities holding if and only if  $y_p = 0$ . By the implicit function theorem,  $\partial e^*/\partial y_p > 0$ . Also,  $e^* \rightarrow +\infty$  as  $y_p \rightarrow +\infty$ . These imply that the constraint is violated for  $y_p \geq y^*$ , where  $y^*$  is defined as  $Ah[e^*(y^*, m_c)] = \mu/(1 - \alpha)$ .

Therefore,

$$e_M = \begin{cases} e^*(y_p, m_c) & \text{if } y_p < y^* \\ \bar{e} & \text{if } y^* \leq y_p \end{cases} \quad (2.5)$$

where  $\bar{e}$  is defined as  $Ah(\bar{e}) = \mu/(1 - \alpha)$ .<sup>6</sup>

Meanwhile,  $e_N$  maximizes  $u(y_p - e) + v[Ah(e)]$  subject to  $Ah(e) \geq \mu/(1 - \alpha)$ . The interior solution,  $e^{**}(y_p)$ , corresponds to  $e^*(y_p, 0)$ . Since the properties of  $e^*$  with respect to  $y_p$  hold for  $e^{**}$ , the constraint is violated for  $y_p < y^{**}$ , where  $y^{**}$  is defined as  $Ah[e^{**}(y^{**})] = \mu/(1 - \alpha)$ . Also, for  $y_p < \bar{e}$ ,  $e_N$  cannot be defined since any  $e \leq y_p$  cannot satisfy the constraint. Therefore,  $e_N$  is defined as

$$e_N = \begin{cases} \bar{e} & \text{if } \bar{e} \leq y_p < y^{**} \\ e^{**}(y_p) & \text{if } y^{**} \leq y_p \end{cases} \quad (2.6)$$

Note that  $e^{**}$  is always optimal if migration is impossible. Therefore,  $e^{**}$  will be used as the status quo to describe the prospect effect.

Before moving to the second step, examine the property of  $e^*$  with respect to  $m_c$ . For any  $y_p > 0$ ,

$$\frac{\partial e^*}{\partial m_c} = \frac{Ah'(e^*) \{v'[Ah(e^*)] - \alpha v'[\alpha Ah(e^*) + \mu]\}}{d^2U/de^2}.$$

Intuitively,  $\partial e^*/\partial m_c < 0$  since the higher the probability of migration is, the more likely the return

<sup>6</sup>Strictly speaking, the parent needs to choose  $e$  infinitesimally smaller than  $\bar{e}$  for  $y_p \geq y^*$ . However, since the properties of  $\bar{e}$  and  $e$  infinitesimally smaller than  $\bar{e}$  are qualitatively the same and  $\bar{e}$  does not constitute the optimal education investment after the second step, let us treat  $\bar{e}$  as the solution for  $y_p \geq y^*$ .

to human capital is to be small. Clearly, if  $y_p \leq y^*$  for some given  $m_c$ , then this implies  $v'[Ah(e^*)] > \alpha v'[\alpha Ah(e^*) + \mu]$  and  $\partial e^*/\partial m_c < 0$  holds in the neighborhood of  $m_c$ . Moreover, note the following.

**Lemma 1.** *For any given  $y_p > 0$ , if there exists  $m \in (0, 1]$  such that  $y_p \leq y^*$  at  $m_c = m$ , then  $\partial e^*/\partial m_c < 0$  for any  $m_c$ .<sup>7</sup>*

Lemma 1 effectively assures  $\partial e^*/\partial m_c < 0$  for any  $m_c$ .  $\partial e^*/\partial m_c \geq 0$  holds only if, for given  $y_p$ , there is no  $m_c$  such that  $e_M = e^*$ . However, in such a case, the property of  $e^*$  is not of our interest since the parent with given  $y_p$  never chooses  $e^*$  for any  $m_c$ . An immediate corollary is that  $e_M = e^*(y_p, m_c) < e^{**}(y_p)$  as long as  $y_p \leq y^*$ . Another corollary is  $y^{**} < y^*$ . From the first corollary,  $e^*(y^*, m_c) < e^{**}(y^*)$  holds at  $y_p = y^*$ . Then, because of  $\partial e^{**}/\partial y_p > 0$ , we must have  $y^{**} < y^*$  so that  $e^*(y^*, m_c) = e^{**}(y^{**}) = \bar{e}$ . Finally,  $y^{**} < y^*$  implies  $e_N > e_M$  for any  $y_p$ . At least one of  $e_M$  or  $e_N$  is an interior solution for any  $y_p$ , and both are for  $y_p \in (y^{**}, y^*)$ .

Then we proceed to the second step of the parent's utility maximization. The parent chooses either  $e_M$  or  $e_N$ . If  $y_p < \bar{e}$ , then she can choose only  $e_M$ , which is  $e^*(y_p, m_c)$  since  $\bar{e} < y^*$ . For  $y_p \geq \bar{e}$ , the parent chooses  $e_N$  if and only if

$$f(y_p) \equiv u(y_p - e_N) + v[Ah(e_N)] - u(y_p - e_M) - (1 - m_c)v[Ah(e_M)] - m_c v[\alpha Ah(e_M) + \mu] > 0, \quad (2.7)$$

assuming that the parent chooses  $e_N$  if she is indifferent between  $e_N$  and  $e_M$ .

**Proposition 1.**

- (i) *There is unique  $\bar{y} \in (y^{**}, y^*)$  such that  $f(\bar{y}) = 0$ .*
- (ii) *The optimal education investment given  $y_p$  is*

$$\hat{e}(y_p) = \begin{cases} e^*(y_p, m_c) & \text{if } y_p < \bar{y} \\ e^{**}(y_p) & \text{if } y_p \geq \bar{y} \end{cases}$$

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<sup>7</sup>Proofs for this and other lemmas and a proposition is provided in Appendix of this chapter.

If  $y_p > \bar{y}$ , the parent makes the education investment of  $e_N = e^{**}$  so that the child will not wish to migrate, and ignores the small return in the foreign country. The level of education investment is the same as the one when migration is impossible. In this sense, the prospect effect does not show up. If  $y_p < \bar{y}$ , on the contrary, the parent decides to let her child wish to migrate and reduces education investment to  $e_M = e^* < e^{**}$ . The prospect effect works for  $y_p < \bar{y}$  and makes the optimal education investment discontinuous at  $y_p = \bar{y}$ . Note that the prospect effect shows up for  $y_p \in (y^{**}, \bar{y})$ , where the child could obtain  $h_c > \mu/(1 - \alpha)$  if only the parent chooses  $e^{**}$ . With migration being possible, the parent with such  $y_p$  economizes education investment and avoids sacrificing her own consumption, knowing that the child receiving small education investment can migrate and earn decent income.

The optimal education investment given  $y_p$  has the following comparative static properties.

**Lemma 2.**

$$\frac{d\bar{y}}{dm_c} = \frac{v[\alpha Ah(e^*) + \mu] - v[Ah(e^*)]}{f'(\bar{y})} > 0,$$

$$\frac{d\bar{y}}{dA} = \frac{h(e^*) \{(1 - m_c)v'[Ah(e^*)] + \alpha m_c v'[\alpha Ah(e^*) + \mu]\} - h(e^{**})v'[Ah(e^{**})]}{f'(\bar{y})} < 0,$$

Moreover,  $\bar{y} \rightarrow 0$  as  $A \rightarrow +\infty$  and  $\bar{y} \rightarrow +\infty$  as  $A \rightarrow 0$ .

The higher the probability of migration is, the wider the area of  $y_p$  is where the prospect effect shows up. The reduced risk of migration failure makes it more attractive for the parent to reduce education investment to  $e^*$  so that the child will wish to migrate. Conversely, an increase in  $A$  shrinks that area. The higher  $A$  is, the less the parent needs to sacrifice her own consumption to give the child large human capital. This encourages the parent to choose  $e^{**}$  so that the child does not wish to migrate.

## 2.4 Incorporating the remittance effect

Now we incorporate the remittance effect of the parental migration. This could be done by replacing  $y_p$  by  $h_p$  or  $\alpha h_p + \mu$ . If the parent does not migrate, either because  $h_p \geq \mu/(1 - \alpha)$  or she

fails to migrate, then the optimal education investment is either  $e^*(h_p, m_c)$  or  $e^{**}(h_p)$ . If the parent migrates, then it is either  $e^*(\alpha h_p + \mu, m_c)$  or  $e^{**}(\alpha h_p + \mu)$ . In addition, if migration were impossible, then  $e^{**}(h_p)$  is optimal. The remaining problem is whether the parent chooses  $e^*$  or  $e^{**}$ . As we express  $e^*$  and  $e^{**}$  in terms of  $h_p$ , the condition  $y_p \geq \bar{y}$  also needs to be expressed in terms of  $h_p$ .

Depending on the level of  $\bar{y}$  and whether the parent succeeds to migrate, that condition is re-expressed differently. To see this, suppose first  $\bar{y} < \mu/(1 - \alpha)$ . Then, the parent earning  $\bar{y}$  must have  $h_p < \mu/(1 - \alpha)$  since the parent with  $h_p \geq \mu/(1 - \alpha)$  earns  $y_p = h_p$ . The parent with  $h_p = \bar{y}$  earns  $\bar{y}$  if she fails to migrate, whereas the parent with  $h_p = (\bar{y} - \mu)/\alpha$  also earns  $\bar{y}$  if she succeeds to migrate —  $(\bar{y} - \mu)/\alpha < \bar{y}$  holds as long as  $\bar{y} < \mu/(1 - \alpha)$ , and the parent with  $h_p = (\bar{y} - \mu)/\alpha$  wishes to migrate. Therefore, the prospect effect works for  $h_p < \bar{y}$  if the parent fails to migrate, and for  $h_p < (\bar{y} - \mu)/\alpha$  if she succeeds to migrate. Conversely, suppose  $\bar{y} \geq \mu/(1 - \alpha)$ . Then, any parent with  $h_p < \mu/(1 - \alpha)$  earns less than  $\mu/(1 - \alpha) < \bar{y}$ , and the parent earning  $\bar{y}$  must be the one who does not wish to migrate. Therefore, the prospect effect works for  $h_p < \bar{y}$  regardless of the parental migration status.

The condition,  $\bar{y} \geq \mu/(1 - \alpha)$  can be restated in terms of the parameter  $A$ , which is vital for the interpretation of the results.

**Lemma 3.** *There exists  $\bar{A}$  such that  $\bar{y} = \mu/(1 - \alpha)$ .  $\bar{y} \geq \mu/(1 - \alpha)$  holds if  $A \leq \bar{A}$ .*

The final optimal education investment can be expressed as  $\hat{e}(h_p, M_p)$ , a function of  $h_p$  and the indicator of parental migration,  $M_p$ , which gives 1 if the parent succeeds to migrate and 0 otherwise. This allows us to discuss the remittance and prospect effects simultaneously. Clearly,  $\hat{e}(h_p, M_p = 1)$  is defined only for  $h_p < \mu/(1 - \alpha)$ .

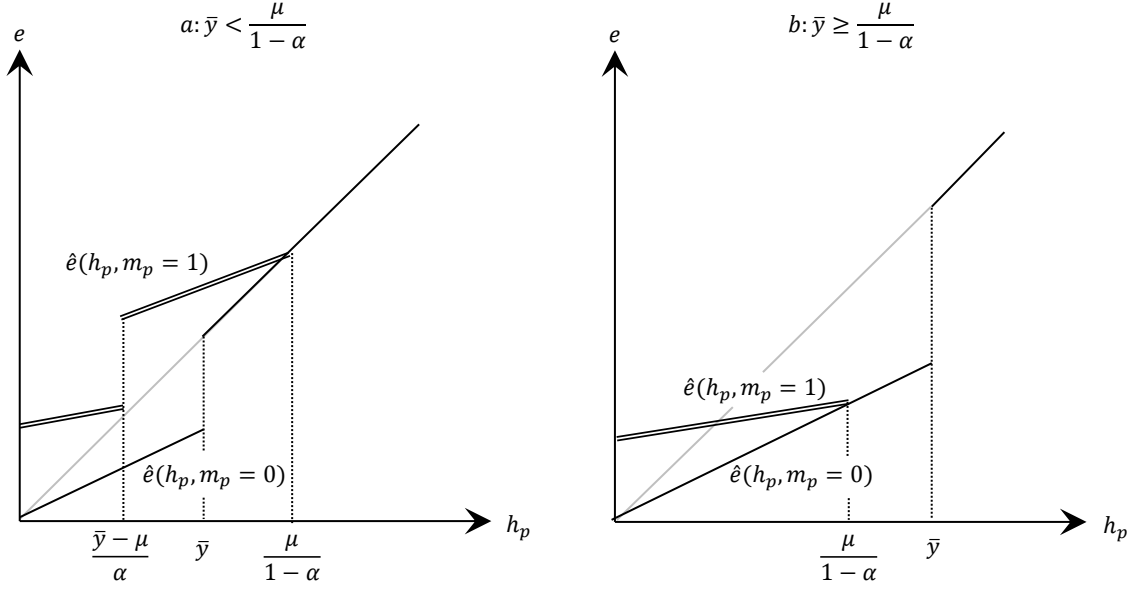


Figure 2.1 The optimal education investment in Proposition 2.

**Proposition 2.** For  $A$  sufficiently large that  $\bar{y} < \mu/(1 - \alpha)$ ,

$$\left\{ \begin{array}{ll} \hat{e}(h_p, M_p = 1) = e^*(\alpha h_p + \mu, m_c) \text{ and } \hat{e}(h_p, M_p = 0) = e^*(h_p, m_c) & \text{if } h_p < \frac{\bar{y} - \mu}{\alpha} \\ \hat{e}(h_p, M_p = 1) = e^{**}(\alpha h_p + \mu) \text{ and } \hat{e}(h_p, M_p = 0) = e^*(h_p, m_c) & \text{if } \frac{\bar{y} - \mu}{\alpha} \leq h_p < \bar{y} \\ \hat{e}(h_p, M_p = 1) = e^{**}(\alpha h_p + \mu) \text{ and } \hat{e}(h_p, M_p = 0) = e^{**}(h_p) & \text{if } \bar{y} \leq h_p < \frac{\mu}{1 - \alpha} \\ \hat{e}(h_p, M_p = 0) = e^{**}(h_p) & \text{if } \frac{\mu}{1 - \alpha} \leq h_p \end{array} \right.$$

Meanwhile, for  $A$  sufficiently small that  $\bar{y} \geq \mu/(1 - \alpha)$ ,

$$\left\{ \begin{array}{ll} \hat{e}(h_p, M_p = 1) = e^*(\alpha h_p + \mu, m_c) \text{ and } \hat{e}(h_p, M_p = 0) = e^*(h_p, m_c) & \text{if } h_p < \frac{\mu}{1 - \alpha} \\ \hat{e}(h_p, M_p = 0) = e^*(h_p, m_c) & \text{if } \frac{\mu}{1 - \alpha} \leq h_p < \bar{y} \\ \hat{e}(h_p, M_p = 0) = e^{**}(h_p) & \text{if } \bar{y} \leq h_p \end{array} \right.$$

Figure 2.1-a describes the levels of the optimal education investment when  $A$  is sufficiently large that  $\bar{y} < \mu/(1 - \alpha)$ . Figure 2.1-b describes the case where  $A$  is sufficiently small that  $\bar{y} \geq$

$\mu/(1 - \alpha)$ . The solid line represents  $\hat{e}(y_p, M_p = 0)$  and the doubled line represents  $\hat{e}(y_p, M_p = 1)$ . For comparison the gray line starting from the origin represents  $e^{**}(h_p)$ , the optimal education investment when migration is impossible, although it overlaps with  $\hat{e}(y_p, M_p = 0)$  for  $h_p \geq \bar{y}$ .<sup>8</sup>

Let us begin with discussing the case with  $\bar{y} < \mu/(1 - \alpha)$ . If the parent with  $h_p < \bar{y}$  fails to migrate, then the optimal education investment is  $e^*(h_p, m_c)$ . The difference between the solid and gray lines,  $e^*(h_p, m_c) - e^{**}(h_p)$ , represents the prospect effect. If the parent has  $h_p \in [\bar{y}, \mu/(1 - \alpha))$  but fails to migrate, or if the parent has  $h_p \geq \mu/(1 - \alpha)$ , then the optimal education investment is  $e^{**}(h_p)$ . Neither the remittance nor prospect effect works.

Meanwhile, consider  $\hat{e}(h_p, M_p = 1)$ . The parent with  $h_p \in [0, (\bar{y} - \mu)/\alpha)$ , which is non-empty unless  $A$  is extremely large that  $\bar{y} \leq \mu$ , chooses  $e^*(\alpha h_p + \mu, m_c)$ . Both the remittance and prospect effects work. The difference between the doubled and gray lines,  $e^*(\alpha h_p + \mu, m_c) - e^{**}(h_p)$ , represents the overall effect of migration. It can be decomposed into the two effects as in:<sup>9</sup>

$$e^*(\alpha h_p + \mu, m_c) - e^{**}(h_p) = \underbrace{e^*(\alpha h_p + \mu, m_c) - e^*(h_p, m_c)}_{\text{the remittance effect}} + \underbrace{e^*(h_p, m_c) - e^{**}(h_p)}_{\text{the prospect effect}}. \quad (2.8)$$

For  $h_p$  sufficiently close to 0, the remittance effect makes the overall effect of migration positive since only  $e^*(\alpha h_p + \mu, m_c)$  is positive at  $h_p = 0$ . However, the overall effect is not necessarily positive for  $h_p$  sufficiently close to  $(\bar{y} - \mu)/\alpha$  particularly when  $(\bar{y} - \mu)/\alpha$  is close to  $\mu/(1 - \alpha)$ , since the remittance effect tend to zero as  $h_p \rightarrow \mu/(1 - \alpha)$  but the prospect effect remains negative. In this sense, while  $\hat{e}(h_p, M_p = 1)$  lies above the gray line for any  $h_p < (\bar{y} - \mu)/\alpha$  in Figure 2.1-a, it could lie below the gray line for  $h_p$  sufficiently close to  $(\bar{y} - \mu)/\alpha$ . The optimal education investment makes a jump at  $h_p = (\bar{y} - \mu)/\alpha$  and the parent with  $h_p \in [(\bar{y} - \mu)/\alpha, \mu/(1 - \alpha))$  chooses  $e^{**}(\alpha h_p + \mu)$  so that the child will not wish to migrate. Only the remittance effect works although its volume expressed as  $e^{**}(\alpha h_p + \mu) - e^{**}(h_p)$  tends to 0 as  $h_p \rightarrow \mu/(1 - \alpha)$ . Note that the parent with  $h_p \in [(\bar{y} - \mu)/\alpha, \bar{y})$  would choose  $e^*$  and the prospect effect would work if she failed to migrate. In

<sup>8</sup>The exact shapes of those functions are not necessarily linear and depend on the shapes of  $u$ ,  $v$  and  $h$ .

<sup>9</sup>Alternatively, the overall effect can be decomposed into the prospect effect,  $e^*(\alpha h_p + \mu, m_c) - e^{**}(\alpha h_p + \mu)$ , and the remittance effect,  $e^{**}(\alpha h_p + \mu) - e^{**}(h_p)$ . Yet, the decomposition in (2.8) expresses the prospect effect in the same way as in the case where the parent fails to migrate.

this sense, the remittance effect shrinks the area of  $h_p$  where the prospect effect works, and allows the child to be a skilled non-migrant worker instead of an unskilled migrant.<sup>10</sup>

Then discuss the case where  $A$  is sufficiently small that  $\bar{y} \geq \mu/(1 - \alpha)$ , described in Figure 2.1-b. For  $h_p < \mu/(1 - \alpha)$ , the prospect effect works regardless of the migration status of the parent. If the parent fails to migrate, then she chooses  $e^*(h_p, m_c)$ . Only the prospect effect,  $e^*(h_p, m_c) - e^{**}(h_p)$ , shows up. If the parent succeeds to migrate, then she chooses  $e^*(\alpha h_p + \mu, m)$ , the remittance effect also works, and the overall effect of migration can be decomposed as in (2.8). The overall effect is positive for sufficiently small  $h_p$ . However, for  $h_p$  sufficiently close to  $\mu/(1 - \alpha)$ , it must be negative and  $\hat{e}(h_p, M_p = 1)$  must lie below the gray line. If  $\mu/(1 - \alpha) \leq h_p < \bar{y}$ , then only the prospect effect works. The parent is sufficiently highly educated that she does not migrate by herself, but reduces education investment so that her child will wish to migrate in the future. The prospect effect ceases to work only for  $h_p > \bar{y}$ . Yet, the remittance effect does not work for such  $h_p$ , either.

In sum, the overall effect of migration varies by the level of human capital and by cases. The case with  $\bar{y} < \mu/(1 - \alpha)$  describes an optimistic scenario. As long as the parent succeeds to migrate, the overall effect of migration mostly raises education investment. Clearly, taking into account the risk that the parent fails to migrate, the scenario becomes less optimistic since only the prospect effect can work if the parent fails to migrate. Meanwhile, the case with  $\bar{y} \geq \mu/(1 - \alpha)$  describes a pessimistic scenario where the prospect effect plays the main role. Even if the parent migrates, the overall effect of migration is positive only for small  $h_p$ . The prospect effect works for a wider area of  $h_p$  than in the previous case. The prospect effect works even if the parent has, say, upper-middle level human capital such that she does not choose to migrate by herself.

The results are immediately applicable to the case where the economy comprises multiple households. Assuming that the probability of parental migration is equal to the fraction of the parents succeeding to migrate, the aggregate overall effect of migration for any  $h_p < \mu/(1 - \alpha)$  can be expressed by

$$m_p \hat{e}(h_p, M_p = 1) + (1 - m_p) \hat{e}(h_p, M_p = 0) - e^{**}(h_p), \quad (2.9)$$

---

<sup>10</sup>For such  $h_p$ , the overall effect can be decomposed into the remittance effect,  $e^{**}(\alpha h_p + \mu) - e^*(h_p, m_c)$ , and the prospect effect,  $e^*(h_p, m_c) - e^{**}(h_p)$ .

which is equivalent to the weighted average of the distance between the gray and doubled lines and that between the gray and solid lines. For  $h_p$  where both effects work, the aggregate effect can be further decomposed into

$$m_p \underbrace{[e^*(\alpha h_p + \mu m_c) - e^*(h_p m_c)]}_{\text{The remittance effect}} + \underbrace{[e^*(h_p, m_c) - e^{**}(h_p)]}_{\text{The prospect effect}}. \quad (2.10)$$

An implication of the two scenarios is that migration is likely to have a negative overall effect in countries with small  $A$ .  $A$  would be small if, for example, the school infrastructure is poor, the quality of teachers is low, and education-related items are expensive for its quality, all of which seem to match the circumstances in most developing countries. This conversely implies that policies to raise  $A$ , such as public expenditure and aid programs, can make the overall effect of migration positive. An increase in  $A$  lowers  $\bar{y}$  and  $(\bar{y} - \mu)/\alpha$ , and shrinks the area of  $h_p$  where the prospect effect works. A sufficiently drastic increase of  $A$  can make the optimal education investment as in Figure 2.1-a even if it is as in Figure 2.1-b before the increase of  $A$ . However, it should be noted that the remittance effect plays a role only if parents succeed to migrate. Therefore, if  $m_p$  is small, then limited would be the extent to which the parental migration plays its role, and the overall effect of migration at the aggregate level, as in (2.10), could be negative regardless of the scenarios.

The comparative static properties with respect to the probabilities of migration provide mixed implications. On one hand, an increase in  $m_p$  raises the aggregate education investment by increasing the number of parents succeeding to migrate and choosing  $\hat{e}(h_p, M_p = 1)$  instead of  $\hat{e}(h_p, M_p = 0)$ . On the other hand, an increase in  $m_c$  reduces the aggregate education investment by directly reducing  $e^*$  and by raising the upper-bound  $h_p$  below which the prospect effect works,  $\bar{y}$  or  $(\bar{y} - \mu)/\alpha$ . Therefore, whether a policy to promote migration, which would generally raise both  $m_p$  and  $m_c$ , raises or reduces education investment is not clear, just like whether migration overall encourages education investment is not clear. However, such a policy at least makes it more likely that the pessimistic scenario shows up, because that policy raises  $\bar{y}$  and the likelihood that  $\bar{y} > \mu/(1 - \alpha)$  holds.



The final remark is that, even in the pessimistic scenario, migration improves parental welfare because a parent with a given  $h_p$  can always choose  $e^{**}(h_p)$  regardless of whether migration is possible. Conversely, an emigration restriction — if such a policy is enforceable and ethically feasible — or immigration restrictions by migration destination countries would lead to a welfare loss even if it alleviates the negative prospect effect on education investment. Therefore, policies to raise  $A$  would be more realistic ways for a migrant-sending country to avoid or reduce the negative prospect effect than restricting migration.

## Appendix for Chapter 2: Proofs

PROOF OF LEMMA 1. Suppose first that  $\partial e^*(y_p, m')/\partial m = 0$  or, equivalently,  $v'[Ah(e^*(y_p, m'))] - \alpha v'[\alpha Ah(e^*(y_p, m'))] = 0$  for some  $m'$ . The F.O.C. for any  $m$  can be written as

$$\begin{aligned} -u'(y_p - e) + (1 - m')Ah'(e)v'[Ah(e)] + m'\alpha Ah'(e)v'[\alpha Ah(e) + \mu] \\ + (m' - m)Ah'(e)\{v'[Ah(e)] - \alpha v'[\alpha Ah(e) + \mu]\} = 0. \end{aligned}$$

$e = e^*(y_p, m')$  satisfies it for any  $m$ . Therefore, if  $\partial e^*(y_p, m')/\partial m = 0$  for some  $m$ , then  $e^*$  is independent of  $m$  and  $\partial e^*(y_p, m)/\partial m = 0$  for any  $m$ .

Now suppose  $Ah[e^*(y_p, m')] \leq \mu/(1 - \alpha)$  or, equivalently,  $\partial e^*(y_p, m')/\partial m < 0$  for some given  $y_p$  and  $m'$ . Then,  $\partial e^*(y_p, m)/\partial m \neq 0$  for any  $m$ . By continuity,  $\partial e^*(y_p, m)/\partial m > 0$  cannot hold for any  $m$ , either. Therefore,  $\partial e^*(y_p, m)/\partial m < 0$  for any  $m$ .  $\square$

PROOF OF PROPOSITION 1. Consider  $y_p \in [\bar{e}, y^{**}]$ , which is not empty since  $\bar{e} = e^{**}(y^{**})$  and  $e^{**}(y_p) < y_p$  for any  $y_p > 0$ . Then,  $e_N = \bar{e}$  and  $u(y_p - \bar{e}) + v[Ah(\bar{e})] = u(y_p - \bar{e}) + (1 - m)v[Ah(\bar{e})] + mv[\alpha Ah(\bar{e}) + \mu] < u(y_p - e^*) + (1 - m)v[Ah(e^*)] + mv[\alpha Ah(e^*) + \mu]$ , where the inequality holds since  $e_M = e^*$  maximizes  $u(y_p - e) + (1 - m)v[Ah(e)] + mv[\alpha Ah(e) + \mu]$ . Hence  $f(y_p) < 0$ . For  $y_p \geq y^*$  where  $e_M = \bar{e}$  but  $e_N = e^{**}$ , an analogous logic leads to  $f(y_p) > 0$ . Since  $f(y_p)$  is continuous, there is some  $\bar{y} \in (y^{**}, y^*)$  such that  $f(\bar{y}) = 0$ . Since  $f'(y_p) = u'(y_p - e^{**}) - u'(y_p - e^*) > 0$  for any  $y_p \in (y^{**}, y^*)$  by the envelope theorem,  $\bar{y}$  such that  $f(\bar{y}) = 0$  is unique.  $\square$

PROOF OF LEMMA 2. The derivatives of  $\bar{y}$  are obtained by applying the implicit function theorem to (2.7). Since  $f'(y_p) > 0$  for  $\bar{y} \in (y^{**}, y^*)$ , their signs are determined by their numerators. The numerator of  $d\bar{y}/dm$  is positive since  $\bar{y} < y^*$  implies  $Ah[e^*(\bar{y}, m)] < \mu/(1 - \alpha)$ . Also, from the F.O.C., the numerator of  $d\bar{y}/dA$  can be re-expressed as

$$\frac{h(e^*)u'(\bar{y} - e^*)}{Ah'(e^*)} - \frac{h(e^{**})u'(\bar{y} - e^{**})}{Ah'(e^{**})}.$$

Since  $e^* < e^{**}$ ,  $u'' < 0$ , and  $h'' < 0$ , it is negative. Therefore,  $d\bar{y}/dA < 0$ .

For  $A \rightarrow +\infty$ , suppose  $\bar{y} \rightarrow x > 0$ . Since  $y^* > \bar{y}$ ,  $y^* \rightarrow x' \geq x$ . Then, the definition of  $y^*$ ,  $Ah[e^*(y^*)] = \mu/(1 - \alpha)$ , is violated for sufficiently large  $A$  since  $Ah[e^*(y^*)] \rightarrow +\infty$ . Hence  $\bar{y} \rightarrow x \leq 0$ . Since  $\bar{y} > y^{**} > 0$ ,  $\bar{y} \rightarrow 0$ .

For  $A \rightarrow 0$ , suppose  $\bar{y} \rightarrow x < +\infty$ . Since  $y^{**} < \bar{y}$ ,  $y^{**} \rightarrow x' \leq x$ . Then, the definition of  $y^{**}$ ,  $Ah[e^{**}(y^{**})] = \mu/(1 - \alpha)$ , is violated for sufficiently small  $A$  since  $Ah[e^{**}(y^{**})] \rightarrow 0$ . Hence,  $\bar{y} \rightarrow +\infty$ .  $\square$

**PROOF OF LEMMA 3.** Since  $\bar{y} \rightarrow 0$  as  $A \rightarrow +\infty$  and  $\bar{y} \rightarrow +\infty$  as  $A \rightarrow 0$ , there exists positive  $A$  such that  $\bar{y} = \mu/(1 - \alpha)$ . Since  $d\bar{y}/dA < 0$ , such  $A$  is unique. Denoting it by  $\bar{A}$ , we have  $\bar{y} \gtrless \mu/(1 - \alpha)$  if  $A \lesseqgtr \bar{A}$ . By expressing  $f(y_p)$  as  $f(y_p, A)$ ,  $\bar{A}$  is implicitly defined as  $f[\mu/(1 - \alpha), \bar{A}] = 0$ .  $\square$

**Chapter 3 An empirical investigation on the roles of parental remittances and the prospect of children's future migration**

### 3.1 Introduction

How labor migration affects education investment has also been paid attention by empirics. The empirical literature has examined this issue mainly from two perspectives.

A strand of the literature, the *brain gain* literature, has examined whether the possibility of future migration under positive selection affects education or human capital levels of individuals, as this is the central question in this literature (Batista et al. 2012; Beine et al. 2007; Shrestha 2017). This closely mirrors the prospect effect in Chapter 2 although the effect is predicted to be *positive* and often labeled as *the brain gain effect*. As expected, they often find that, in a positive selection circumstance, future migration prospects encourage education investment. However, such an analysis has not been conducted for negative selection migration.

The other strand of the literature has focused on the roles of parental migration and sheds light on negative selection as well as positive selection. Interestingly, while the increased income by migration *per se* would encourage education investment, and this view is supported empirically for many countries (Adams and Cuecuecha 2010, 2013; Alcaraz et al. 2012; Yang 2008), some empirics also find that parental migration has neutral or even negative effects on education investment, even after controlling the potential endogeneity of migration (Acosta 2011; Amuedo-Dorantes & Pozo 2010; Kandel & Kao 2001; López-Córdova 2005; McKenzie & Rapoport 2011). These findings are attributable to potential side-effects of parental migration. Two side-effects are remarkable. The first one is that of parental absence. Parental absence due to migration can reduce education investment by forcing children to do housework or take care of family businesses instead of schooling, or by reducing home education and parental care. The second side-effect is related to the prospects of children's future migration. Parental migration can increase the prospect of children's future migration by providing information and connection or through its demonstration effect that correlates parents' and children's migration decisions, and the increased future migration prospects could discourage education investment in a negative selection circumstance. In this sense, the literature has discussed the role of negative selection migration prospects to some extent.

While these side-effects are interesting, and Chapter 4 explores them, focusing only on parental

migration does not fully illustrate the role of the prospects. Children of non-migrating parents can also have the prospects and the side-effect of parental migration to strengthen the prospects could be limited if, for example, children can obtain information and connection from the outside of their households, such as relatives, neighbors, friends, and the internet. To discuss the prospect effect fully, we need to account the prospects of children of non-migrating parents.

An empirical challenge to examine the prospect effect is that, unlike the actual migration status, future migration prospects are basically unobservable. However, the *brain gain* literature has made attempts to examine the roles of migration prospects. Shrestha (2017), in the context of soldier migration from Nepal to the United Kingdom, uses a change in the recruiting policy and the ethnic preference of the British Army to capture the prospect effect. Batista et al. (2012) examined the prospect effect by estimating the beliefs on the probability of migration that individuals would have in their childhood.

This chapter empirically examines the effects of negative selection migration on children's education at the micro level. The author aims to capture the prospects of children's migration by utilizing an exogenous change in the migration circumstance.

The structure of this chapter is organized as follows. In Chapter 3.2, the author explains the data to be used, which is household surveys conducted in Tajikistan, and the background information on that country. Chapter 3.3 presents the samples and the definitions of the main variables to be used and the concepts of the estimations. Chapter 3.4 describes the estimation methodology. Chapter 3.5 shows the results. Chapter 3.6 concludes. Supplementary information for the empirical analyses are provided in the appendix of this chapter.

## **3.2 Data and background**

This chapter uses the data of the Tajikistan Living Standard Survey (TLSS) 2007 and the Tajikistan Household Panel Survey (THPS) 2011. The TLSS 2007 is conducted by the World Bank and UNICEF. The THPS 2011 is its follow-up survey. These surveys provide national representative data on individual and household characteristics. They also partly form a panel, where the THPS

2011 revisits approximately one third of the sample in the TLSS 2007, but the remaining two thirds of the sample were visited only in the TLSS 2007.<sup>11</sup>

Tajikistan is a former Soviet Union country in Central Asia. It is one of the poorest of the transition countries. Labor migration, mostly to Russia, is highly common and migrants are negatively selected in terms of education levels. Migrants also tend to migrate alone, leaving their children in Tajikistan, and share their incomes with their household members through remittances or by bringing the money directly when they return home. These features fit the settings of the theoretical model.

Let us discuss the background more specifically. Tajikistan gained independence in 1991, the year of the dissolution of the Soviet Union. Like other former Soviet Union countries, the economy of Tajikistan retrogressed greatly during the initial post-Soviet period. The real GDP decreased to approximately 35% in 1996 compared to the pre-independence level in 1991. Tajikistan also experienced a civil war that began right after the independence and continued to 1997. Although the economy rapidly grew in the 2000s, it was in 2012 when the real GDP recovered to the pre-independence level (The World Bank 2018).

Regarding education, Tajikistan boasts a fairly high level of education for its GDP level, as is often the case for former communist countries. Education in Tajikistan comprises 9 years of compulsory education, 2 years of secondary education, 1-4 years of vocational education, and tertiary education. Generally, children (or their parents) decide whether to advance to secondary education after completing compulsory education at the ages of 15 or 16, and whether to advance to tertiary education or vocational education or to leave school after completing secondary education at the ages of 17 or 18.<sup>12</sup> The enrollment rate of compulsory education is almost 100 percent.

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<sup>11</sup>Since the empirical analyses in this chapter focus on the final education attainment, rather than education status at a given point of time such as enrollment, the author does not conduct a panel data analysis. The TLSS 2009 is also available, which covers almost the same sample as the THPS 2011 and will be used in the next chapter, but is not used here for the same reason.

<sup>12</sup>Children can also be enrolled in vocational schools after completing compulsory education. However, it is more common to be enrolled in vocational education after completing secondary education. According to the official statistics (*Agenstvo po statistike pri Prezidente Respubliki Tadjikistan* 2016), the majority of the students in vocational schools were 18 or 19 years old in any year since 2000. The number of students aged 16 or 17 were even less than that of adult students. Also, according to the TLSS 2007, among students aged 19 years or younger and enrolled in vocational schools, approximately 70% of them have completed secondary education.

Moreover, the rate of completion of secondary education is also high for men, except for very old generations, amounting up to 80-90 percent in our data. Therefore, at least among men, the timings for the main education investment decisions come at the ages of 17 or 18 when they complete secondary education.

However, education investment became expensive after independence. Public education expenditure decreased drastically after independence and during transition to market economy. The civil war in the 1990s destroyed education infrastructure, which pushed up education costs. To some extent, the education circumstance improved in the 2000s. The public education expenditure as the percentage of GDP increased from approximately 2.5% in 2001-2004 to 3.5% in 2005 and 4.9% in 2009 (*Agenstvo po statistike pri Prezidente Respubliki Tadjikistan* 2016), while the real GDP itself also increased. Nevertheless, public education expenditure, even after the increase, still fell short of the level that was needed to adequately fund the education system, and the responsibility for funding education costs was transferred to households (UNICEF 2013; Whitsel 2011). Public schools charges fees for various school-related items, such as textbooks and uniforms, which were offered for free in the Soviet era. Students need to take paid extra-curricular courses if they wish to advance to higher education. Bribes and private contributions are required at times. Under such a circumstance, parents would reduce investment for higher education if its return is small.

Meanwhile, Tajikistan is one of the most migration-dependent countries in the world. The value of the international remittances was equivalent to 35 to 50 percent of GDP in 2006-2014 (The World Bank 2018). In the THPS 2011 data, 30.2% of men aged 25-59 years as of 2011 experienced labor migration in between 2006 and 2011. Female migration was not common and 92.8% of migrants were men. Russia is the main destination where 99.3% of labor migrants headed.

Labor migration from Tajikistan has the following two interesting features. The first one is its selectivity. Migrants tend to be less educated and younger than those not experiencing migration. Panel A of Table 3.1 shows the distributions of education attainment among men having experienced migration during 2006-2011 and those having not. Migrants are more likely to have



Table 3.1 The summary statistics on migration and education attainments in the THPS 2011.

Panel A: Distributions of education attainment (%)	Less than secondary	Secondary	Vocational	Tertiary
Migrants in 2006-2011	8.1	58.1	20.3	13.5
Non-migrants	7.2	48.9	19.8	24.1
Difference	0.8	9.2***	0.4	-10.5***
Panel B: Migration rates by education attainment and age cohort (%)	Less than secondary	Secondary	Vocational	Tertiary
Men aged 25-39 years	44.8	42.9	44.9	29.3
Men aged 40-49 years	21.4	26.6	29.1	12.4
Men aged 50-59 years	9.1	8.9	13.4	4.7

Only men aged 25-59 years as of 2011 used. The total sample size is 1,881. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

secondary education and less likely to have tertiary education than non-migrants. This selectivity matches the labor market conditions in Russia, where migrants from Tajikistan tend to work as simple laborer (ILO 2010; Horie & Ryazantsev 2011).<sup>13</sup> Panel B shows the breakdown of migration rates by education attainment and age cohort. Generally, negative or intermediate selection is observed for any age cohort. Among young men aged 25-39 years as of 2011, the migration rate is almost constant, 43-45%, across education attainment up to vocational education but demonstrates a sharp decrease between vocational and tertiary educations although even non-negligible fraction of those with tertiary education migrate. Among other men, the selectivity seems more negative-intermediate than purely negative. The migration rate reaches its peak at vocational education although that among lowly educated individuals is still higher than that among individuals with tertiary education. The breakdown also shows that the migration rate is constantly decreasing in age regardless of education attainment. Young individuals seem more willing, or less reluctant, to move than old individuals.

The second feature of migration from Tajikistan is that it rapidly increased in the second half

<sup>13</sup>Note that this tendency does not seem to be solely because migrants tend to be uneducated. In the TLSS 2007 data, the top four occupations of migrants are construction-related workers, general unskilled workers, stall and market salespersons, and drivers. While 86.0% of those without tertiary education engage in these occupations, the proportion is 76.4% even among those with tertiary education. This suggests that migrants' jobs are limited to unskilled ones and that this causes negative selection of migrants.

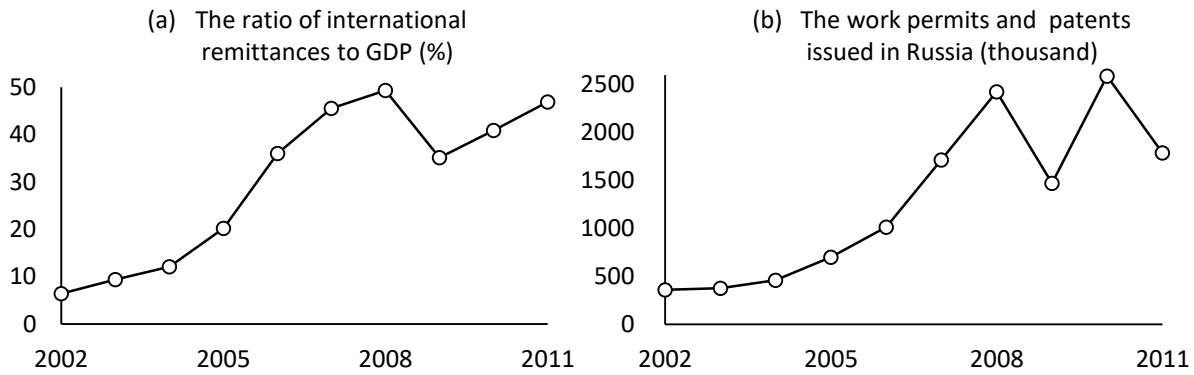


Figure 3.1 Volume of international migration in Tajikistan and migration circumstance in Russia. Source for (a): The World Bank (2018). Source for (b): Russian Federation Federal Statistics Service (2018) and Ryazantsev & Korneev (2014)

of the 2000s. Figure 3.1 (a) shows the value of international remittances as the percentage of GDP in 2002-2011. It was about 10 percent in the first half of the 2000s but amounted up to 35-50% in 2006-2011, although the ratio decreased during the global financial crisis. Also, in the THPS 2011 data, the proportion of men aged 25-59 years as of 2005 having experienced migration in 2001-2005 is 12.8%, which is by far smaller than the aforementioned rate for 2006-2011, 30.2%.

A key factor behind the rapid increase of migration is the Russian immigration policy. While Tajikistan nationals, as a member of Commonwealth of Independent States (CIS), were allowed to enter Russia freely without visa, their employment opportunities were controlled by work permits. Up to the first half of the 2000s, Russia was restrictive to immigrant workers and kept the quota on work permits low. However, around 2005 and 2006, Russia began demanding immigrant labor because of its economic boom and declining labor force and liberalized immigration by increasing the quota (Ryazantsev & Korneev 2014). Figure 3.1 (b) shows the numbers of work permits Russia issued, which cover immigrants from all CIS countries.<sup>14</sup> It began increasing around 2005 and its yearly average in 2006-2011 became 4.5 times larger than that in 2002-2005.

Reflecting the prevalence of migration in Tajikistan, a few previous empirics have also examined the role of parental migration on education investment. Although the results are not clear, where both positive (Ogawa & Nakamuro 2010) and negative (Dietz et al. 2015) effects

<sup>14</sup>The numbers for 2010 and 2011 include those of immigration patents, a system which Russia introduced in 2010.

of parental migration are observed, the literature has discussed the side-effect of parental migration that strengthens future migration prospects and reduces education investment. The details of these previous studies are more closely related to Chapter 4 and will be discussed there. However, it could be noted here that their main focus is placed on examining the effect of parental migration and that little attention has been paid to the prospects of children in non-migrating households.

### 3.3 Samples, definitions of variables and concepts for the main estimations

The basic idea of the empirical analyses of this chapter is to examine the education attainment of children, taking advantage of the significant change in the migration circumstances. The education levels of the children for whom the education investment decisions were made before 2005 would not be largely affected by migration because neither their parents would be likely to be migrants nor they would not have strong migration prospects. Conversely, both parental migration and future migration prospects would affect children for whom the education investment decisions were made after 2006.

Let us define these two generations of children as “before” and “after” generations hereafter and the dummy variable, *after*, as the indicator for an “after” generation child. Also, following the notation in Chapter 2, denote children’s education attainment by  $h_c$ . Then, the effect of being “after” generation,

$$E[h_c|after = 1] - E[h_c|after = 0],$$

captures the overall effect of migration, which corresponds to the human capital version of (2.9) in the theoretical model in Chapter 2,  $m_p Ah[\hat{e}(h_p, M_p = 1)] + (1 - m_p) Ah[\hat{e}(h_p, M_p = 0)] - Ah[e^{**}(h_p)]$ , or its integration with respect to  $h_p$ . Moreover, by controlling parental migration directly, the overall effect of migration can be decomposed as in (2.10), the details of which will be discussed later.

Although we cannot observe the exact timing when the education investment decision for each child was made, the author defines “before” and “after” generations as follows, assuming that the

ages of 17 and 18 are the timings of the main education investment decisions. “Before”-generation children are those becoming 18 years old in 2002-2005. Their education decisions is likely to be made before the policy change and unlikely to be affected by the increased migration. Their data are exclusively obtained from the TLSS 2007. Meanwhile, “after”-generation children are those becoming 18 years old in 2006-2011, when migration was already common. Their data are obtained both from the TLSS 2007 and the THPS 2011. Although these children may be adult in terms of their ages, let us keep using the term “children” to refer to them.

Among the children in these generations, this chapter focuses on men for whom at least one of their biological parents is available in the data. That is, the sample excludes the observations both whose parents are dead or who live separately from their biological parents due to, for example, marriage, since important characteristics of the biological households and parents are not available for these observations. The sample still includes the cases where biological parents or children by themselves were migrating at the time of the survey, unless they all were migrating simultaneously, since the survey collected basic information on the characteristics of migrating household members. Observations both whose biological parents are unavailable account only 4.3% of all “before” and “after” generation men and, hence, the extent to which dropping these observations disturbs the results would be limited. Regarding the focus on male children, since migrants from Tajikistan are exclusively male, it would be male education that the prospect effect plays a role.<sup>15</sup> Moreover, women in these generations, who were aged around 20 years as of the time of each survey, tend to live separately from their biological households more than men, with the proportion being 38.8%, mainly because women tend to marry young in Tajikistan (see Chapter 4.3). Therefore, considering the objective, we focus only on men. After dropping 25 observations for whom some of the important information, such as their own education levels, are missing, the final sample size becomes 2,393 children (1,148 “after” generation children and 1,245 “before” generation children).

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<sup>15</sup>This alone may sound that female children serve as a good control group in a difference-in-difference estimation. However, because of the gender gap in education, the potentially heterogeneous effects of parental migration by gender (see Chapter 4), and early marriage of women discussed below, the validity of female education as a control group is questionable.

The key variables other than *after* are the child's and parents' education attainments and the indicator of parents' migration, which correspond to  $h_c$ ,  $h_p$  and  $M_p$  in the theoretical model in Chapter 2.  $h_c$  and  $h_p$  are measured as the years of education. The author converts the highest education diploma to the years of education as follows:  $h = 0$  if no education;  $h = 4$  if completing only four-year primary education;  $h = 9$  if completing all nine-year compulsory education;  $h = 11$  if completing two-year secondary education;  $h = 13$  if completing vocational education and;  $h = 15$  if completing tertiary education; although the exact years for vocational and tertiary education vary by courses. For children attending school at the time of the survey, mostly vocational or tertiary school students, the levels they were attending are regarded as their highest education diplomas. Parental education,  $h_p$ , is defined as the average of the years of schooling of the father and the mother. Note that education investment for most parents was made in the Soviet era. Therefore, we could reasonably regard parental education as exogenous to their migration.

Meanwhile, parental migration,  $M_p$ , is the dummy variable giving 1 if the parents migrated in 2006-2011. It is defined regardless of generation, but will affect only education investment for "after" generation since migration in 2006-2011 would not affect education investment made before 2005. Since the information on migration before 2005 is not fully collected in the TLSS 2007, this chapter does not define migration before 2005. Nevertheless, observing migration in 2006-2011 suffices to decompose the overall effect of migration for "after" generation.

Table 3.2 shows the comparison of  $h_c$  of "after" versus "before" generations. Among all sample, "after" generation has 0.17 years less education than "before" generation, with the difference being weakly significant, suggesting that the overall effect of migration is negative. Then we compare  $h_c$  separately for  $h_p \leq 11$ , lowly educated parents the mean of whose education is at most secondary, and for  $h_p \geq 12$ , highly educated parents.<sup>16</sup> The difference is negative for both categories of  $h_p$  although only that for  $h_p \geq 12$  is significant. However, the null hypothesis that these two differences are not different cannot be rejected.

The remaining rows further breaks down the difference in  $h_c$  by eight categories of  $h_p$ . The

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<sup>16</sup>No observation has  $h_p \in (11, 12)$ . Indeed, with any combination of parents' schooling years in the definition of this chapter, any  $h_p \geq 10$  becomes an integer.

Table 3.2 The comparison of education levels of “after” versus “before” generations

	Mean education years, $h_c$ “after”	Mean education years, $h_c$ “before”	Difference	(Std. err.)	Observations
All sample	11.420	11.590	-0.170*	(0.0907)	2,393
<i>Breakdown by parents’ education, <math>h_p</math></i>					
11 years or less	10.889	11.049	-0.160	(0.117)	1,292
12 years or more	11.993	12.275	-0.282**	(0.133)	1,101
<i>Further breakdown by parents’ education, <math>h_p</math></i>					
Less than 9 years	9.926	10.917	-0.990**	(0.483)	174
9 or 9.5 years	10.429	10.681	-0.252	(0.293)	114
10 years	10.730	11.008	-0.278	(0.306)	228
11 years	11.108	11.176	-0.068	(0.139)	776
12 years	11.757	11.832	-0.075	(0.190)	540
13 years	12.039	12.421	-0.382*	(0.214)	388
14 years	11.810	12.737	-0.927*	(0.500)	80
15 years	13.404	13.696	-0.291	(0.431)	93

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

difference is large and weakly significant for  $h_p < 9$ , but small and insignificant up to  $h_p = 12$ . The difference is negative and weakly significant for  $h_p = 13$  and 14, but the mean  $h_c$  for “after” generation makes a jump and the difference becomes small for  $h_p = 15$ . This also seems to match the pessimistic scenario in Figure 2.1-b, with  $\bar{y}$  lying between  $h_p = 14$  and 15. However, the small sample size for such  $h_p$  restricts us from further interpretation.

We extend the idea in this before-after comparison from the next section. However, before that, let us note two potential concerns on the validity of this before-after concept. As a general limitation, a before-after estimator could reflect the differences in macro-level socioeconomic factors that vary over time and directly affect the outcome. The exogenous nature of the concept of being “after” generation reasonably eliminates endogeneity with respect to individual-level unobservable factors, such as children’s innate learning ability. However, being “after” could be correlated to macro-level factors that are also different for “before” and “after” generations.

However, note here that this possibility seemingly supports the view, rather than questioning it, that the overall effect of migration is negative. As is briefly discussed in Chapter 3.1, the education circumstance improved throughout the 2000s while the economy also generally developed. These

trends would have a positive impact on education investment *ceteris paribus* and raise  $h_c$  of “after” generation. Conversely, observing that “after” generation children are less educated than “before” generation supports the view that the true overall effect of migration is negative.

An alternative but related concern is that approximately half of the “after” generation children, those becoming 18 in 2008-2010, can be regarded as the generation hit by the global financial crisis. The GDP growth rate became negative in Russia in 2009 (The World Bank 2018). The rate in Tajikistan remained positive but were lower than the rate in the previous years. The volume of the remittances to Tajikistan also declined sharply in 2009. How the crisis affect education investment in Tajikistan can be mixed. On one hand, the crisis in Russian economy could affect education investment through changing the migration circumstance. The shocks in Russia could raise education investment by reducing the probability, or the belief on the probability, of children’s future migration, while it could reduce education investment by reducing the probability of parental migration or the amount of remittances. Indeed in Mexico, the crisis and the resulting reduction of remittances reduced education investment (Alcaraz et al. 2012). On the other hand, a more critical problem is that the crisis in Tajikistan economy could also reduce education investment directly, not through changing the migration circumstance. If this is the main source of the difference in  $h_c$  between generations, then we need to conclude that the before-after discussion in Table 3.2 effectively discusses the effect of the crisis.

However, this risk does not seem prevalent, either. Figure 3.2 (a) shows the mean  $h_c$  for each one-year cohort of the sample. Each cohort is labeled by the year when children became 18 years old. The level of parental education is controlled since parents of early and late cohorts have slightly different education levels.<sup>17</sup> The trend shows that the mean  $h_c$  decreased around the time of the migration liberalization, increased during the period of the crisis, and began decreasing in 2010 when the economy began recovering from the crisis. To supplement this, Figure 3.2 (b) shows the rate of advancing to tertiary education among those having completed secondary education. Although the rate reaches the local peak in 2005 and 2010, one year lagged behind the mean  $h_c$ ,

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<sup>17</sup>To do this, the author first regressed  $h_c$  to the cohort dummies and the dummies for eight categories of  $h_p$  shown in Table 3.2, and then obtained the mean  $h_c$  by fixing the parental education at the overall mean.

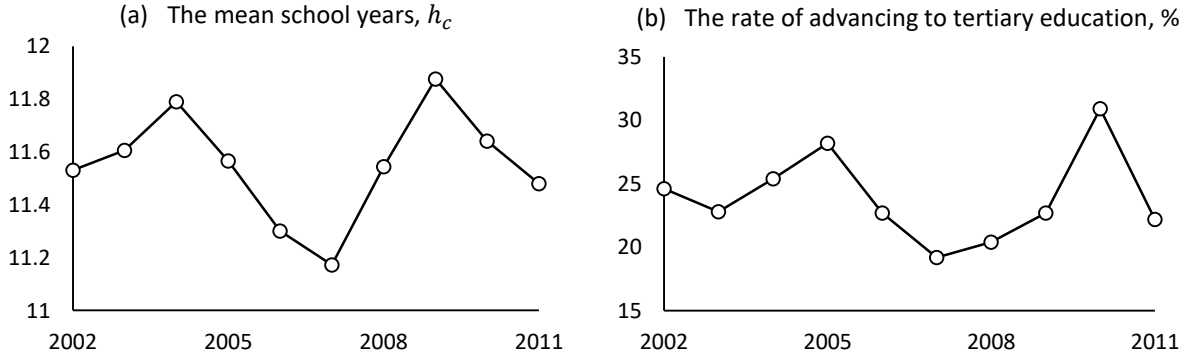


Figure 3.2 The means of  $h_c$  by the year when children became 18 years old.

the time trend is similar: the rate began decreasing after the policy change rather than after the crisis. Therefore, we could exclude the possibility that the difference in  $h_c$  between generations is solely caused by the crisis shocks. In addition, the increased  $h_c$  during the period of the crisis is consistent to the view that the crisis raised education investment through reducing children’s future migration prospects. This conversely strengthens the view that migration overall reduced education investment.

Clearly, even with these discussions, the author does not intend to claim that the before-after framework here is free of any potential effect of time-variant macro factors. Nevertheless, the overall effect of migration estimated as the effect of being “after” generation would allow us to discuss the roles of future migration prospects, particularly those which children of non-migrating parents have.

### 3.4 Estimation methodology

#### 3.4.1 Examining the overall effect

To examine the effects of migration more precisely, we begin estimating the following equation:

$$h_c = \sum_k \beta_k \mathbb{I}(h_p = k) + \beta_{after} after + \mathbf{X}\boldsymbol{\gamma}' + \eta_j + \varepsilon. \quad (3.1)$$



To control parental education,  $h_p$  is used as a categorical variable, where categorization follows eight categories in Table 3.2. Because almost all parents were educated in the Soviet era, parental education could be reasonably regarded as exogenous to parental migration.  $X$  is the vector of covariates other than parental education,  $\eta_j$  is the district fixed effect that captures the time-invariant regional factors, such as school availability, general wealth levels, and any unobservable factor in each district,<sup>18</sup> and  $\varepsilon$  is the error term.  $\beta_{after}$  captures the effect of being “after” generation, which could be regarded as the overall effect of migration.

To take into account the potential heterogeneous overall effect, we also estimate the following equation:

$$h_c = \sum_k \beta_k \mathbb{I}(h_p = k) + [\beta_{after,11} \mathbb{I}(h_p \leq 11) + \beta_{after,12} \mathbb{I}(h_p \geq 12)] \times after + X\gamma' + \eta_j + \varepsilon. \quad (3.2)$$

This equation separately estimates the overall effect for children whose parents are lowly educated,  $h_p \leq 11$ , and highly educated,  $h_p \geq 12$ , although this way of heterogeneity was not significantly observed in Table 3.2. Further heterogeneity, such as eight categories of  $h_p$ , is avoided since the sample size per category becomes too small, especially for the head and tail ends of  $h_p$ .

As covariates, the following variables will be used throughout: the average of parents’ ages when the child was 18 years old; its squared term; the dummy for the child’s *own chronic illness*; the dummy *minority* giving 1 if the child is not ethnic Tajik; *the household size*; the dummy *both parents* giving one if both father and mother are in household, including the cases where one of them is temporarily absent due to migration; *the household size*; *the male ratio* among household members; *the dependency ratio* which is the fraction of household members younger than 18 or older than 59; and the dummy for *urban* households. The covariates control the effects of various observable characteristics that could differ between “before” and “after” generations. The summary statistics are shown in Table 3A1 in the appendix of this chapter.

<sup>18</sup>A district, *nohiya* in Tajik and *raion* in Russian, is an administrative unit below a province, *viloyati* in Tajik and *oblast’* in Russian. Tajikistan is divided into 58 districts. In the TLSS and THPS, the capital city of Dushanbe is divided into four inner-city districts, and the provincial capital cities and a few other cities are counted as independent districts. In total, our dataset has 64 districts.

We first estimate these models in OLS. However, an econometric concern is that, while OLS assumes the dependent variable,  $h_c$ , to be continuous,  $h_c$  is indeed a categorical variable by definition and takes discrete values at 0, 4, 9, 11, 13 and 15. Considering this, the author also employs ordered probit.

Although the discussion in Chapter 3.3 suggests that the changing macro-level factors would rather attenuate the negative overall effect of migration than exaggerating it, we explicitly control these factors by including the following variables as covariates; the public education expenditure as the percentage of GDP; the log of per capita GDP; and the log of per capita investment at the district level; all measured as of the year when the child became 18 years old. Because these variables are correlated each other, they will be used one by one. The data for these factors are obtained from *Agenstvo po statistike pri Prezidente Respubliki Tadjikistan* (2005, 2012, 2016).

Meanwhile, we check the appropriateness and robustness of the estimation concept in the following two ways. First, we redo estimations using only those having completed secondary school as the sample. While we divide the sample children into two generations by the years when they became 18 years old, those having left school without completing secondary education, or their parents, must make their decisions to leave school before becoming 18 years old. Then, the timings of their decisions and the definition of the two generations may not match, particularly among the early-cohort “after” generation children without secondary education. Restricting the sample to those having completed secondary education would allow us to check whether this causes a critical bias.<sup>19</sup> The second way is that, instead of *after*, we use the log of the number of working permits and patents issued by Russia in the year when the child became 18 years old. This tests the very concept of the before-after criterion. This also allows  $\beta_{after}$  to capture continuous changes in the migration circumstance, rather a discontinuous one at the 2005/06 threshold.

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<sup>19</sup>In addition, the main sample include children who are still in secondary school. While their final education levels are regarded as  $h_c = 11$ , some of them may advance to higher education, and their schooling years could be undervalued. Restricting the sample also eliminates the risk that this undervaluation of  $h_c$  biases the estimates.

### 3.4.2 Decomposing the overall effect

While “after” generation tends to have lower education than “before” generation and the overall effect of migration is predicted to be negative, that the overall effect is negative does not necessarily claim that the prospect effect is negative. Even if the prospects do not affect education investment, the side-effects of parental migration, such as that of parental absence, can make the overall effect of migration negative. Moreover, some parents may lose income by migration due to income-maximization failures, and this can also make the overall effect negative.

To check whether the negative overall effect, if any, is caused by the prospect effect or the side-effects of parental migration, we decompose the overall effect into the prospect effect and the effect of parental migration as follows. Let  $h_c(M_p)$  for  $M_p = 0, 1$  be the levels of the child’s human capital when the parents do not migrate and do migrate, respectively. Then,  $E[h_c|after = 1] - E[h_c|after = 0]$  can be re-expressed as follows:<sup>20</sup>

$$\begin{aligned}
& m_p E[h_c(1)|after = 1, M_p = 1] + (1 - m_p) E[h_c(0)|after = 1, M_p = 0] - E[h_c|after = 0] \\
&= m_p \underbrace{\{E[h_c(1)|after = 1, M_p = 1] - E[h_c(0)|after = 1, M_p = 1]\}}_{\text{the effect of parental migration}} \\
&\quad + \underbrace{\{E[h_c(0)|after = 1] - E[h_c|after = 0]\}}_{\text{the prospect effect}},
\end{aligned} \tag{3.3}$$

where  $E[h_c(0)|after = 1, M_p = 1]$  is the counter-factual human capital level that “after” generation children would obtain if their parents who do not migrate did migrate, and  $E[h_c(0)|after = 1] = m_p E[h_c(0)|after = 1, M_p = 1] + (1 - m_p) E[h_c(0)|after = 1, M_p = 0]$  is the counter-factual if all parents did not migrate. The first bracket captures the effect of parental migration, which include the remittance effect in the terminology in Chapter 2 and the side-effects of parental migration. After controlling the first term, the second bracket corresponds to the prospect effect.

Suppose that parental migration is exogenous. Then  $E[h_c(0)|after = 1, M_p = 1] = E[h_c(0)|after = 1, M_p = 0] = E[h_c(0)|after = 1]$  holds, and the decomposed effects could be obtained by OLS or

<sup>20</sup>The second equality of (3.3) is obtained by adding and subtracting  $mE[h_c(0)|after, M_p = 1]$ .

ordered probit. A simple linear equation to decompose the overall effect of migration is

$$h_c = \sum_k \beta_k \mathbb{I}(h_p = k) + \beta_{after,N} after + \beta_{after,M} M_p \times after + \mathbf{X}\boldsymbol{\gamma}' + \eta_j + \varepsilon. \quad (3.4)$$

$\beta_{after,M}$  captures the effect of parental migration for “after” generation, assuming that parental migration has a homogeneous effect across all  $h_p$ .  $\beta_{after,N}$  captures the remainder, the prospect effect.  $M_p$  is used as the interaction term with *after* because we intend to decompose the overall effect of migration. Also,  $M_p$  refers to parental migration in 2006-2011 and would not have a direct effect on education investment for “before” generation.

However, the homogeneity of the effect of parental migration does not necessarily hold. The volume of the remittance effect could vary by  $h_p$  because the income gain by migration and the income-elasticity of education investment could vary by  $h_p$ . The side-effects of parental migration could also vary. To take into account these issues, the following equation separately estimates the effects of parental migration for  $h_p \leq 11$  and  $h_p \geq 12$ :

$$h_c = \sum_k \beta_k \mathbb{I}(h_p = k) + \beta_{after,N} after + \left[ \beta_{after,M,11} \mathbb{I}(h_p \leq 11) + \beta_{after,M,12} \mathbb{I}(h_p \geq 12) \right] M_p \times after + \mathbf{X}\boldsymbol{\gamma}' + \eta_j + \varepsilon. \quad (3.5)$$

A potential caveat of this equation is that  $\beta_{after,M,11}$  and  $\beta_{after,M,12}$  could capture the heterogeneous prospect effect to some extent, if any. To solve this, the prospect effect can also be separately estimated for these two groups in the following equation:

$$h_c = \sum_k \beta_k \mathbb{I}(h_p = k) + \left[ \beta_{after,N,11} \mathbb{I}(h_p \leq 11) + \beta_{after,N,12} \mathbb{I}(h_p \geq 12) \right] \times after + \left[ \beta_{after,M,11} \mathbb{I}(h_p \leq 11) + \beta_{after,M,12} \mathbb{I}(h_p \geq 12) \right] M_p \times after + \mathbf{X}\boldsymbol{\gamma}' + \eta_j + \varepsilon. \quad (3.6)$$

Unlike the before-after criterion, however, parental migration is not necessarily exogenous and parents who migrate and who do not may have different unobservable factors. Migrating parents can be negatively (positively) selected in terms of unobservable factors, such as Russian

language fluency, communication ability, physical strength, self-confidence and home preference, which may be directly correlated to the children's learning ability and attitudes. Moreover, if negatively (positively) selected migrants earn less (more) than the averagely skilled individuals with the same observable characteristics, then the OLS or ordered probit estimates of the effect of parental migration would also capture the income effect of unobservable skills. Because the directions of the selectivity in terms of education and these factors do not need to be the same, the endogeneity can both positively and negatively bias the estimated effect of parental migration. The potential endogeneity of parental migration can also bias the estimates of the prospect effect as it is effectively defined as the overall effect minus the effect of parental migration.

To deal with the potential endogeneity of parental migration, the author instruments  $M_p$  with some  $z$  that affects parental migration but not children's education. This requires  $z$  not to affect children's migration prospects directly. Note that  $M_p$  appears as the interaction terms. This chapter, therefore, employs the following three-step 2SLS, which is discussed in Wooldridge (2002, ch. 9, 18) and applied in the migration literature as well (e.g. Alcaraz et al. 2012). We first estimate the probability of  $M_p = 1$  in a linear probability model using  $z$  and other covariates and obtain the predicted value denoted by  $\hat{M}_p$ . Then, for (3.4), we run 2SLS or IV ordered probit using the interaction term  $\hat{M}_p \times after$  as the instrument in the first stage. For (3.5) and (3.6), we interact  $\hat{M}_p$  to  $after \times \mathbb{I}(h_p \leq 11)$  and  $after \times \mathbb{I}(h_p \geq 12)$ , and run 2SLS or IV ordered probit, where the first stages estimate  $\mathbb{I}(h_p \leq 11) \times M_p \times after$  and  $\mathbb{I}(h_p \geq 12) \times M_p \times after$ .<sup>21</sup> Although the interaction terms of  $\hat{M}_p$  serve as formal instruments for the first stages of 2SLS and IV ordered probit,  $z$  remains working as the instrument conceptually and being referred to as the instrument throughout the remainder. Standard tests for IV estimations are applicable to these three-step procedures.

As the instrument  $z$  for parental migration, the author focuses on the migration liberalization in Russia one more time, and this time uses the average of parents' ages as of 2006. The age is a strong predictor of migration as we see the probability of migration decrease in age in Table 3.1. The

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<sup>21</sup>Alternatively, by using  $z \times after$ ,  $z \times \mathbb{I}(h_p \leq 11) \times after$  and  $z \times \mathbb{I}(h_p \geq 12) \times after$  as the instruments, we can employ standard 2SLS and IV ordered probit. Similar results are obtained in this procedure although the instruments are slightly weaker than in the three-step procedure.

liberalization of migration would play a limited role on the migration decisions of parents who were already relatively old in 2006, compared to those of parents who were relatively young. Parental migration instrumented in this way captures the propensity of migration predicted from their ages and  $X$  and induced by the Russian policy change and leaves unobservable factors affecting the migration decisions in the residuals. It could be pointed out that the parental age may be directly correlated to education investment. Old parents may be more dependent on children and wish them to work or, conversely, old parents may have sufficient wealth to send their children to tertiary school. Parental age may also correlated to the child's birth order which may affect education investment (one is likely to be the first child if the parents are young, and likely to be the last child if the parents are old). However, these channels of effects can be controlled by ones of the covariates, the parental age and its squared term as of the year when the child became 18 years old.

The idea of this instrument is related to the idea to use exogenous environmental characteristics affecting migration (or remittances) as instruments, which is common in the literature, although the literature use these characteristics more explicitly. Frequently used characteristics are, for example, the migration rate (Batista et al. 2012; McKenzie & Rapoport 2011), the distances to transportation and financial institutions (Alcaraz et al. 2012; Amuedo-Dorantes & Pozo 2006), and exogenous shock in the migration destination (Yang 2008). However, in our framework where we aim to capture the effects of parental migration and children's prospects separately, a simple use of these environmental characteristics, especially time-invariant ones, as instruments for parental migration may not be valid since these characteristics can also affect children's future migration prospect directly. Our instrument aims to exploit the difference of parental reaction by their age to the immigration liberalization in Russia.

A minor but not necessarily negligible caution is that the relationship between parental migration and age is not necessarily linear. An increase of the parental age above a certain level may not have any impact on the parental reaction to the immigration policy in Russia. This possibility will be explored with results.

## 3.5 Results

### 3.5.1 Examining the overall effect of migration

Column (I) in Table 3.3 shows the OLS estimates under (3.1).  $\beta_{after}$  is significantly negative, suggesting the negative overall effect of migration. Its volume implies that “after” generation receives 0.27 year less education than “before” generation, which is larger than the simple difference in  $h_c$  between generations shown in Table 3.2. Then, considering the discrete nature of  $h_c$ , column (II) shows the ordered probit coefficients.  $\beta_{after}$  remains negative and significant at the 1% level. Its marginal effect at the mean implies that “after” generation children are 1.5 percentage points more likely to leave school after completing secondary education and 0.9 and 3.1 percentage points less likely to complete vocational and tertiary education.

Columns (III) and (IV) then examine the potential heterogeneity of the overall effect of migration. In both OLS and ordered probit estimations, the overall effect for highly educated parents,  $\beta_{after,12}$ , is larger in the absolute term than that for lowly educated parents,  $\beta_{after,11}$ . Moreover,  $\beta_{after,11}$  of ordered probit is even insignificant. These seemingly suggest the potential heterogeneity. However, the null hypothesis of  $\beta_{after,11} = \beta_{after,12}$  cannot be rejected, even for the ordered probit estimates. Therefore, let us focus on examining  $\beta_{after}$  instead of the heterogeneous effects of  $\beta_{after,11}$  and  $\beta_{after,12}$  for a while.

Some of the covariates have significant coefficients.  $h_c$  is naturally increasing in parental education. This would reflect the income effect while it may also reflect the parents’ attitude toward education to some extent. Child’s own chronic illness and high dependency rates are negatively associated to  $h_c$ . Children for whom both parents are available have significantly high  $h_c$ , suggesting conversely the difficulty of education investment in households with single, divorced or widowed parents. Being minority, the household size, and the male ratio of household members do not have significant coefficients. A little caution would be necessary to interpret the effect of parental age. It has a U-shaped relationship to  $h_c$  with its bottom peak lying around 47.5 years, not an inverted-U shape, suggesting that parental age captures other effects than a standard age-income relationship.

Table 3.3 The overall effect of migration and the effects of covariates

	(I) OLS	(II) Ordered probit	(III) OLS	(IV) Ordered probit
$\beta_{after}$	-0.270*** (0.0880)	-0.128*** (0.0480)		
$\beta_{after,11}$			-0.236** (0.120)	-0.0869 (0.0631)
$\beta_{after,12}$			-0.310** (0.130)	-0.177** (0.0727)
$\mathbb{I}(h_p = 9 \text{ or } 9.5 \text{ years})$	0.135 (0.252)	0.0137 (0.127)	0.134 (0.253)	0.0114 (0.127)
$\mathbb{I}(h_p = 10 \text{ years})$	0.328 (0.245)	0.176 (0.124)	0.323 (0.247)	0.171 (0.125)
$\mathbb{I}(h_p = 11 \text{ years})$	0.680*** (0.214)	0.400*** (0.104)	0.673*** (0.217)	0.392*** (0.105)
$\mathbb{I}(h_p = 12 \text{ years})$	1.139*** (0.220)	0.659*** (0.110)	1.171*** (0.228)	0.697*** (0.119)
$\mathbb{I}(h_p = 13 \text{ years})$	1.594*** (0.231)	0.933*** (0.116)	1.623*** (0.234)	0.968*** (0.123)
$\mathbb{I}(h_p = 14 \text{ years})$	1.647*** (0.321)	0.994*** (0.167)	1.677*** (0.322)	1.032*** (0.171)
$\mathbb{I}(h_p = 15 \text{ years})$	2.702*** (0.296)	1.626*** (0.175)	2.732*** (0.298)	1.662*** (0.179)
Parents' age when child was aged 18 years	-0.165* (0.0956)	-0.124** (0.0532)	-0.164* (0.0956)	-0.123** (0.0533)
Its squared term	0.00174* (0.000966)	0.00130** (0.000534)	0.00173* (0.000966)	0.00130** (0.000534)
Child's own chronic illness	-1.018*** (0.279)	-0.515*** (0.134)	-1.018*** (0.279)	-0.516*** (0.134)
Minority	0.0165 (0.133)	-0.00395 (0.0742)	0.0181 (0.133)	-0.00217 (0.0742)
Household size	-0.0127 (0.0203)	-0.00696 (0.0108)	-0.0127 (0.0203)	-0.00696 (0.0108)
Male ratio	0.262 (0.321)	0.117 (0.177)	0.266 (0.321)	0.122 (0.177)
Dependency	-0.548* (0.317)	-0.412** (0.178)	-0.549* (0.317)	-0.413** (0.178)
Both parents in data	0.319*** (0.122)	0.204*** (0.0674)	0.320*** (0.122)	0.204*** (0.0674)
Urban	-0.298* (0.168)	-0.0738 (0.0851)	-0.296* (0.168)	-0.0718 (0.0852)
(Pseudo-)R <sup>2</sup>	0.176	0.092	0.176	0.093

$N = 2,382$ . Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Standard  $R^2$  for OLS and pseudo- $R^2$  for ordered probit. Fixed effects for all estimations and constants omitted.



Table 3.4 The overall effect of migration, controlling macro-level factors

	(I) OLS	(II) Ordered probit	(III) OLS	(IV) Ordered probit	(V) OLS	(VI) Ordered probit
$\beta_{after}$	-0.396*** (0.121)	-0.208*** (0.0652)	-0.438*** (0.151)	-0.249*** (0.0828)	-0.343*** (0.105)	-0.176*** (0.0573)
Public education expenditure as % of GDP	0.144 (0.0886)	0.0921* (0.0487)				
Log per capita GDP			0.834 (0.603)	0.604* (0.335)		
Log per capita investment in each district					0.0698 (0.0493)	0.0461* (0.0278)

$N = 2,393$  for all estimations. Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . All estimations use the same covariates shown in Table 3.3 as well as the district fixed effect. GDP and investment are measured in constant prices. All macro-level factors are measured as of the year when each child became 18 years old.

Not observing an inverted-U relationship is not necessarily counter-intuitive. The age-income relationship could be weak here since parental ages do not cover the area of ages where income generally steeply increases, the twenties. The relationship may be reflecting the birth order effect. That a parent is 47.5 years old when the child is 18 implies that the parent was 29.5 years old when the child was born, and a child whose parents were 29.5 years old when she was born is likely to be in the middle of birth order. The U-shaped relationship implies that children in the middle of birth order tend to be less educated than elder and younger siblings.

To take into account the risk that  $\beta_{after}$  captures the potential effects of time-variant macro-level factors, Table 3.4 presents  $\beta_{after}$  estimated in models with three macro-level factors. Columns (I) and (II) show the OLS and ordered probit estimates with the public education expenditure as the percentage of GDP when each child became 18 years old. Public education expenditure is generally increasing in time. Naturally, it has a positive effect on  $h_c$ , although significant only in the ordered probit estimate. Controlling this,  $\beta_{after}$  becomes larger than the estimates in Table 3.3. Similarly, with the log of per capita GDP and the log of per capita investment in each district as of the year when each child became 18 years old,  $\beta_{after}$  becomes larger. Therefore, as predicted, ignoring time-variant macroeconomic circumstances attenuates the volume of  $\beta_{after}$ , but whether to control these factors does not affect the main conclusion that the overall effect of migration is

Table 3.5 The overall effect of migration, using the alternative specifications

	Those having completed secondary education		Log of working permits in Russia instead of <i>after</i>	
	(I) OLS	(II) Ordered probit	(III) OLS	(IV) Ordered probit
$\beta_{after}$	-0.156** (0.0744)	-0.154** (0.0643)	-0.158** (0.0661)	-0.0635* (0.0360)

$N = 1,914$  for (I) and (II), and  $N = 2,393$  for (III) and (IV). Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . All estimations use the same covariates shown in Table 3.3 as well as the district fixed effects.

negative.

Then, we check the estimation concept using the results in Table 3.5. Columns (I) and (II) shows the effect of being “after” generation estimated from the sample of children having completed secondary school at the time of the surveys. Possibly because the variation of  $h_c$  is reduced, the volume and significance of  $\beta_{after}$  in OLS becomes smaller than the ones in Table 3.3, but it remains significant at the 5% level. Conversely, the ordered probit coefficient of  $\beta_{after}$  becomes slightly larger than the one in Table 3.3. The marginal effects of being “after” also become slightly larger: “after” generation children are 5.2 percentage points more likely to leave school after completing secondary education, and 1.2 and 4.0 percentage points less likely to complete vocational and tertiary education. Nevertheless, the overall conclusion is the same as the one obtained from the main sample. Then, we estimate (3.1) by replacing *after* by the log of working permits issued in Russia. Results are similar to the ones obtained in Table 3.3. In column (III), the OLS estimate is negative and significant at the 5% level. Its value, -0.158, implies that doubling the number of working permits in a given year reduces the schooling of children becoming 18 in that year by 0.110 years.<sup>22</sup> Since the average number of quota in 2006-11 is 4.5 times that in 2002-2005, the increase reduces  $h_c$  by 0.238 years, which is close to  $\beta_{after}$  in Table 3.3. The ordered probit estimate in column (IV) is weak, significant at the 10% level, but remains negative.

<sup>22</sup>A standard interpretation of the coefficient of a log variable is that, if  $y = a + b \log x$ , then a  $q\%$  increase of  $x$  raises  $y$  by  $[q \times b/100]\%$ . Under this way of interpretation, doubling the work permit (or a 100% increase) raises  $h_c$  by  $-\beta_{after} = 0.158$  years. However, this way of interpretation is not accurate when  $x$  increases discretely instead of infinitesimally. Doubling the number of work permits reduces  $h_c$  by  $0.158 \times \log 2 \approx 0.110$  years. Similarly, multiplying the permits by 4.5 reduces  $h_c$  by  $0.158 \times \log(4.5) \approx 0.238$ .

### 3.5.2 Decomposing the overall effect of migration

Now we decompose the overall effect of migration by controlling parental migration. Panel A of Table 3.6 shows the results under OLS and Ordered Probit. Columns (I) and (II) present the prospect effect,  $\beta_{after,N}$ , and the effect of parental migration,  $\beta_{after,M}$ , estimated in (3.4) where parental migration is not interacted to parental education. Parental migration has a positive but insignificant coefficient in either estimation. Then, in columns (III) and (IV), the effect of parental migration is separately estimated for lowly and highly educated parents as in (3.5). Now parental migration has a positive effect when parental education is 11 years or less, which is significant at the 1% level. The OLS estimate states that migration of such parents raises  $h_c$  by 0.658 years. The marginal effects of the ordered probit result show that “after” generation children with migrating parents, if  $h_p \leq 11$ , are 5.3 percentage points less likely to leave school after completing secondary education and are 2.3 and 9.1 percentage points more likely to complete vocational and tertiary education than “after” generation children whose parents did not migrate. Parental migration, however, has a negative but insignificant effect for  $h_p \geq 12$ . Note that, throughout columns (I) to (IV), the volume of the prospect effect,  $\beta_{after,N}$ , is slightly larger than the overall effect of migration,  $\beta_{after}$ , in Table 3.3, because the positive effect of parental migration is subtracted from the overall effect. Columns (V) and (VI) allows the prospect effect to be heterogeneous under the model in (3.6).  $\beta_{after,N,11}$  and  $\beta_{after,N,12}$  become more similar than the heterogeneous overall effects in Table 3.3. The null hypothesis that these coefficients are not different cannot be rejected here, either.

These results, however, may be biased by the endogeneity of parental migration. The positive coefficients of parental migration for  $h_p \leq 11$  and the negative ones for  $h_p \geq 12$ , respectively, may be caused by positive and negative selection in terms of unobservable skills.

Panel B of Table 3.6 shows the IV estimates. Standard errors are clustered by the values of the instrument, the parents’ mean age as of 2006, although the levels of significance for the main variables do not change greatly even if we do not cluster standard errors. Columns (I) and

Table 3.6 The decomposed effects of migration

<i>Panel A: Parents' migration not instrumented</i>	(I) OLS	(II) Ordered probit	(III) OLS	(IV) Ordered probit	(V) OLS	(VI) Ordered probit
<i>The prospect effect</i>						
For all $h_p$ : $\beta_{after,N}$	-0.298*** (0.0920)	-0.140*** (0.0497)	-0.298*** (0.0877)	-0.140*** (0.0498)		
For $h_p \leq 11$ : $\beta_{after,N,11}$					-0.305** (0.126)	-0.121* (0.0654)
For $h_p \geq 12$ : $\beta_{after,N,12}$					-0.289** (0.134)	-0.163** (0.0751)
<i>The effect of parents' migration</i>						
For all $h_p$ : $\beta_{after,M}$	0.225 (0.178)	0.0947 (0.100)				
For $h_p \leq 11$ : $\beta_{after,M,11}$			0.658*** (0.227)	0.345*** (0.134)	0.662*** (0.233)	0.335** (0.136)
For $h_p \geq 12$ : $\beta_{after,M,12}$			-0.127 (0.253)	-0.101 (0.138)	-0.131 (0.257)	-0.0894 (0.140)
<i>Panel B: Parents' migration instrumented</i>	(I) 2SLS	(II) IV ordered probit	(III) 2SLS	(IV) IV ordered probit	(V) 2SLS	(VI) IV ordered probit
<i>The prospect effect</i>						
For all $h_p$ : $\beta_{after,N}$	-0.373*** (0.0937)	-0.193*** (0.0496)	-0.376*** (0.0937)	-0.196*** (0.0495)		
For $h_p \leq 11$ : $\beta_{after,N,11}$					-0.402*** (0.145)	-0.191** (0.0756)
For $h_p \geq 12$ : $\beta_{after,N,12}$					-0.347** (0.135)	-0.204*** (0.0642)
<i>The effect of parents' migration for</i>						
For all $h_p$ : $\beta_{after,M}$	0.827* (0.502)	0.528* (0.272)				
For $h_p \leq 11$ : $\beta_{after,M,11}$			1.495** (0.661)	1.015*** (0.342)	1.582** (0.676)	1.000*** (0.356)
For $h_p \geq 12$ : $\beta_{after,M,12}$			0.346 (0.600)	0.190 (0.325)	0.244 (0.622)	0.211 (0.331)

$N = 2,393$  for all estimations. Robust standard errors in parentheses for Panel A. Standard errors clustered by the parental age as of 2006 in parentheses for Panel B. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . All estimations use the same covariates shown in Table 3.3 and the district fixed effects.

(II) show the estimates without interacting  $M_p$  to parental education.<sup>23</sup> The effect of parental migration becomes larger than the Panel A estimates, and becomes significant at the 10% level. The instrument is sufficiently strong with the first-stage F value being 84.1 — and, in any subsequent IV estimation in this chapter, the first-stage F values exceed 10. However, whether the IV estimates are more appropriate than the previous results is ambiguous. The exogeneity of parental migration cannot be rejected for the 2SLS estimate, but the independence of equations is rejected at the 10% level for the IV ordered probit estimate.

Then we allow parental migration to have a heterogeneous effect in columns (III) and (IV). The coefficients of parental migration for  $h_p \leq 11$  remain positive and significant, but its volume greatly increased from the Panel A estimates. The effect for  $h_p \geq 12$  also moves upward but remains insignificant. Note that, similarly to columns (I) and (II), the exogeneity of migration cannot be rejected for the 2SLS estimate, but is rejected for the IV ordered probit estimate at the 10% level. Finally, in columns (V) and (VI) where we allow the prospect effect as well as the effect of parental migration to be heterogeneous, the volumes of the prospect effect for lowly and highly educated parents are almost the same. Considering this and the results so far, now it would be reasonable to conclude that the prospect effect works regardless of parental education levels.

To check the robustness of the identification so far, let us try alternative IV specifications. Panel A of Table 3.7 demonstrates the IV estimates in two alternative specifications. Following the results so far, we employ equation (3.5) as the second stage equation, which allow only parental migration to have a heterogeneous effect. In columns (I) and (II), we use the squared term of parental age as of 2006,  $z^2$ , in addition to  $z$  in the first-step probability estimation. This allows for non-linearity between parental migration and their ages. Both  $z$  and  $z^2$  have 1%-significant coefficients, and the probability of parental migration has a negative and convex slope with respect to parental age as of 2006. In the final results, in either estimation,  $\beta_{after,M,11}$  slightly shifts upward and  $\beta_{after,N}$  shifts downward from the results in Table 3.6. Then, in columns (III) and (IV), we employ probit

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<sup>23</sup>The full results of the estimation of the probability of  $M_p = 1$ , whose predicted value  $\hat{M}_p$  is commonly used in columns (I) to (IV), and the first-stage and second-stage estimations for columns (I) and (III) are provided in the appendix of this chapter.

Table 3.7 The decomposed effects of migration estimated in alternative IV specifications

<i>Panel A: Alternative IV specifications</i>	(I) 2SLS	(II) IV Ordered Probit	(III) 2SLS	(IV) IV Ordered Probit
<i>The prospect effect: <math>\beta_{after,N}</math></i>	-0.391*** (0.0946)	-0.204*** (0.0497)	-0.457*** (0.118)	-0.226*** (0.0567)
<i>The effect of parents' migration</i>				
For $h_p \leq 11$ : $\beta_{after,M,11}$	1.772** (0.698)	1.163*** (0.363)	2.598*** (0.920)	1.444*** (0.493)
For $h_p \geq 12$ : $\beta_{after,M,12}$	0.335 (0.591)	0.187 (0.321)	0.643 (0.794)	0.302 (0.423)
<i>Panel B: With public education expenditure</i>	(I) OLS	(II) Ordered Probit	(III) 2SLS	(IV) IV Ordered Probit
<i>The prospect effect: <math>\beta_{after,N}</math></i>	-0.417*** (0.123)	-0.217*** (0.0660)	-0.463*** (0.0965)	-0.251*** (0.0524)
<i>The effect of parents' migration</i>				
For $h_p \leq 11$ : $\beta_{after,M,11}$	0.639*** (0.225)	0.333** (0.133)	1.352* (0.698)	0.909** (0.356)
For $h_p \geq 12$ : $\beta_{after,M,12}$	-0.160 (0.255)	-0.123 (0.139)	0.192 (0.636)	0.0833 (0.350)
<i>Panel C: Only parents aged 55 years or younger as of 2006</i>	(I) OLS	(II) Ordered Probit	(III) 2SLS	(IV) IV Ordered Probit
<i>The prospect effect: <math>\beta_{after,N}</math></i>	-0.234** (0.103)	-0.105* (0.0554)	-0.374*** (0.102)	-0.191*** (0.0540)
<i>The effect of parents' migration</i>				
For $h_p \leq 11$ : $\beta_{after,M,11}$	0.596*** (0.226)	0.323** (0.134)	2.065*** (0.666)	1.237*** (0.337)
For $h_p \geq 12$ : $\beta_{after,M,12}$	-0.271 (0.254)	-0.178 (0.138)	0.310 (0.638)	0.177 (0.349)

$N = 2,393$  in Panels A and B, and  $N = 2,095$  in Panel C. In parentheses, robust standard errors for OLS and ordered probit, and standard errors clustered by the values of  $z$  for 2SLS and IV ordered probit. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . All estimations use the same covariates shown in Table 3.3 as well as the district dummies.

for the first-step estimation of  $\hat{M}_p$ , although the first-stage regressions of 2SLS and IV ordered probit are linear. This specification allows non-linear relationships of parental migration with their characteristics, not only with the parental age, but still avoids the forbidden regression problem. The estimated effect of parental migration for  $h_p \leq 11$  becomes further large. Note that, in this estimation, even the exogeneity of parental migration for 2SLS is rejected at the 10% level.

In Panel B, we redo OLS, ordered probit, 2SLS and IV ordered probit estimations by adding as covariates the public education expenditure as the percentage of GDP. Just like the before-after estimates of the overall effect, the prospect effect could be attenuated because of the changing macro-level circumstances. In line with this expectation, the volume of the prospect effect becomes larger in any estimation than the one in the corresponding estimation in Table 3.6. Conversely, the estimated effect of parental migration becomes slightly smaller. Nevertheless, addition of the public education expenditure does not alter the basic conclusion. Similar results can be obtained by using the other two macro factors previously used.

Finally, Panel C of Table 3.7 uses only observations whose parents were aged 55 years or younger as of 2006. This drops 298 observations from the main sample. By restricting the parental ages, we exclude observations whose parents are unlikely to be affected by the Russian immigration policy, which is close to the idea to use a non-linear instrument or non-linear first-step probability estimation in Panel A. Compared to the results in Table 3.6, the OLS and ordered probit estimates become slightly weak. However, in the 2SLS and IV ordered probit results, the prospect effect is similar to the one in Table 3.6, but the effect of parental migration becomes strong. Moreover, the exogeneity of parental migration is rejected for the 2SLS estimate here.

In sum, regardless of the estimation methods, the negative prospect effect and the positive effect of parental migration are robustly observed. Endogeneity of parental migration seems to attenuate the volumes of these effects to some extent. In addition, the changing macro-level circumstances also attenuate the volumes of the prospect effect. However, either we control or ignore these factors, the signs of the prospect effect and the effect of parental migration remain the same. The decomposition also supports the view that the relationship between the human capital levels of

parents and children are as in the pessimistic scenario demonstrated in Figure 2.1-b in Chapter 2, because the effect of parental migration is positive only for  $h_p \leq 11$  but the prospect effect is negative globally.

### 3.6 Conclusion

This chapter examined the effects of migration on education investment, following the theoretical implication in Chapter 2, and using microdata from Tajikistan. That country experienced a rapid increase in migration in the second half of the 2000s due to the immigration policy change in the main migration destination, Russia. Migrants are negatively or intermediately selected. Meanwhile, despite the legacy of the Soviet Union, education investment became expensive after independence and households' endogenous education investment decisions could play an important role.

A challenge to examine the prospect effect of children's future migration is that the prospect itself is basically unobservable. To overcome this issue, this chapter takes advantage of the rapid increase of migration induced by the liberalization of immigration Russia. Children making education investment decisions after the liberalization would be affected largely by migration but those having made education investment before the liberalization would be affected little. Under this assumption, a before-after analysis provides the overall effect of migration inclusive of the prospect effect. By explicitly control parental migration, the overall effect could be decomposed into the prospect effect and the effect of parental migration. However, the decomposition also faces the potential risk of bias due to the endogeneity of parental migration. This chapter aimed to deal with this issue by taking advantage of the difference of the parental reactions to the Russian immigration policy, assuming that relatively young parents at the time of the policy change would be more affected by the policy than relatively old parents.

The results show that migration overall reduced education investment. This is observed robustly in various specifications, including the ones where we account the possibility that a before-after estimator can reflect various time-variant macro-level factors. Also, the results that control



parental migration show that parental migration encourages education investment in households where parents are lowly educated, and that the prospect effect discourages education investment regardless of parental migration status. These effects are robustly observed even after considering the endogeneity of parental migration although the endogeneity seemingly attenuate these effects slightly.

These results reveal a pessimistic view on the role of migration on education investment in Tajikistan. The relationship between the education levels of parents and children seems to be close to the pessimistic scenario in the theoretical model in Chapter 2. This provides an alternative example of the negative consequences of labor migration on education investment in migrant-sending countries. The literature has primarily focused on either *brain drain* or the negative side-effects of parental migration as sources of such negative consequences of labor migration. However, the results in this chapter suggests that a negative consequence can show up in a negative-selection circumstance in a way that cannot be attributed to the side-effects of parental migration.

Clearly, the results and views in this chapter may not be automatically applicable to the other countries with negative selection migration. While Tajikistan provides an interesting framework to examine the roles of migration, that country could be an exceptional case rather than a general example. Whether the results of the present study hold as a general effect of negative selection migration needs to be critically examined with evidence from other cases and other frameworks. Nevertheless, the results provide a benchmark for further research.

### Appendix for Chapter 3

Table 3A1 shows the summary statistics of covariates separately for “before” and “after” generations. Table 3A2 shows the first-step estimation of  $\hat{M}_p$  and the first-stage and second-stage estimations for column (I) and (III) of Table 3.6.

Table 3A1 Summary statistics of covariates

	“After” generation		“Before” generation	
	mean	std. dev.	mean	std. dev.
Parental education, $h_p$	11.429	1.842	11.104	2.144
Parental age when the child was aged 18	47.036	5.851	47.051	6.273
Parents’ ages as of 2006	45.517	6.045	49.496	6.337
Parents’ migration in 2006-2011	0.132	0.339	0.051	0.221
Child’s own chronic illness	0.031	0.174	0.057	0.232
Minority	0.172	0.378	0.206	0.405
Household size	7.504	2.979	7.741	2.786
Male ratio	0.574	0.135	0.561	0.136
Dependency	0.324	0.175	0.310	0.158
Both parents available in data	0.883	0.321	0.813	0.390
Urban	0.287	0.452	0.253	0.435
Dushanbe, the capital city	0.129	0.335	0.131	0.337
Soghd Province	0.198	0.398	0.188	0.391
Khatlon Province	0.327	0.469	0.315	0.465
Region of Republican Subordination	0.243	0.429	0.258	0.438
Gorno Badakhshan Autonomous Region	0.104	0.305	0.108	0.311

$N = 1,148$  for “after” generation and  $N = 1,245$  for “before” generation.

Table 3A2 The underlying estimations for IV estimations in Table 3.6.

	OLS for probability $M_p = 1$	1st stage for (I)	2nd stage for (I)	1st stages for (III)		2nd stage for (III)
				$M_p \times after$ $\times \mathbb{I}(h_p \leq 11)$	$M_p \times after$ $\times \mathbb{I}(h_p \geq 12)$	
z: Parents' mean age as of 2006	-0.0181*** (0.00512)					
1st: $\hat{p} \times after$		1.445***	0.827*			
2nd: $\beta_{after,M}$		(0.115)	(0.502)			
1st: $\hat{p} \times after \times \mathbb{I}(h_p \leq 11)$				1.236*** (0.135)	0.123*** (0.0427)	1.495** (0.661)
2nd: $\beta_{after,M,11}$						
1st: $\hat{p} \times after \times \mathbb{I}(h_p \geq 12)$				0.0880** (0.0378)	1.428*** (0.136)	0.346 (0.600)
2nd: $\beta_{after,M,12}$						
<i>after</i>	-0.000377 (0.0214)	-0.0576*** (0.0114)	-0.373*** (0.0937)	-0.0228*** (0.00768)	-0.0345*** (0.00809)	-0.376*** (0.0937)
$\mathbb{I}(h_p = 9, 9.5)$	-0.0266 (0.0189)	0.0157 (0.0157)	0.152 (0.242)	0.0143 (0.0149)	0.00061 (0.00509)	0.150 (0.244)
$\mathbb{I}(h_p = 10)$	-0.00155 (0.0220)	0.00152 (0.0163)	0.347 (0.278)	-0.00147 (0.0157)	0.00436 (0.00501)	0.337 (0.281)
$\mathbb{I}(h_p = 11)$	-0.00610 (0.0192)	0.00182 (0.0115)	0.691*** (0.213)	0.00015 (0.0102)	0.00475 (0.00467)	0.666*** (0.215)
$\mathbb{I}(h_p = 12)$	0.0475** (0.0218)	0.00276 (0.0147)	1.115*** (0.245)	0.00588 (0.00816)	-0.0126 (0.0107)	1.189*** (0.247)
$\mathbb{I}(h_p = 13)$	0.00728 (0.0260)	-0.00040 (0.0145)	1.603*** (0.257)	0.00528 (0.00864)	-0.0129 (0.0104)	1.657*** (0.260)
$\mathbb{I}(h_p = 14)$	-0.00190 (0.0364)	-0.0142 (0.0269)	1.663*** (0.354)	0.0119 (0.00977)	-0.0338 (0.0249)	1.707*** (0.352)
$\mathbb{I}(h_p = 15)$	-0.0248 (0.0365)	0.00987 (0.0255)	2.721*** (0.292)	0.0108 (0.0104)	-0.00777 (0.0227)	2.770*** (0.294)
Parents' mean age when child was 18	-0.0181 (0.0117)	-0.00196 (0.00853)	-0.152 (0.0949)	-0.00635 (0.00633)	0.00436 (0.00569)	-0.145 (0.0952)
Its squared term	0.000296*** (0.000110)	0.00002 (0.00008)	0.00164* (0.000951)	0.00006 (0.00006)	-0.00004 (0.00006)	0.00158* (0.000955)
Child's own chronic illness	-0.00795 (0.0262)	0.0199 (0.0181)	-1.028*** (0.346)	0.00583 (0.0121)	0.0132 (0.0132)	-1.018*** (0.343)
Minority	-0.00547 (0.0190)	0.00826 (0.0148)	0.00696 (0.106)	-0.00259 (0.0108)	0.0104 (0.0102)	0.0174 (0.106)
Household size	-0.00593** (0.00271)	0.00047 (0.00173)	-0.00808 (0.0183)	0.00122 (0.00117)	-0.00096 (0.00127)	-0.00752 (0.0183)
Male ratio	-0.0548 (0.0518)	-0.00321 (0.0347)	0.294 (0.339)	-0.0188 (0.0239)	0.0149 (0.0250)	0.320 (0.333)
Dependency	0.00412 (0.0527)	0.00108 (0.0356)	-0.586 (0.381)	-0.0295 (0.0236)	0.0317 (0.0261)	-0.560 (0.373)
Both parents in data	0.0898*** (0.0191)	0.00600 (0.00829)	0.270** (0.128)	0.00836 (0.00592)	-0.00190 (0.00579)	0.259** (0.125)
Urban	0.00714 (0.0227)	0.0112 (0.0178)	-0.312** (0.146)	0.00120 (0.0112)	0.00962 (0.0136)	-0.305** (0.144)
Constant	1.074*** (0.301)	0.0331 (0.219)	14.91*** (2.305)	0.159 (0.162)	-0.119 (0.145)	14.68*** (2.314)

$N = 2,393$ . Standard errors clustered by the parents' mean age as of 2006 in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Adjusted  $R^2$  shown for the 1st stage estimations. The district fixed effects omitted.

**Chapter 4 Parental migration and gender gap in education in  
Tajikistan**

## 4.1 Introduction

While this chapter also examines the effects of migration on education investment and uses the microdata from Tajikistan as in Chapter 3, the main focus is placed on the role of parental migration and the gender difference in education investment.<sup>24</sup>

As is often the case for the former Soviet Union countries, the education level in Tajikistan is fairly high. Compulsory education is universal. Female education improved in the Soviet era, partly because of the Soviet ideology on the roles of female labor force. However, after independence, as Tajikistan experienced harsh socioeconomic upset due to transition to market economy and a civil war, female education deteriorated and a gender difference in education attainment widened. According to the official statistics, the ratio of female to male students in secondary school (grades 10 and 11) decreased from 1.008 in the 1991/92 school year to 0.600 in the 2001/02 school year, and the ratio in tertiary school decreased from 0.507 to 0.313 during the same period (*Agenstvo po statistike pri Prezidente Respubliki Tadjikistan* 2016). Also, according to the TLSS 2007, which is also used in Chapter 3, while 87.7% of women who became 18 years old in 1987-1991 have completed at least secondary education, that proportion is merely 68.1% among women who became 18 years old in 2002-2006.<sup>25</sup>

In this chapter, the author examines the effect of parental migration on education investment, paying attention to the possibility that parental migration has a heterogeneous effect on male and female education. The analysis partly aims to complement the discussion in the previous chapter, but also aims to derive implication of parental migration on the educational gender difference.

The remainder of this chapter proceeds as follows. In Chapter 4.2, the author explains the data, samples and the main variables, highlighting the difference from the ones in Chapter 3. In Chapter 4.3, the author summarizes the discussions in the previous literature. Although a few discussions in the literature has already been presented in the previous chapters, the literature has made plenty of attempts to examine the role of parental migration, focusing on its potential gender heterogeneity.

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<sup>24</sup>This chapter is based on Yamada (forthcoming) written in Japanese.

<sup>25</sup>The figures are obtained by using the sampling weights so that they are national representative. The proportion is 80-90% among any generation for men.

These discussions are presented here. The background information for Tajikistan, especially the one related to gender, is also supplemented. Chapter 4.4 describes the estimation methodology. Chapter 4.5 shows the results. Chapter 4.6 discusses the interpretations and implications of the results to conclude. Supplementary information is provided in the appendix of this chapter.

## **4.2 Data, sample, variables**

The analysis of this chapter uses three datasets: the Tajikistan Living Standard Survey (TLSS) 2007 and 2009, and the Tajikistan Household Panel Survey 2011. The TLSS 2007 and the THPS 2011 are also used in Chapter 3. The sample of the TLSS 2009 are almost the same as that of the THPS 2011. Unlike the analysis in Chapter 3, the analysis in this chapter examines the effect of parental migration on the enrollment in secondary education. Vocational education is treated as a part of secondary education throughout this chapter since some children advance to vocational education after completing compulsory education (see Chapter 3.2 and footnote 12). The reference school year in these surveys are set at the 2006/07, 2008/09, and 2010/11 school years, respectively.

### **4.2.1 Sample**

To focus on the secondary education enrollment has strength and weakness. Because whether to be enrolled in secondary education is not the final education investment decision for those considering to advance to higher education, examining the secondary education enrollment does not fully illustrate the education investment decisions. Relatively high enrollment rate among male children also limits the scope of the effect of parental migration for male children. However, especially for female children, focusing on the secondary education enrollment still has benefits. On one hand, a part of the benefit is related to the data limitation. As is discussed in Chapter 3.2, women in Tajikistan tend to marry young, and married women tend to be recorded as members of their husbands' households in the TLSS and THPS, not as the members of their biological households. The information of their biological parents and households, including parental migration, is mostly unavailable for these individuals. Therefore, to examine the role of parental migration on final ed-

education attainments, one needs to focus on female children who have not got married, which is hardly representative of population and would lead to an obvious bias. Such a problem would not be prevalent among women in secondary education age. Indeed, in the TLSS 2007, the proportion of those having ever married is 6.3% among women aged 16-18 years. On the other hand, the prevalence of gender difference in the secondary education enrollment and the fact that more than 30% of women do not complete secondary education according to the TLSS 2007 suggest that the secondary education enrollment is a relevant measurement of education investment for women. Observing that parental migration affects secondary education enrollment, either positively or negatively, provides an implication of parental migration on a fundamental level of education, which would be at least as interesting as observing an effect of parental migration on advanced education.

Specifically, in this chapter, the author basically focuses on individuals aged 16-18 years at the time of each survey. However, the following individuals are excluded from the sample. First, those who had not completed basic education yet and those who had completed secondary education at the beginning of the reference school year of the survey are excluded. These individuals were basically not eligible for secondary education at the time of the survey.<sup>26</sup> Second, the author also excludes individuals none of whose parents are recorded in the data. This includes individuals who live separately from their parents for marriage or any other reason, and both whose parents are dead. Excluding these observations, as well as observations for whom the information on important characteristics is missing, the sample size becomes 2,144 individuals (1,069 boys and 1,075 girls).

The author pools the observations from three datasets. A panel data analysis will not be conducted although the original datasets partly forms a panel, basically because both the interval of surveys and the duration of secondary education are two years and, consequently, the dataset of children eligible for secondary education does not form a panel.

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<sup>26</sup>Note that those whose ages are 16-18 years but who are not eligible for secondary education in a given year often appear as sample individuals in the other years. For example, an individual aged 18 years and having completed secondary education as of 2011 is often included in the sample for 2009 as a 16 year-old secondary school student.

Table 4.1 The secondary education enrollment rate by gender and parental migration

	Male	Female
All households	82.4	56.1
Migrating households, $M_i = 1$	84.1	50.3
Non-migrating households, $M_i = 0$	82.1	57.1

$N = 2, 144.$

#### 4.2.2 Main variables

The dependent variable,  $educ_i$ , is a dummy variable taking one if individual  $i$  was enrolled in secondary education. The main explanatory variable is the dummy for parental migration,  $M_i$ , which takes one if at least one of the parents of individual  $i$  experienced labor migration within four years, including the year of the survey. The four-year window here is intuitive. For example, a large part of the enrollment decision for a second year student in the 2010/11 school year might have been made in the 2008/09 school year when he/she was about to complete compulsory education and consider whether to continue schooling. Then the parental migration status in a few years ago could affect the child's current enrollment status.

Table 4.1 shows a simple comparison of the secondary education enrollment rate by gender and parental migration among the sample. The rate for male children is 26.3 percentage points higher than that for female children. Interestingly, the rate is higher among male children if the parents migrate, but is higher among female children if the parents do not migrate. This suggests the possibility that parental migration has a heterogeneous effect on male and female enrollment, although the difference in the enrollment rate by the parental migration status is not significant for either gender.

### 4.3 Literature

Unlike the roles of the future migration prospects, those of parental migration have been primarily examined from the empirical perspective. The theoretical discussion in Chapter 2 takes into consideration the remittance effect of parental migration. However, parental migration can have



various other side-effects on education investment. Moreover, whether parental migration has a homogeneous or heterogeneous effect on male and female education in a given country would depend largely on the social, economic or cultural background on the gender roles in that country. Consequently, it is not straightforward to obtain precise predictions on the roles of parental migration on education investment. Nevertheless, it would be fruitful to summarize the existing discussions, which facilitate the interpretation of the results.

The effect of parental migration that has been the most widely discussed is whether parental migration (or remittance receipt) raises education investment for children left behind, or the remittance effect in the terminology of Chapter 2. Generally, poverty is one of the main constraints for education investment in developing countries. Poor parents may face difficulties to pay school fees and other education-related expenses. Even if education is provided freely, the opportunity cost of education could be prevalent. Poor parents may need to send their children to work, instead of school, to improve their living standards, to feed themselves and to survive. The remittances from migrants, under such a circumstance, would encourage education investment through its income effect, as is modeled in Chapter 2, or through eliminating the financial constraint or allowing the households to survive without sending their children to work. Indeed, many empirical studies have confirmed such a positive effect of parental migration through remittances for many regions of the world, such as Latin America, South-East Asia and Sub-Saharan Africa, even after controlling potential endogeneity of parental migration and remittances (Adams & Cuecuecha 2010; 2013; Antman 2012; Calero et al. 2009; Yang 2008). As long as income affects education investment and parental migration increases income, it is intuitive that the money *per se* provided by migrants encourages education investment.

However, the remittance effect is not the unique effect of parental migration, and the literature has pointed out two main side-effects of parental migration on education investment (Acosta, 2011; Amuedo-Dorantes & Pozo, 2010; Kandel & Kao, 2001; McKenzie & Rapoport, 2011). First, the absence of parents during their migration episodes can have a direct effect on children's education. If parents own businesses or farms that need to be maintained while their absences, children left

behind may need to provide labor instead of going to school. The need for housework, such as caring for younger siblings, can also force elder children to leave school, reduce school attendance, or reduce the time for homework. The parental absence can also reduce home education, parental care and support for children, and family discipline, all of which can have adverse effects on children's learning.

The second side-effect is the increased prospects of children's future migration. Parental migration can provide the connections and information that reduces the cost of migration in the future, and this could strengthen children's future migration prospects. Parental migration can also have some demonstration effect on children's career plans (McKenzie & Rapoport, 2011). Just like the prospect effect would have a negative effect in a negative selection circumstance, the side-effect of the increased prospects could have a similar effect on education investment.

Because these positive and negative effects can show up simultaneously, whether parental migration encourages or discourages education investment is ambiguous *a priori*. The results in Chapter 3 suggest that the overall effect of parental migration is positive at least for male children. However, the implication is not necessarily applicable to female children since the roles of parental migration could be heterogeneous to male and female children. The remittance effect may not have a large impact on female education if parents prioritize male education and spend the increased income for male children. Conversely, if parents view female education as a luxury good and male education as a necessity good, then the increased income by migration would encourage female education more than male education. The literature points out that remittances raise only female education in Mexico and Ecuador (Antman 2012; Calero et al. 2009). The side-effects of parental migration can also be heterogeneous. If migrants are predominantly men, which holds in the case of Tajikistan, the effect of parental migration through the increased prospects would not be prevalent for female education. Which gender the parental absence affects more would depend on the background of each country. McKenzie and Rapoport (2011) argue that, while parental migration discourages education investment for both gender, the increased migration prospects play the main role for male education and that the parental absence plays the main role for female education. Hu

(2013) shows that both the positive effect of remittances and the negative effect of parental absence affect only female education in a context of domestic migration in China. Kroeger and Anderson (2014) point out the possibility that the increased prospects reduce male education investment in Kyrgyzstan, although their results are not robust to endogeneity of parental migration.

Gender difference and division in economic activities are widely observed in Tajikistan. On one hand, in Tajikistan or more generally in Central Asian countries, while Islam is the main religion, the state is secular, and the religious practices are not rigid (Ro'i & Wainer 2009). The Soviet ideology also promoted female education and social participation. Female labor force participation continued increasing even in the 1990s (Igarashi & Kumo 2016). On the other hand, the interviews in Tajikistan conducted by Igarashi and Kumo (2016) and Whitsel (2009) also reveal that values of gender roles and division — husbands should be breadwinner and women should be housewives — remain widespread even among women. The increased female labor force participation could be a consequence of poverty after independence rather than a consequence of female empowerment (Igarashi & Kumo 2016). Parents also prioritize marriage over education for their daughters because women are regarded as “old maid[s] (Whitsel 2009, p. 37)” at the ages of 22 or 23 years old. These circumstances are consistent to the increased gender difference in education after independence. That is, female education decreased after independence because it was regarded unimportant, or at least less important than male education.

Family bargaining between genders can also play roles in shaping gender-heterogeneous effects of parental migration. In family economics, female empowerment, increased bargaining power of women, and handing money to women are found to increase investment in children, either because women are more altruistic or responsible for caring for children (Banerjee and Duflo 2011, Chp. 5; Duflo 2003). Considering that most migrants from Tajikistan are men, the increased dependence on fathers' earnings due to migration could reduce education investment by raising the bargaining power of fathers. Conversely, if the fathers' absence due to migration increases the opportunities that mothers make family decisions, then fathers' migration could raise education investment by increasing mothers' power. However, whether these views holds in case of Tajikistan is not clear

if we take into account the tendency that masculine values are widespread even among women. Indeed, according to UNICEF (2013), not only fathers but mothers also often discourage female children from attending school in Tajikistan.

Now we discuss the previous studies for Tajikistan. While a few studies have examined the effects of parental migration or remittances in Tajikistan, they observe different effects and have not reached consensus. Each study has strengths and weaknesses, latter of which this chapter aims to overcome. Clément (2011) shows that the receipt of international remittances does not have any significant effect on the share of education expenditure over all household expenditure, and notes that this is “evidence of an unproductive use of remittances (p. 76).” A caution is necessary to interpret this result, however, since not observing an increase in the share of education expenditure could also be regarded as evidence that remittances raise both the total and education expenditures proportionally. Nevertheless, whether his results can be interpreted in this way is not clear, either. Since his study does not focus solely on education, the sample includes households that do not have any children, and any effect of remittances on education expenditure may be attenuated.

Ogawa and Nakamuro (2010) show that the remittance receipt increases the enrollment rate, using the data of the TLSS 2007. Their sample includes children aged 7-22 years, i.e. all children in school ages. To deal with the endogeneity of the remittance receipt, they employed the instrumental variable methods, using the distances to various financial institutions as the instruments. Such instruments are frequently used in the literature and supposed to capture the easiness to receive remittances (Amuedo-Dorantes & Pozo 2006). Unfortunately, these instrumental variables are missing in not a small number of areas and the information of approximately a half of the sample children could not be used in their IV analysis. Therefore, the representativeness of the estimation sample are questionable. The potential gender-heterogeneous effect is not examined, either. Nevertheless, their results are in line with the results in Chapter 3.

On the contrary, Dietz et al. (2015) show that migration of household members reduces school enrollment regardless of gender, although gender heterogeneity is only briefly examined. They use the same three surveys as the ones that this chapter uses, and focus on children aged 7-18

years as the sample, i.e. all children eligible for compulsory or secondary education. They control the potential endogeneity of parental migration with respect to time-invariant unobservable factors by the fixed-effect model, taking advantage of the panel nature of the surveys. However, their method also has caveats. The fixed-effect model cannot eliminate the endogeneity bias due to unobservable time-variant factors, such as unemployment shocks. Although their method effectively examine how a change in the migration status affects children's enrollment, such a method can even augment the risk of bias due to time-invariant shocks. The fixed effects also absorb the effects of migration if a household continuously sends migrants over three survey years. Regarding the sample construction, while they use wide year range of children, inclusion of children in compulsory education ages as the sample would attenuate the effect of any factor, including parental migration.

#### 4.4 Methodology

In this chapter, the author pools the sample from three datasets and examines the effect of parental migration by estimating the probability of secondary education enrollment. The basic equation to be estimated is as follows:

$$educ_i = \beta M_i + \gamma female_i + X_i \delta' + \varepsilon_i \quad (4.1)$$

$\beta$  captures the effect of parental migration on the probability of enrollment.  $female_i$  is the dummy for female children, and  $\gamma$  captures the general gender difference in enrollment.  $X_i$  is the individual and household characteristics.  $\varepsilon_i$  is the error term. In this basic model, however, the gender-heterogeneous effect of parental migration is kept out of the scope. To take into account such an effect, the following equation will also be estimated:

$$educ_i = \beta_m M_i \times (1 - female_i) + \beta_f M_i \times female_i + \gamma female_i + X_i \delta' + \varepsilon_i \quad (4.2)$$

$\beta_m$  captures the effect of parental migration for male children, and  $\beta_f$  captures that for female children.

As covariates  $X_i$ , this chapter uses similar variables that appeared in Chapter 3. The parents' average age as of the year of the survey and its squared term; the household size; the parents' average years of schooling, which is used as continuous variable this time; the male ratio; and *minority*, the dummy for ethnic non-Tajiks. In addition, we use the following variables that do not appear in the previous chapter; the number of adults in household aged 19 to 60 years; and the proxy dummy for having elder siblings, which takes one if there is at least one household member older than individual  $i$  but younger than 25 years old. Addition of these variables is related to the need to control the quantity-quality trade off and the birth-order effect (Becker & Lewis 1973; De Haan 2010). That a household has many children would reduce education investment per child by reducing the household resource per capita. After controlling the number of adults, which would have a positive effect on enrollment because a household with many adults would have large income-earning potential, the household size would capture the effect of the number of children. Meanwhile, having elder siblings and not being the first child are often found to have negative effects on education investment. Although the exact number of siblings is not available in our dataset, the proxy for having elder siblings would capture these effects to some extent. Finally, the year dummy are used to control the macro-level time-variant factors, and either the province dummies or the district dummies are used to control the regional and geographic fixed effects. The summary statistics of these individual and household characteristics are shown in the appendix of this chapter.

The author first estimates the enrollment probability by OLS, directly applying the equations (4.1) and (4.2), and then estimates it by probit under the probit counterparts of these equations. Which of OLS and probit suits better in the context of this analysis is controversial. Generally, when the true probability to be estimated is not close to 1 or 0, either estimation would provides similar results. However, because the enrollment rate is fairly high, the true probability could be locally close to 1, particularly for male children. Considering this, the probit estimation would be

more suitable in case of Tajikistan. However, a caveat to use probit is that perfect prediction occurs in the estimations with the district fixed effects for districts with relatively small sample size, and the sample size decreases by approximately 3%. Although the extent to which this causes bias would be limited, examining the linear probability model in addition to the probit model would allow us to discuss the robustness of the results.

The author also examines the enrollment probability by 2SLS and IV probit, considering the possibility of the endogeneity of parental migration. To examine the equation (4.1), standard 2SLS and IV probit procedures suffice, with the following being the first-stage equation:

$$M_i = \xi_a female_i + \mathbf{X}_i \theta'_a + \zeta z_i + \epsilon_{ai}, \quad (4.3)$$

where  $z_i$  is the instrumental variable. To examine the equation (4.2), however, the author employs the three-step procedures that are analogous to the ones in Chapter 3, because parental migration appears as interaction terms. Specifically, using the equation (4.3), we obtain the predicted probability  $\hat{M}_i$  and run 2SLS and IV probit with the following being the first-stage equations:

$$M_i \times (1 - female_i) = \xi_b female_i + \mathbf{X}_i \theta'_b + \zeta_{bm} \hat{M}_i \times (1 - female_i) z_i + \zeta_{bf} \hat{M}_i \times female_i + \epsilon_{bi} \quad (4.4)$$

$$M_i \times female_i = \xi_c female_i + \mathbf{X}_i \theta'_c + \zeta_{cm} \hat{M}_i \times (1 - female_i) z_i + \zeta_{cf} \hat{M}_i \times female_i + \epsilon_{ci} \quad (4.5)$$

As the instrument  $z_i$ , the analysis in this chapter uses the migration rate in each district in each year, which is defined as the proportion of individuals experiencing labor migration within four years over adults aged 19-60 years. The migration rate is considered to be correlated to the degree of migration network development (Batista et al. 2012; McKenzie & Rapoport 2011). However, the extent to which this affects parental migration decisions would be different by the ages of parents. Therefore, by interacting the migration rate with the parental age, the explanatory power of the instrument would be improved. This is close to the instrument used by Hanson and Woodruff (2003) in the migration literature with respect to the use of the interaction term of an environmental variable and individual characteristics, and is also close to the idea of the instrument in Chapter 3

with respect to the use of parental age. Note that an increase of the migration rate would encourage parental migration while an increase of the parental age would discourage it. Considering this,  $z_i$  is defined as the interaction of the average ages of parents and the non-migration rate, i.e. one minus the migration rate.

Regarding the instrument here, two issues could be noted. First, we need to pay attention to the risk that the migration rate (or the non-migration rate) is correlated to locational, geographic and regional characteristics of each district. The author always use the district fixed effect when running 2SLS and IV probit to control the potential time-invariant district-level characteristics. The author also examines the models, using the log of the wage rate and the log of investment per capita at each district in each year as covariates to control the time-variant district-level characteristics directly.

The second issue is that, even if the potential bias due to regional characteristics other than migration network can be fully controlled, migration network can affect the prospects of children's future migration directly. Then the predicted  $\hat{M}_i$  may capture the children's future migration prospects to some extent and have a direct and negative correlation to enrollment, not through the side-effect of parental migration. However, this risk may not be largely prominent. In the first place, for female education, this would not provide a significant risk since most migrants are men. Moreover, the author presumes that this risk is not significant for male education, either. By running the equations (4.1) and (4.2), including  $z_i$  or its interacting terms with gender as covariates, these variables do not have a significant effect on the probability of enrollment. This suggests either that children have future migration prospects regardless of the migration network, that the prospects do not affect the secondary education enrollment decisions, or that interacting with parental age eliminates the correlation between  $z_i$  and children's prospects.

In addition to the gender heterogeneity, the author also examines the heterogeneous effect of parental migration with respect to parental education. Letting  $High_i$  be the dummy variable taking one if the average years of schooling of parents is 12 years or more, the linear equation to be



estimated is written as follows:

$$\begin{aligned}
 educ_i = & \beta_{mL}M_i \times (1 - female_i) \times (1 - High_i) + \beta_{fL}M_i \times female_i \times (1 - High_i) \\
 & + \beta_{mH}M_i \times (1 - female_i) \times High_i + \beta_{fH}M_i \times female_i \times High_i + \gamma female_i + \mathbf{X}_i\boldsymbol{\delta}' + \varepsilon_i
 \end{aligned}
 \tag{4.6}$$

The author examines this model by OLS, probit, 2SLS and IV probit with the respective counterparts of this linear equation.

## 4.5 Results

We begin with examining the effect of parental migration, assuming the effect to be homogeneous for male and female children. Table 4.2 shows the results. Column (I) shows the OLS estimate with the province fixed effects. Parental migration has a negative but insignificant coefficient. The volume and the level of significance decrease in column (II) where the fixed effects at the district level is used. This suggests the possibility that correlations between some regional effects, parental migration, and the enrollment decisions negatively bias the estimates. Columns (III) and (IV) show the marginal effects estimated by probit, where the province fixed effects are used for the former and the district fixed effects for the latter. The effect of parental migration is negative and weakly significant in column (III). However, after controlling the district fixed effects, that effect becomes insignificant. Note that the sample size for column (IV) is smaller than that for column (III) because of the perfect prediction in a few small districts. However, the results in OLS and probit are similar, and the extent to which attrition of the sample disturbs the estimates would be limited.

We move to the IV estimations. Column (V) shows the 2SLS results (for the first stage estimation, see the appendix of this chapter). The coefficient of parental migration remains negative and its volume becomes larger than the OLS estimate. However, it also remains insignificant. The instrument is strong, with the first-stage F statistics being 13.8, greater than the rule of thumb of 10. However, the endogeneity of parental migration cannot be rejected. Column (VI) shows the

Table 4.2 The results under the basic equation

	(I) OLS	(II) OLS	(III) Probit	(IV) Probit	(V) 2SLS	(VI) IV Probit
Parental migration	-0.0478 (0.0293)	-0.0217 (0.0300)	-0.0571* (0.0334)	-0.0353 (0.0348)	-0.302 (0.292)	-0.480 (0.292)
Female	-0.268*** (0.0206)	-0.264*** (0.0206)	-0.284*** (0.0218)	-0.306*** (0.0229)	-0.262*** (0.0208)	-0.290*** (0.0326)
Parental age	-0.0407** (0.0186)	-0.0432** (0.0181)			-0.0475** (0.0183)	
Its squared term	0.00040** (0.000189)	0.00043** (0.000183)			0.00045** (0.00018)	
Parental education	0.0452*** (0.00548)	0.0410*** (0.00538)	0.0486*** (0.00617)	0.0468*** (0.00616)	0.0414*** (0.00530)	0.0452*** (0.00676)
Both parents	0.0557** (0.0259)	0.0553** (0.0260)	0.0645** (0.0300)	0.0720** (0.0314)	0.0898** (0.0438)	0.124*** (0.0473)
Household size	-0.0169*** (0.00549)	-0.0151*** (0.00560)	-0.0185** (0.00611)	-0.0175*** (0.00652)	-0.0165*** (0.00590)	-0.0188*** (0.00667)
Adult size	0.0231** (0.00989)	0.0198** (0.00994)	0.0262* (0.0113)	0.0248** (0.0119)	0.0164 (0.0105)	0.0187 (0.0129)
Proxy for elder siblings	-0.0502** (0.0230)	-0.0550** (0.0227)	-0.0606** (0.0250)	-0.0725*** (0.0257)	-0.0460* (0.0243)	-0.0566* (0.0294)
Male ratio	-0.0694 (0.0663)	-0.0819 (0.0664)	-0.0648 (0.0742)	-0.0976 (0.0786)	-0.106 (0.0708)	-0.130 (0.0798)
Minority	0.0323 (0.0247)	0.00906 (0.0292)	0.0289 (0.0248)	0.00104 (0.0326)	0.0162 (0.0302)	0.0119 (0.0330)
Urban	0.0463* (0.0266)	0.00211 (0.0355)	0.0499* (0.0291)	-0.00380 (0.0373)	-0.00857 (0.0368)	-0.0188 (0.0387)
Constant	1.576*** (0.451)	1.328*** (0.443)			1.486*** (0.466)	
Year fixed effects	yes	yes	yes	yes	yes	yes
Province fixed effects	yes	no	yes	no	no	no
District fixed effects	no	yes	no	yes	yes	yes
Observations	2,144	2,144	2,144	2,080	2,144	2,080

The estimated coefficients for OLS and 2SLS and the estimated marginal effects for probit and IV probit. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. The cells for the parental age and its squared term for probit and IV probit results are left blank because it is not feasible to obtain the marginal effects of these variables separately (see footnote 27).

Table 4.3 The gender-heterogeneous effects of parental migration

	(I) OLS	(II) OLS	(III) Probit	(IV) Probit	(V) 2SLS	(VI) IV Probit
For male	-0.00738 (0.0366)	0.0375 (0.0383)	-0.0176 (0.0368)	0.0129 (0.0335)	-0.282 (0.285)	-0.474 (0.294)
For female	-0.0829* (0.0429)	-0.0716* (0.0427)	-0.0898* (0.0477)	-0.0831 (0.0510)	-0.320 (0.314)	-0.480 (0.315)
Year fixed effects	yes	yes	yes	yes	yes	yes
Province fixed effects	yes	no	yes	no	no	no
District fixed effects	no	yes	no	yes	yes	yes
Observations	2,144	2,144	2,144	2,080	2,144	2,080

The estimated coefficients for OLS and 2SLS and the estimated marginal effects for probit and IV probit. Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . All estimations use the covariates shown in Table 4.2.

IV probit estimates. The marginal effect of parental migration is even larger than the 2SLS coefficient but remains insignificant. The independence of the first and second-stage equations, which is equivalent to exogeneity of parental migration, cannot be rejected. Note, however, that the  $p$ -value of the significance of parental migration is 0.101. Although this number itself does not prove anything, it suggests the possibility that, with an appropriate heterogeneity accounted, the effect of parental migration could be significant.

The control variables have intuitive coefficients. Being female reduces the enrollment probability by 26 to 31 percentage points. Parental education and that both parents are in households raise enrollment, and the parental age has a U-shaped effect on enrollment,<sup>27</sup> all of which are similar to the results in Chapter 3. The household size has a negative effect and the adult size a positive effect (although insignificant in IV estimations), which are consistent. The proxy dummy for elder siblings has a negative effect. Therefore, in addition to the interpretation that the U-shaped effect of the parental age reflects the birth order effect, having elder siblings or not being the first-born child reduces education investment for that child.

Then, we take into account the gender-heterogeneous effect in Table 4.3. Columns (I) to (IV)

<sup>27</sup>Because it is not feasible to obtain the marginal effects of the parental age and its squared term separately for a probit result, the cells for these variables are left blank. The marginal effect of parental age can be obtained conditional on parental age. For example, from the estimation in column (III), the marginal effect is estimated to be -0.0105 if parents are 40 years old, 0.00009 if parents are 51 years old, and 0.00915 if parents are 60 years old.

Table 4.4 The gender-heterogeneous effects of parental migration under alternative specifications

<i>Panel A: Without gender heterogeneity</i>	(I) 2SLS	(II) IV Probit	(III) 2SLS	(IV) IV Probit		
For both genders	-0.314 (0.295)	-0.473 (0.301)	-0.229 (0.223)	-0.327 (0.283)		
Observations	2,144	2,080	2,144	2,080		
<i>Panel B: With gender heterogeneity</i>	(III) 2SLS	(IV) IV Probit	(III) 2SLS	(IV) IV Probit	(V) 2SLS	(VI) IV Probit
For male	-0.297 (0.287)	-0.477 (0.297)	-0.212 (0.220)	-0.370 (0.284)	-0.0475 (0.156)	-0.157 (0.208)
For female	-0.327 (0.317)	-0.467 (0.328)	-0.241 (0.243)	-0.352 (0.296)	-0.0838 (0.178)	-0.150 (0.229)
Observations	2,144	2,080	2,144	2,080	2,144	2,080

The estimated coefficients for 2SLS and the estimated marginal effects for IV probit. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All estimations use the covariates shown in Table 4.2 and the year and district fixed effects.

show OLS and probit estimates of the effects of parental migration for male and female. While the effect for male is close to zero, that for female is negative, reducing the enrollment probability by 7-9 percentage points. However, the level of significance is not very high and the probit estimate with the district fixed effects is even insignificant. The effect of parental migration is not significant for either gender in the IV estimates in columns (V) and (VI). The instruments remain sufficiently strong in this gender-heterogeneous specification. The volume of the effect for male is also close to that for female education. However, the exogeneity and independence of parental migration cannot be rejected.

To check the robustness of the IV estimations, alternative specifications are also tried. Table 4.4 shows the results. Panel A shows the estimate ignoring the potential gender heterogeneity of the effect of parental migration, and Panel B shows the estimates allowing gender heterogeneity. In columns (I) and (II), to control the time-variant macro-level factors, the log of the wage rate and the log of investment per capita in each district in each year are added as covariates (for the Panel B estimates, these variables are added in the estimation of  $\hat{M}_i$ ). The results are almost the same as the ones obtained so far. The extent to which the time-variant regional characteristics confound the IV

estimates seems to be limited. Then, in columns (III) and (IV), taking into account the non-linear relationship between parental migration and their ages, the interaction term of the non-migration rate and the squared term of the parental age is used as an instrument in addition to  $z_i$ . In any estimation, the volumes of the estimated effects of parental migration become smaller than the ones obtained so far. Considering that the estimated volumes of the effects in the IV estimations so far seem too large, dealing with the non-linear relationship between parental migration and their ages contributes to providing a more precise estimates, although the estimates remain insignificant. The instruments remain strong, and the over-identification is not a significant problem. Nevertheless, exogeneity and independence of parental migration cannot be rejected. Finally, although only for the estimations in Panel B, columns (V) and (VI) examine the non-linearity in an alternative specification; namely that, after obtaining  $\hat{M}_i$  in the original specification, both  $\hat{M}_i$  and  $\hat{M}_i^2$  are interacted with gender dummies and that the four interaction terms in total will be used as the instruments in the first stages of 2SLS and IV probit. The volumes of the effect becomes further smaller than in columns (III) and (IV). However, parental migration remains exogeneous.

Now, we interact parental migration with the dummies for parental education as well as with children's genders. Table 4.5 shows the results. All estimations use the year and district fixed effects. In the OLS estimates in column (I), if parents are lowly educated, then parental migration has a positive effect on the male enrollment probability but a negative effect on the female enrollment probability. The positive effect for male loses its significance in the probit results in column (II), but the negative effect for female remains significant at the 10% level. Meanwhile, parental migration does not have a significant effect for either gender if parents are highly educated. Then, in columns (III) and (IV), the endogeneity of parental migration is taken into account. Both in the 2SLS and IV probit results, parental migration has a negative and significant effect on enrollment only if children are female and parents are lowly educated. The volume of the effect for male enrollment when parents are lowly educated also becomes largely negative. However, in 2SLS, the coefficient for male is significantly different from the one for female, suggesting that parental migration reduces only female enrollment. The marginal effect of parental migration when parents

Table 4.5 The heterogeneous effects of parental migration with respect to gender and parental education

	(I) OLS	(II) Probit	(III) 2SLS	(IV) IV Probit
Male, parental education 11 years or less	0.103** (0.0486)	0.0518 (0.0327)	-0.327 (0.304)	-0.513 (0.316)
Male, parental education 12 years or more	-0.0393 (0.0544)	-0.0492 (0.0606)	-0.281 (0.322)	-0.188 (0.386)
Female, parental education 11 years or less	-0.126** (0.0578)	-0.129* (0.0678)	-0.647* (0.346)	-0.591*** (0.104)
Female, parental education 12 years or more	-0.0362 (0.0572)	-0.0178 (0.0711)	0.0948 (0.334)	-0.110 (0.421)
Observations	2,144	2,080	2,144	2,080
	(V) 2SLS	(VI) IV Probit	(VII) 2SLS	(VIII) IV Probit
Male, parental education 11 years or less	-0.248 (0.229)	-0.315 (0.287)	-0.103 (0.166)	-0.177 (0.203)
Male, parental education 12 years or more	-0.202 (0.262)	-0.00071 (0.228)	-0.0716 (0.198)	0.0399 (0.159)
Female, parental education 11 years or less	-0.542** (0.271)	-0.503*** (0.165)	-0.432** (0.196)	-0.463*** (0.169)
Female, parental education 12 years or more	0.160 (0.261)	0.111 (0.304)	0.243 (0.212)	0.162 (0.256)
Observations	2,144	2,080	2,144	2,080

The estimated coefficients for OLS and 2SLS and the estimated marginal effects for probit and IV probit. Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . All estimations use the covariates shown in Table 4.2 and the year and district fixed effects.

are lowly educated is similar for male and female, but is significant only for female. Unlike the results in the previous specifications, the exogeneity and independence of parental migration are rejected at the 1% level. In particular, in IV probit, the correlation of the error terms for enrollment and parental migration is estimated to be significant only if parents are lowly educated. Therefore, endogeneity seems to matter if parents are lowly educated.

Let us check the robustness of these results by alternative specifications. In columns (V) and (VI), the interaction term of the non-migration rate and the squared term of parental age is added as an instrument to estimate  $\hat{M}_i$ . The estimated coefficients and marginal effects slightly shift upward compared to the ones in columns (III) and (IV), but the negative effect for female enrollment when

parental education level is low remains significant. The difference of the effects for male versus female when parents are lowly educated remains significant in 2SLS but not in IV probit. In columns (VII) and (VIII), after obtaining  $\hat{M}_i$  in the original way, the interaction terms of  $\hat{M}_i^2$  with gender and parental education are added in the first stages for 2SLS and IV probit. The effects shift further upward. The volume for male enrollment when parents are lowly educated now becomes small, and even the IV probit estimate of that effect becomes significantly different from the one for female enrollment. The endogeneity and independence of parental migration cannot be rejected in any of these estimations.

To summarize, we could first note that the negative effect for female enrollment when parents are lowly educated is significant and robustly observed in any specification. Meanwhile, parental migration does not seem to affect male enrollment significantly. Although its effect is positive in the OLS estimate if parents are lowly educated, this effect is lost in the IV estimations. The volume of the effect for male is even close to the effect for female in column (IV). However, the effect for male is not significant in any IV specification and is significantly different from that effect for female in multiple specifications. Although we cannot judge precisely what IV specification is the best, it would be more likely that parental migration does not affect the male enrollment probability significantly.

## **4.6 Discussion and conclusion**

This chapter focused on examining the effect of parental migration on the secondary education enrollment probability. The results reveal that parental migration reduces the enrollment probability only if children are female and parents are lowly educated. This effect is robustly observed even if we take into account the potential endogeneity of parental migration which provides a significant bias in some specifications. Such a gender-heterogeneous effect appears to widen the gender gap in education, which have been a problem in Tajikistan since independence.

For male, the results imply that the extent to which parental migration affects the enrollment decisions in secondary education is limited. This can be either because the remittance effect and the

Table 4.6 Unpaid family works conducted by female children out of school

Panel A: The proportion of female children not enrolled in secondary education but engaging in unpaid family works, %		Panel B: The estimation of the probability to engage in unpaid family work by OLS, among female children not enrolled in secondary education	
Parents are migrants	10.7	The effect of parental migration	0.0726*
Parents are not migrants	4.3		(0.0404)
Difference	6.4**		

$N = 470$ . \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . For Panel B: Robust standard errors in parentheses. The estimation uses the covariates shown in Table 4.2 and the year and district fixed effects.

side-effects of parental migration do not play roles or because these effects cancel out each other. The former possibility would be quite likely: because the enrollment rate among male children is fairly high, secondary education is not the timing for the main education investment decisions for most male children.

Conversely, the results for female enrollment imply that negative side-effects of parental migration play the main roles. Since future migration possibility would be out of the scope for most female children due to the predominance of male among migrants, the parental absence is a candidate for the channel of the negative effect. Table 4.6 shows supportive evidence for this view. Panel A shows the proportions of those engaging in unpaid family works among female children not enrolled in secondary school, separately calculated by the parental migration status. The proportion is 4.3% if parents are not migrating, but the figure amounts up to 10.7% if parents are migrants. The difference between these figures are significant at the 5% level. Panel B estimates the probability of engaging in unpaid family works by OLS under the basic equation, (4.1), with the district fixed effects (an interaction with gender dummy is no more necessary since the sample is solely female). The effect of parental migration on that probability is positive and weakly significant. It could be noted that these data do not provide causal interpretations. We can consider the possibility that female children happen to engage in unpaid family work after leaving school and having nothing else to do, rather than that they intentionally leave school to engage in unpaid family work. These figures do not preclude the other channels of the side-effects, either. The decreased home education and the changed bargaining power among family members may also



contribute to the negative effect of parental migration we observe. Nevertheless, these tendencies are at least consistent to the possibility that the need to provide household labor plays a key role for female enrollment decisions.

In addition, the results of this chapter, alongside the ones in Chapter 3, are partially consistent with the previous empirics that find conflicting effects of parental migration in Tajikistan: Ogawa and Nakamuro (2010) claim the positive effect, using the data of children aged 7-22 years, but Dietz et al. (2015) suggest the negative effect, using the data of children aged 7-18 years. The differences in their samples and methodologies make it questionable whether their results are directly comparable. However, the results of Chapter 3 and 4 are at least partially consistent with them and support their results to some extent, rather than supporting one of them and refusing the other. The negative effect on female secondary education enrollment observed in this chapter is partly consistent to the finding in Dietz et al. (2015), perhaps both the present analysis and their method both cover secondary education enrollment. Meanwhile, the positive effect of parental migration on the male children's final education outcome in Chapter 3 and the insignificant effect of parental migration on male secondary education enrollment in this chapter suggest that parental migration affects male education investment above secondary education. This is consistent to the positive effect in Ogawa and Nakamuro (2010), who use children aged up to 22 years.

Finally, a policy implication of the present chapter is that, unlike male education, a policy to encourage education investment may not be effective for preventing the negative effect of parental migration for female education. Rather, development of labor market that allows parents to hire labor instead of having their daughters work during their migration could be effective.

## Appendix for Chapter 4

Table 4A1 shows the summary statistics of the main sample. Table 4A2 shows the first-stage estimations for 2SLS of column (V) in Table 4.2 and column (V) in Table 4.3. The equation to estimate  $\hat{M}_i$  used in the first-stage estimations for column (V) in Table 4.3 is the same as the first-stage equation for 2SLS of column (V) in Table 4.2.

Table 4A1 Summary statistics of the sample

	Mean.	Std. dev.
Parental migration, $M_i$	0.501	0.500
Female	0.129	0.335
Parental age	45.92	6.181
Parental education	11.34	1.892
Proportion with 11 years or less education ( $High_i = 0$ )	0.550	0.498
Proportion with 12 years or more education ( $High_i = 1$ )	0.450	0.498
Both parents	0.164	0.370
Household size	7.274	2.740
Adult size	3.521	1.812
Proxy for elder siblings	0.669	0.471
Male ratio	0.500	0.160
Minority	0.195	0.396
Urban	0.288	0.453
<i>Distribution of observations over provinces</i>		
Dushanbe, the Capital City	0.147	0.354
Soghd Province	0.186	0.389
Khatlon Province	0.298	0.458
Regions of Republican Subordination	0.249	0.433
Gorno Badakhshan Autonomous Region	0.120	0.325

$N = 2,144$ .

Table 4A2 First-stage estimations for 2SLS

	1st stage for column	1st stages for column	
	(V) in Table 4.2	(V) in Table 4.3	
	$M_i$	$M_i \times (1 - female_i)$	$M_i \times female_i$
The non-migration rate × parental age; $z_i$	-0.0183*** (0.00493)		
$\hat{M}_i \times (1 - female_i)$		1.076*** (0.198)	-0.0219 (0.194)
$\hat{M}_i \times female_i$		0.0296 (0.171)	0.931*** (0.215)
Female	0.00455 (0.0164)	0.00371 (0.0104)	0.00816 (0.0129)
Parental age	-0.00108 (0.0124)	0.00275 (0.00848)	-0.00264 (0.00931)
Its squared term	0.00011 (0.00011)	0.00002 (0.00008)	-0.00002 (0.00009)
Parental education	0.00038 (0.00334)	0.00071 (0.00213)	-0.00079 (0.00256)
Both parents in data	0.122*** (0.0164)	-0.0105 (0.0239)	0.0102 (0.0273)
Household size	-0.00500 (0.00480)	-0.00152 (0.00301)	0.00155 (0.00410)
Adult size	-0.0128 (0.00794)	0.00285 (0.00485)	-0.00281 (0.00681)
The proxy dummy for elder siblings	0.0314* (0.0188)	-0.00592 (0.0133)	0.00582 (0.0150)
Male ratio	-0.0878 (0.0544)	0.00615 (0.0383)	-0.00563 (0.0457)
Minority	0.0254 (0.0242)	0.00882 (0.0177)	-0.00920 (0.0174)
Urban	-0.0319 (0.0277)	0.00563 (0.0200)	-0.00543 (0.0224)
Constant	0.669** (0.303)	-0.116 (0.229)	0.108 (0.265)

$N = 2, 144$ . Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . The year and district fixed effects are omitted but used.  $\hat{M}_i$  used in the first-stage estimations for column (V) in Table 4.3 is obtained from the same equation as the first-stage estimation for column (V) in Table 4.2.

## **Chapter 5 Labor migration and political views in transition countries**

*Peace, progress, human rights – these three  
goals are insolubly linked to one another:  
it is impossible to achieve one of these goals  
if the other two are ignored.*

Andrei D. Sakharov<sup>28</sup>

## 5.1 Introduction

In this chapter,<sup>29</sup> unlike the chapters so far, the author examines the roles of migration in shaping individuals' beliefs, support and preference regarding a market economy versus a planned one and democracy versus authoritarianism in former communist, transition countries in Eastern and Southern Europe, the Caucasus and Central Asia.

Collapse of communist regimes in Central and Eastern Europe and the dissolution of the Soviet Union are ones of the largest and most dramatic politico-economic events in the modern era. The demise of the Berlin Wall became a symbol of democratization, along with some popular background quotes such as “*Ich bin ein Berliner*” by John F. Kennedy and “Mr. Gorbachev, tear down this wall!” by Ronald Reagan.<sup>30</sup> The Eastern part of the world experienced huge, rapid and revolutionary changes in almost all spheres of the political, economic and daily lives, which seemed to mark “the end point of mankind’s ideological evolution and the universalization of Western liberal democracy as the final form of human government (Fukuyama 1989, p. 4).”

However, transition to democratic and market-based politico-economic systems has been a great challenge since then. The revolution occurred at the costs of huge recession and collapse of the systems to which nations had been accustomed for decades. The shock therapy introduced in the early stage of transition turned out to be “shock without therapy (Galbraith 2002),” and

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<sup>28</sup>A translated remark in his Nobel Lecture from which he himself was absent. December 11, 1975. Retrieved from Nobel Media AB, <https://www.nobelprize.org/prizes/peace/1975/sakharov/lecture/>.

<sup>29</sup>This chapter is based on a coauthored presentation with Masato Hiwatari in the 58th Annual Conference of the Japan Association for Comparative Economic Studies held at Hokkaido University in June 9th, 2018.

<sup>30</sup>The former delivered in Berlin in June 26, 1963, and the latter delivered in Berlin in June 12, 1987. Both retrieved from American Rhetoric, <https://www.americanrhetoric.com/>.

recovery from the shock took more than a decade in some countries. Violent conflicts took place in many places, including the ones in the former Yugoslavia, Tajikistan and the Caucasus and the relatively recent one in the Crimea.

Nor has transition been completed universally. Rather, as time goes, the direction of transition began demonstrating diversity across countries. Central-Eastern European countries, some of which have history of trials to overthrow the communist regimes even before 1989, experienced rapid and successful transition. Some of them became European Union member states while some others are regarded as candidates for future members. On the contrary, in some of the former Soviet Union countries, despite the virtue and intention of *Perestroika* and other reforming policies, the regimes continue to be authoritarian. The figures in the regional Soviet succeeded the power and maintained it for decades or transferred it to the persons directly assigned by them. Oligarchs seized a significant power. Corruption has been widespread, including bribery to officials and tandems of — and even double roles of — oligarchs and political powers (Gill 2015; Stefes 2006). Also at the micro level, especially in the former Soviet Union countries, nostalgic feelings toward the Soviet era became widespread (White 2010).

The literature has recently begun paying attention to labor migration as a channel to transmit information, ideas and political views which would affect individuals' politico-economic beliefs and attitudes at the grass-root level. Labor migrants do not only provide remittances, but also promote diffusion of information, culture and norms that they learn in the migration destinations (Levitt 1998). Migration to developed countries are found to promote democracy in migrant-sending developing countries (Docquier et al. 2016). Remittances can even improve the governmental performances by reducing individuals' dependency on local patronage relationships (Pérez-Armendáriz and Crow 2010).

The roles of human mobility and information in the overthrow of the communist regimes cannot be overlooked. The desire for emigration to the “West” and the information from exiles, dissidents and separated family members, alongside the dissatisfaction to the communist regimes, the stagnation and the zeal for Western living standards, caused the chain reaction that ultimately resulted

in the demises of the Berlin Wall and Iron Curtain and the dissolution of the Soviet Union.

The monetary and informational flows accompanying human mobility continued after these events. Not only in Tajikistan discussed in the previous chapters, human mobility in the form of labor migration became common in many transition countries, particularly from the 2000s. Western Europe remained attracting immigrants from transition countries. Some of high-income transition countries, such as Czech Republic, Kazakhstan and Russia, also became destinations for labor migrants, whereas individuals in relatively poor transition countries began seeking employment opportunities in foreign countries.

Under such circumstances, the roles of human mobility could also be important for the progress of transition and the promotion of democratic and market-based regimes. In Moldova, where the communist party regained its power in the elections in the 2000s, emigrants to Western European countries “perceive themselves as “teaching” [...] how Western Europe “works” (Barsbai et al. 2017, p 47)” and played an important role in overthrowing the communist revival. The potential direct effect of the benefits of remittances would also promote the supports for freedom of money transactions and human mobility. However, human mobility could also have adverse effects. If sending emigrants and receiving remittances are beneficial, then the converse, receiving immigrants and sending remittances, can increase economic pressures to natives and have adverse impacts on people’s attitudes toward liberal and market-based politico-economic systems. Indeed, hostility toward minority and immigrants (or “migrant-phobias,” Mukomel 2013) is observed in countries such as Russia.

In this chapter, the author empirically examines how sending emigrants and receiving immigrants at the macro-level affect the micro-level support for a market economy and democracy in transition countries located in Eastern and Southern Europe, the Caucasus and Central Asia. The analysis uses the combined dataset of micro-level surveys, Life in Transition Surveys I to III, and the macro-level indicators of migration and remittances.

The analysis aims to contribute to the literature in two ways. First, it contributes to the transition literature by examining the impact of migration on transition in a wide scope. Despite recent

prevalence of labor migration in transition countries, the literature has paid attention to its roles in transition from a relatively limited scope. The analysis of Barsbai et al. (2017) on the Moldovan case is one of few exceptions, and the impact of migration in many other transition countries have been left undiscovered. Second, the analysis also contributes to the literature examining the effects of migration on political attitudes in a general perspective. While the literature has conducted both cross-country and micro-level analyses with focus on low- and middle-income countries, they have primarily focused on examining the roles of emigration (Spilimbergo 2009; Abdih et al. 2012; Docquier et al. 2016). However, in many regions and subregions, countries do not only send emigrants but also receive immigrants. Transition countries are interesting in this aspect, and the diversities of the politico-economic status and migration patterns allow us to examine the roles of emigration and immigration simultaneously.

The remainder of this chapter proceeds as follows. In Chapter 5.2, the author describes the background for transition and migration. Chapter 5.3 summarizes the existing discussions on the roles of migration in shaping politico-economic views. Chapter 5.4 presents the data to be used and the descriptive statistics on the recent trends of individual support for a market economy and democracy. Chapter 5.5 presents the estimation methodology. Chapter 5.6 shows the main results, and Chapter 5.7 supplements them. Chapter 5.8 concludes.

## **5.2 Background**

### **5.2.1 Transition**

Although determining the precise moment when the end of communist regimes started is controversial, the years 1989 and 1991 are the turning points for most countries. The countries in Europe, the Caucasus and Central Asia overthrowing their communist regimes and/or becoming independent countries initiated revolutionary reforms in almost all spheres of social, economic, political and institutional systems in these years.

The progress and direction of transition are diverse. Let us first take a look at the trajectory of the real GDP as of the ratio to that in 1991. Figure 5.1 (a) shows the average ratios in four areas



of the transition countries; Central-Eastern Europe and the Baltic states (CEB); South-Eastern Europe (SEE); Eastern Europe and the Caucasus (EEC); and Central Asia (CA). The real GDP data are obtained from United Nations Statistics Division (2018), and the classification of these regions follows that of the European Bank of Reconstruction and Development (EBRD).<sup>31</sup> Any area, and indeed any country experienced a decline of GDP, which is called “transformational recession (Kornai 1994).” Yet, the trajectories after the first a few years of transition are diverse. In CEB and SEE, the real GDP began recovering relatively quickly and grew up to 2008. After the economy experienced a dip in 2009, the growth slowed down. The slow down in the 2010s could be a natural consequence of economic catching up. For example, the per capita GDP of Czech Republic, Slovakia and Slovenia exceeded 30,000 PPP USD in 2016, which are comparable to the levels in the Western European countries. Meanwhile, in the other two areas, EEC and CA, the decrease of the real GDP in early years of transition was more drastic and persistent. On average, in the mid 1990s, the real GDP of EEC countries became approximately a half of that in 1991. Recovery from the recession took a long time and it was the mid to late 2000s when the real GDP recovered to its level in 1991. The trajectories after that are largely different within the two areas. The economic growth slowed down in the 2010s in EEC whereas the real GDP continued growing in CA.

Meanwhile, the score of the transition indicators measured by EBRD (2018) also varies across areas. Figure 5.1 (b) shows the trajectories of the average scores of transition indicators for four areas. The indicators rate the degrees of transition in 1.0 (little or no change from a rigid centrally planned economy) to 4.3 (standards of an industrialized market economy) in terms of; large scale privatization; small scale privatization; governance and enterprise restructuring; price liberalization; trade and foreign exchange system; and competition policies. CEB was the fastest in transition and completed transition in many fields by the mid or late 1990s. All countries became European Union members in 2004. In SEE, the score improved slowly and was even the lowest of

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<sup>31</sup>The list of countries corresponding to these regional areas are shown in the appendix of this chapter. Two countries, Turkmenistan and Uzbekistan, that will be excluded from the analyses later, are included in this section except in Figure 5.2 (b). See also Chapter 5.4.2.

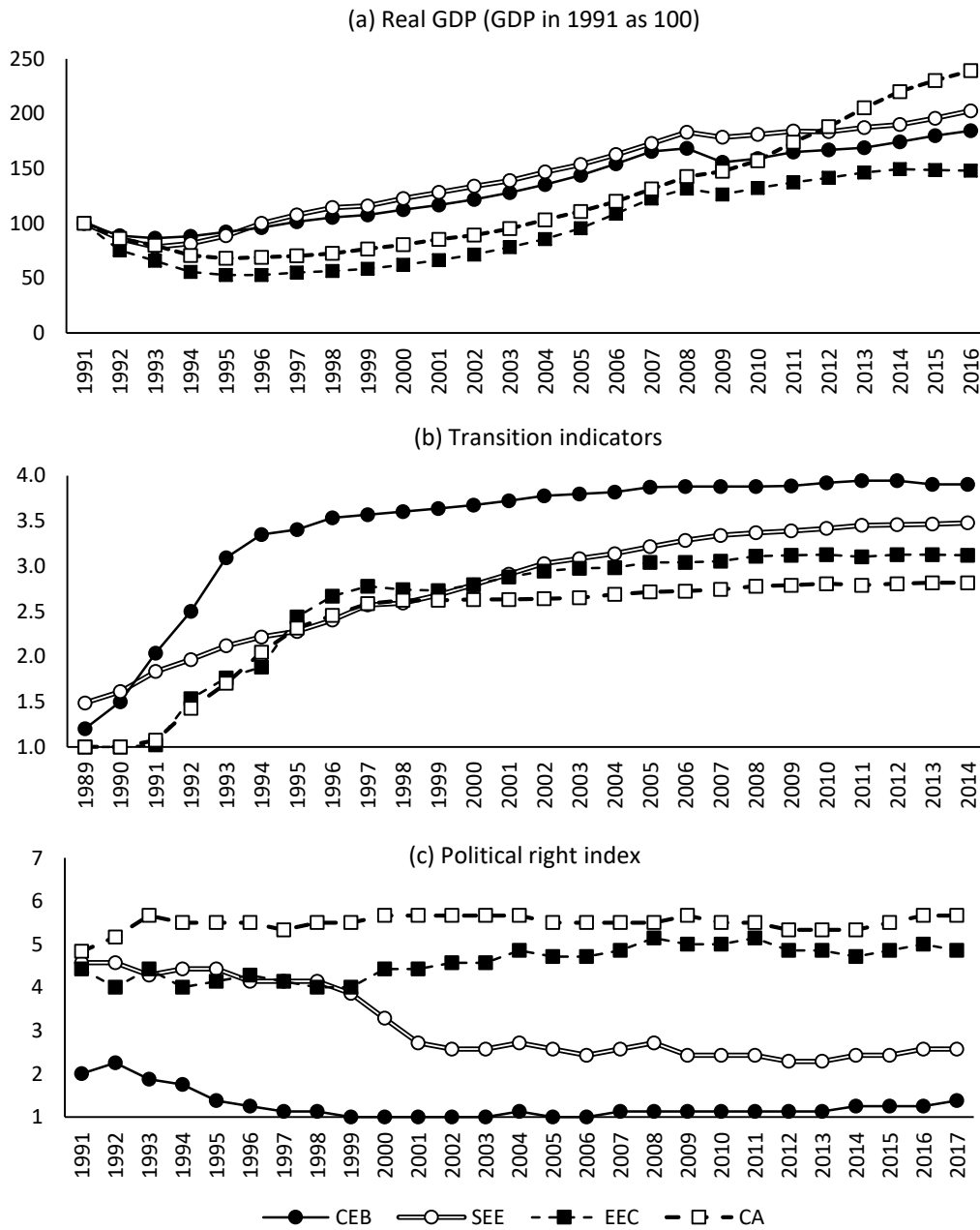


Figure 5.1 Trajectories of transition  
 Source: (a) United Nations Statistics Division (2018); (b) EBRD (2018); (c) Freedom House (2018).

the four areas in 1996-1998, but continued improving in the 2000s. This does not imply that the progress of transition in all countries in SEE followed that trajectory. On the contrary, the progress of transition was diverse within SEE countries. The score of Croatia reached 3.0 in 1995, close to the trajectory in CEB, whereas the score in Serbia and Montenegro reached 3.0 twelve years after Croatia, in 2007. In EEC and CA, the speed of transition was faster than in SEE at least up to 1997. However, the transition slowed down after that year. Throughout the 21st century, the average scores of transition indicators are almost constant in these two areas.

Figure 5.1 (c) shows the average of the Political Right index by Freedom House, where 1 corresponds to the greatest political rights and 7 corresponds to the least political rights.<sup>32</sup> In CEB, although the index was already low in 1991, it further decreased through transition. In the other areas, the score of the index was similar in 1991, but its trajectory through transition varies across areas. In SEE, political right drastically improved around 2000. In EEC, the score improved slightly in the 1990s but then worsened. In CA, the score worsened after independence and remained almost constant over time.

The large diversity in the degree and progress of transition and democratization reflects the diversity in the characteristics of transition countries. In CEB and SEE countries, transition could be regarded as endogeneous, and the grass-root level support for transition would be large. Some countries in these areas, such as Hungary, the former Czechoslovakia and Poland, experienced a few trials to overthrow communist regimes before 1989. Transition since 1989 also took form of the overthrows of the communist authorities by, for example, the democratic movement by *Solidarity* in Poland or, in an extreme case, the execution of Nicolae and Elena Ceaușescu in Romania. Yugoslavia's social ownership and self-management system, as oppose to the Soviet-style regime, maintained economic liberty in that region to some extent, which is evident in the fact that the transition indicators of these countries recorded 2.7 or 3.0 in some field even as of 1989. Geographic proximity to the Western Europe provided these countries aspiration for European

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<sup>32</sup>The indices for Czech Republic and Slovak Republic for 1991 and 92 are replaced by that of Czechoslovakia, and the indices for Serbia and Montenegro –as separate countries – up to 2006 were replaced by Yugoslavia or the State Union of Serbia and Montenegro.

Union membership and incentives to improve their governance (Cameron 2007; Roland 2002). The experiences of being independent countries might also help them quickly establish market-based democratic regimes.

In contrast, the EEC and CA countries have limited experience as independent countries in the modern era and needed to establish independent and sustainable economies and fiscal systems. The radical reformations employed in many countries in these areas lead to the emergence of oligarchs whereas the inability of the states to stabilize their fiscal systems decreased the living standards of the majority of the people (Galbraith 2002; Green and Bauer 1998; Stefes 2006; Svejnar 2002). Facing these economic challenges, the political reformations were left behind. Even the dissolution of the Soviet Union was not based on the majority's will but was "purely the result of elite action (Gill 2015, p. 9)" in the first place. Although these countries conducted reforms on electoral systems, in many countries the political leaders or figures in the regional communist parties in the Soviet era remained in power, and the Soviet-style institutions were inherited (Gill 2015; Herron 2009). This gave rise to, according to the terminologies in Levitsky and Way (2002), "electoral authoritarian" or "competitive authoritarian" regimes, with the former being closer to full-scale authoritarianism than the latter, characterized by elections that serve only to legitimate the incumbents, abuses of state power, biased media coverage and harassment of oppositions. Emergence of such regimes is reflected in the public views toward politics in these areas. In a survey conducted in Belarus, Russia and Ukraine in the 2000s, while individuals admit that they have more opportunities to express their opinions than in the Soviet era, they do not feel that their influence over the policy making improved, and they tend to have nostalgic feelings toward the Soviet era (White 2010).

## **5.2.2 Migration**

While human mobility or desire for it played a critical role in the overthrow of the communist regimes, it also became an important phenomenon after that event. The first huge wave of migration occurred right after the beginning of transition. Over 1.6 million ethnic Germans having settled in

the Soviet Union republics emigrated to Germany (Rahmanova-Schwarz 2010). Citizens of other ethnicity in the Soviet Union having settled in the outside of their ethnic homelands, which became foreign territories after the dissolution of the Soviet Union, also migrated to their ethnic homelands. Over 20 million citizens of the former Soviet Union republics have changed their permanent place of residence since 1991 (Ryazantsev & Korneev 2014). Civil and independence wars in Yugoslavia and Tajikistan in the 1990s also sent out international refugees and asylum seekers. This wave of migration slowed down in the end of the 1990s. For example, in Russia, the outflow of permanent migrants in 2000 became approximately one-fifth of that in the peak years, 1991 and 1992, while the inflow of permanent immigrants in 2000 became less than one-third of that in the peak year, 1994 (Iontsev et al. 2013). Large number of refugees from Balkan countries also returned to that region at the end of the 1990s (International Organization for Migration 2000).

The second huge wave of migration began in the 2000s, especially in the mid to late 2000s, which comprised mainly temporary labor migrants rather than permanent migrants. As transition countries got integrated to the Western economy, including the EU expansion to CEB countries in 2004, labor mobility became facilitated. Moreover, as transition progressed and economy grew, some of the transition countries also began receiving labor immigrants. Figure 5.2 (a) and (b) show the values of the international remittance inflow and outflow in four geographic areas of transition countries calculated from the data of the World Bank (2018). In the 1990s, remittance inflow to transition countries was limited although this is partly because not all transition countries collected that information. However, since the mid 2000s, remittance inflow rapidly grew in any area. Remittance outflow also demonstrates a rapid increase from 2005 in EEC, mainly in Russia. Nevertheless, note that the total remittance outflow over all areas falls short of the total remittance inflow, implying that a substantial amount of remittances comes from non-transition countries, particularly from Western Europe. The value of international remittance inflow was equivalent to 20% or more in major migrant-sending countries, such as Tajikistan, Kyrgyzstan and Moldova, and 10% or more in some of the Balkan countries, especially after the second wave of migration.

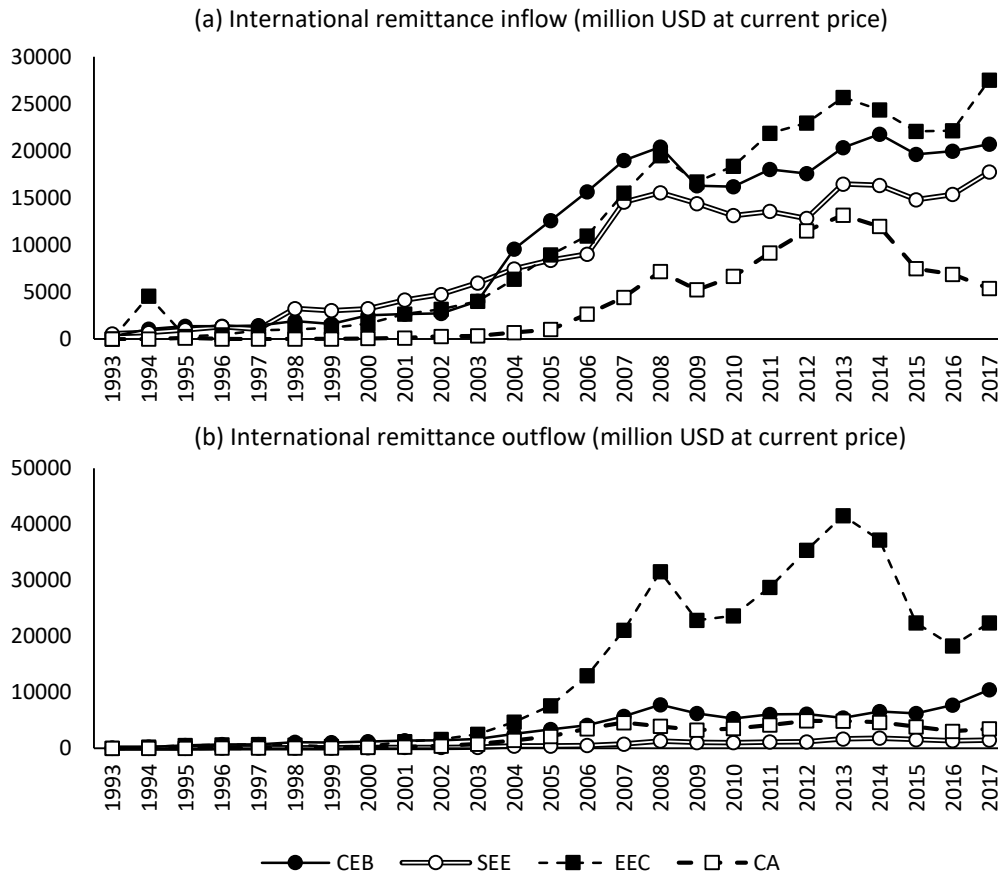


Figure 5.2 Trends of remittance inflow and outflow.  
Source: The World Bank (2018).

### 5.3 Literature and hypotheses

The literature has discussed the roles of migration in forming political views and performances in migrant-sending, low and middle-income countries. Naturally, the effects of migration could be both positive and negative as it would depend on the profile of migrants and background political and economic characteristics of each country. A finding in a country or in an area is not necessarily applicable to other countries or areas. Moreover, while the previous empirics have primarily focused on democracy, corruption, and political transparency and participation, an important politico-economic question for transition countries, which of a market and planned economy is preferable, is out of the scope because of the irrelevance of such a discussion in other coun-

tries. Furthermore, the empirical literature has paid attention mostly to the roles emigration and remittance inflow, and little attention has been paid to immigration or remittance outflow. Therefore, empirical analyses of this chapter are more explorative than ones that aim to find evidence for theoretically established theses. Nevertheless, it would be fruitful to list up potential channels through which emigration and immigration promote or impede support for a market economy and democracy.

The effects of migration could be discussed from three aspects; money, human and information flows.

The money flow in the form of remittances is a potential channel through which emigration and immigration affect individuals' politico-economic views. Households sending emigrants or receiving remittances may support liberal financial flows and well-developed banking system that facilitate the flow of remittances, and consumer-based market and liberal trades that allow them to spend what they earn. They would also support liberal human mobility for the obvious reason. These could increase the supports for a market economy and democracy in migrant-sending or remittance-receiving households in transition countries.

However, the money inflow does not need to foster support for a market economy and democracy among individuals not directly getting benefit. On one hand, if remittance inflow has positive externality so that households not receiving remittances also receive indirect benefits, then labor migration can foster the support among them. On the other hand, remittance inflow can impede the supports from these individuals. For example, that some individuals receiving remittances and improving their living standard can reduce the levels of subjective well-being among those not receiving remittances because subjective well-being is often inversely related to the incomes of others (Easterlin 1995). Then, those feeling losses in their well-being may begin objecting to liberal policies, supporting egalitarianism, and feeling nostalgia for the communist era.

The money inflow can also affect the political and economic views through changing governance. Remittance inflow could reduce the power of local elites and corrupted government by reducing the dependency of remittance-receiving individuals on them, and this could improve the

local governance (Pérez-Armendáriz and Crow 2010). The improved governance could also increase the grass-root support for democracy. However, contrary to this positive scenario, remittance inflow could be harmful for democracy. That local residents become less dependent on local authority could reduce monitoring for the local governance. While the literature has found that this can worsen governance (Abdih et al. 2012; Ahmed 2012), a reduction of civil monitoring on governmental actions and civil indifference on politics *per se* are harmful for democracy.

The effects of human outflow on domestic labor market and economic activities can also play roles. In countries with limited employment opportunities, labor emigration can reduce competition for employment and increase the likelihood that those remaining in the home countries find employment. Emigration also raises wage rate by making domestic labor supply scarce (Mishra 2007; Dustmann, Frattini and Rosso 2015). These improved functioning of a market economy, at least from the workers' perspective, can increase its support.

However, these features of human outflow suggest that receiving immigrants can have the opposite effects. As long as immigrants fill in the gap in labor supply, and their productions do not harm native incumbent firms, receiving immigrants may not impede but even promote support for a market economy among natives. However, if immigrants take up jobs from natives or damage native firms, then receiving immigrants could reduce support for liberal policies, and natives may be inclined toward restrictive politico-economic regimes. Indeed, in Russia, the largest migrant-receiving country in transition countries, hostile feelings toward foreigners and “migrant-phobia” are often observed (Mukomel 2013).

The information flows associated with migration, referred to as social remittances by Levitt (1998), also play an important role. Those who have spent their time in foreign countries provide information, knowledge and senses of values they learned to people in their home countries. The literature suggests that the information from emigrants promotes democracy in migrant-sending developing countries (Docquier et al. 2016; Pérez-Armendáriz and Crow 2010).

In the context of transition, the role of human mobility as a device of information flow could be large. The majority of nationals in transition countries did not have any experience in a market



economy and democratic politics prior to transition, which in turn means that their knowledge on how a market economy works, how they can compete in the global market, and how to participate in policy makings were limited. As shown by Barsbai et al. (2017), emigrants from Moldova to Western countries serve as an information device teaching how Western countries work. It could be pointed out that ordinary labor migrants, as opposed to exiled dissidents in the Cold War era, may not provide literally ideological information and knowledge. Nevertheless, even senses of values on small issues, such as the goodness of “Western lives,” the experience in a market economy as consumers or workers, the importance of being critical to the authority, respect to diversity, and wish for liberty, can contribute to forming people’s attitudes toward the politico-economic systems.

However, the kinds of information emigrants provide would vary across cases, and this could critically affect the effects of emigration. While information from democratic countries can promote democracy, such an effect may not exist if emigrants go to authoritarian countries. Indeed, the positive effect of emigration on democracy is often found only if the emigration destinations are Western, developed countries (Docquier et al. 2016; Barsbai et al. 2017). Moreover, even emigrants to Western countries may not always provide information fostering support for a market economy and democracy. Their opportunities to participate in political activities in the destinations may be limited. They may even have negative feelings toward the politico-economic systems in their migration destinations if they experience discrimination to immigrant workers or nationalistic political movements, which are not uncommon even in developed, democratic countries.

## **5.4 Data**

### **5.4.1 General description of data**

The author uses a combined dataset of micro-level surveys, the Life in Transition Survey I, II and III, and macro-level indicators of migration and remittances.

The Life in Transition Survey (LiTS) was conducted by European Bank of Reconstruction and Development (EBRD) and the World Bank three times, 2006, 2010 and 2016, where each round is denoted by I, II, and III. The surveys collected detailed information on the subjective beliefs

or views toward democracy, a market economy, and many other issues of transition as well as individual and household level information on socioeconomic characteristics and living standard. Individual level data were obtained for a randomly chosen individual for each household. The total sample sizes are 29,002, 38,864, and 51,206 individuals/households in the round I, II and III, respectively (approximately 1,000 individuals/households per country in the LiTS I and II and 1,500 individuals/households in the LiTS III). In each round, at least 28 transition countries were surveyed. The LiTS II and III also conducted surveys in a few Western European countries for comparison, but the author does not use information on these countries.

We complement the micro data in the LiTS by the macro-level data of remittance inflow and outflow, as well as other macro-level indicators such as GDP, obtained from the World Development Indicators (The World Bank 2018), and the political right index of Freedom House (2018).

#### **5.4.2 Main variables and sample**

The author focuses on two questions in the LiTS as the measurements of individuals' politico-economic supports. The first one is whether an individual supports a market economy. The questionnaire asks individuals to choose the one that they agree the most out of the following three statements: 1. "A market economy is preferable to any other form of economic system;" 2. "Under some circumstances, a planned economy may be preferable to a market economy;" and 3. "For people like me, it does not matter whether the economic system is organised as a market economy or as a planned economy." We define a categorical variable,  $market_{ijt}$  for individual  $i$  in country  $j$  in year  $t$ , that takes the values of 1, 2, and 3 if the answer to this question is 2, 3, 1, so that the higher the value is, the more individual  $i$  supports or prefers a market economy.

The second one is whether an individual prefers democracy or authoritarian. The questionnaire asks individuals to choose one from the following three statements: 1. "Democracy is preferable to any other form of political system;" 2. "Under some circumstances, an authoritarian government may be preferable to a democratic one;" and 3. "For people like me, it does not matter whether a

government is democratic or authoritarian.”<sup>33</sup> We define a categorical variable  $democracy_{ijt}$  that takes 1, 2, and 3 if the answer to the question is 2, 3, 1.

These questions measure the individuals’ ideological views regarding a market economy and democracy, rather than asking specifically whether individuals support the current systems. This allows the answers to provide information on whether individuals support a market economy and democracy regardless of the current economic systems and political regimes in their countries. However, we need to account the risks that these questions fail to measure what they aim to measure, because individuals may interpret them differently. For example, the definition of a market economy would be broad, from a fully *laissez-faire* one to a one with moderate governmental interventions, and this kind of differences can contribute to the variation of the answers. Individuals may be unfamiliar to the term authoritarianism. The term “under some circumstances” in the answer option 2 can also be tricky. Individuals supporting a market economy and democracy but also believing that communism was successful in the past may choose that answer option. Considering these issues, while we treat the variables from these questions to be benchmark measurements of support for a market economy and democracy, we will also supplement our analysis by a few alternative measurements.

As the key variables of migration, we use the amounts of remittance inflow and outflow measured in constant PPP, denoted by  $inremittance_{jt}$  and  $outremittance_{jt}$ . While they literally measure how much the economy benefits from sending migrants and how much the domestic productions leak to foreign countries, these remittance flows also serve as proxies for the volumes of human flows.

It could be pointed out that it is simple and straightforward to use data that measure the numbers of immigrants and emigrants, such as the migrant stock data of United Nations Department of Economic and Social Affairs (2017). A similar dataset is also used in the cross-country analysis by Docquier et al. (2016) that covers developing countries around the world. However, in the context of the analysis in this chapter, the use of such data has shortcomings. While immigrant

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<sup>33</sup>An authoritarian government is defined in the LiTS as the “one in which political power is concentrated in a leader or leaders, typically unelected who possess exclusive and unaccountable power.”

stock data mainly treat foreign-born individuals or foreign citizens recorded in the latest national censuses as immigrants, the census data may not cover temporary or illegal immigrants, either because they are dropped from the census targets or unwilling to participate in censuses. Also, because of the long interval of a census, the immigrant stock data would fail to capture short-term trends of migration. Furthermore, the concept to treat foreign-born individuals or foreign citizens as immigrants may not be suitable for transition countries. For the majority of individuals, the current national boundaries are different from the ones when they were born. In some countries, citizenship is granted based on ethnicity, and ethnically foreign permanent residents are excluded from citizenship (Ginsburgs 1993; Shevel 2009).<sup>34</sup> The ethnic cleansing and territorial disputes in some countries further complicate the concept of nationals and immigrants. The remittance data, on the contrary, would capture the presence of migrants in each country who maintain relationships with their origins. Because the data are collected every year, the remittance data would also reflect time trends better than the immigrant stock data.

The final sample covers 27 transition countries. Among the transition countries appearing in the LiTS, the following two are not included in the final sample. First, Kosovo is excluded since this country appears as an independent country only in the LiTS II and III. Some of the macro-level indicators are not available for Kosovo, either. Note that individuals in Kosovo are not included in the Serbian sample in the LiTS I conducted in 2006. Second, Uzbekistan is excluded because of unavailability of the remittance outflow data, although this country appears in any round of the LiTS. In addition, Turkmenistan, another transition country in Central Asia, is also excluded. The LiTS does not cover Turkmenistan because the political and social conditions did not allow for a proper survey (Synovate 2006). The list of countries to be used and to be excluded is provided in

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<sup>34</sup>For example, among the Baltic states, while Lithuania provided citizenship to most permanent residents, Latvia and Estonia did not provide it to ethnic foreigners, such as ethnic Russians (Ginsburgs 1993). This difference seems to be reflected in the migration data. As of 2010, Latvia boasted the largest remittance outflow as the percentage of GDP, Lithuania the second largest in a narrow margin, and Estonia the smallest. The figure of Estonia was merely 40% of that of Lithuania. However, in the migrant stock data of United Nations Department of Economic and Social Affairs (2017) as of the same year, the percentage of immigrants over population was the largest in Estonia, the second largest in a narrow margin in Latvia, and the smallest in Lithuania with the figure approximately one third of that of Latvia. The discrepancy between the immigrant stock and remittance data, especially for Estonia and Lithuania, seems to reflect the difference in their citizenship policies.

the appendix of this chapter.

### 5.4.3 Descriptive statistics

Table 5.1 shows the means of  $market_{ijt}$  and  $democracy_{ijt}$  by country, area and year. If the mean is 2, then the supports for a market economy and planned economy (or democracy and authoritarian regimes) are balanced, and the mean greater than 2 implies that a market economy and democracy are supported more than a planned economy and authoritarianism. Overall, individuals support a market economy more than a planned economy, and democracy more than authoritarian regimes. The support for democracy tend to be higher than the support for a market economy, suggesting that individuals are more skeptical with the economic policies than with the political system.

The support levels vary across countries. In Russia, a market economy and democracy are the first or second least supported in any year. In CEB countries, despite their performance in transition, the supports for a market economy and democracy among individuals are not remarkably high. Conversely, in CA, where the progress of transition and the degree of political liberty are poorest among the four areas, the individual-level supports for a market economy and democracy are high.

The support levels also vary across years and, with this regard, we need to pay attention to the fact that the year 2010 corresponds to the timing of the global financial crisis. The literature observes that the crisis reduced support for a market economy and democracy (Grosjean et al. 2011). The support levels for a market economy and democracy are the lowest in 2010 in many countries in Table 5.1 as well. Nevertheless, the time trend is not uniform across countries. For example, the supports are constantly decreasing or increasing in time in countries such as Ukraine and Macedonia.

## 5.5 Main methodologies

We aim to examine how emigration and immigration at the macro level, measured by remittance inflow and outflow, affect support for a market economy and democracy at the individual level.

Table 5.1 Means of the supports for a market economy and democracy

	Support for market economy			Support for democracy		
	2006	2010	2016	2006	2010	2016
<b>CEB</b>	<b>2.198</b>	<b>2.003</b>	<b>2.075</b>	<b>2.460</b>	<b>2.250</b>	<b>2.290</b>
Czech Republic	2.198	1.945	2.070	2.436	2.263	2.211
Estonia	2.317	2.084	2.091	2.495	2.400	2.366
Hungary	2.079	1.983	2.098	2.488	2.347	2.453
Latvia	2.114	1.794	1.907	2.377	2.015	2.128
Lithuania	2.229	2.090	2.267	2.416	2.218	2.467
Poland	2.163	1.949	2.018	2.377	2.187	2.243
Slovakia	2.179	2.039	1.916	2.521	2.212	2.090
Slovenia	2.306	2.175	2.241	2.572	2.382	2.374
<b>SEE</b>	<b>2.175</b>	<b>2.099</b>	<b>2.136</b>	<b>2.406</b>	<b>2.283</b>	<b>2.288</b>
Albania	2.532	2.180	2.258	2.584	2.265	2.256
Bosnia-Herzegovina	1.945	2.115	2.103	2.413	2.208	2.202
Bulgaria	2.121	2.165	2.089	2.276	2.250	2.196
Croatia	2.080	2.006	1.977	2.395	2.319	2.230
Macedonia	2.059	2.175	2.231	2.323	2.420	2.584
Montenegro	2.240	2.177	2.248	2.652	2.566	2.460
Romania	2.198	2.028	2.141	2.260	2.141	2.271
Serbia	2.226	1.986	2.066	2.343	2.166	2.127
<b>EEC</b>	<b>2.119</b>	<b>2.131</b>	<b>2.031</b>	<b>2.321</b>	<b>2.349</b>	<b>2.221</b>
Armenia	2.088	2.310	2.108	2.337	2.727	2.620
Azerbaijan	2.294	2.419	1.993	2.392	2.499	2.139
Belarus	2.289	2.287	2.008	2.360	2.362	2.055
Georgia	2.159	2.167	2.092	2.471	2.629	2.371
Moldova	2.061	2.129	2.165	2.303	2.309	2.170
Russia	1.865	1.840	1.852	2.048	2.059	2.002
Ukraine	2.078	2.027	1.986	2.334	2.121	2.116
<b>CA</b>	<b>2.225</b>	<b>2.163</b>	<b>2.232</b>	<b>2.410</b>	<b>2.412</b>	<b>2.340</b>
Kazakhstan	1.927	2.036	2.041	2.284	2.383	2.245
Kyrgyzstan	2.220	2.036	2.127	2.398	2.102	2.292
Mongolia	2.547	2.256	2.303	2.496	2.503	2.252
Tajikistan	2.207	2.326	2.450	2.461	2.655	2.566

The basic equation to be estimated is as follows:

$$y_{ijt} = \beta_{inr} \log inremittance_{jt} + \beta_{outr} \log outremittance_{jt} + \mathbf{x}_{ijt} \boldsymbol{\gamma}' + \mathbf{w}_{jt} \boldsymbol{\delta}' + \eta_j + \eta_t + \varepsilon_{ijt} \quad (5.1)$$

$y_{ijt}$  is either  $market_{ijt}$  or  $democracy_{ijt}$ ,  $\mathbf{x}_{ijt}$  is a vector of individual and household characteristics,  $\mathbf{w}_{jt}$  is a vector of macro-level characteristics in country  $j$  in year  $t$ ,  $\eta_j$  is the country fixed effects,  $\eta_t$  is the year fixed effects, and  $\varepsilon$  is the error term. Because of the logarithmic forms, the effects of remittance flows are free of the scale.

As  $\mathbf{x}_{ijt}$ , we include the following individual characteristics: the age; gender; education level, which is controlled by three education dummies for secondary, vocational and tertiary educations (hence less than secondary education is the base level); religions, which is controlled by two dummies for Muslim and atheists; the subjective health status, which is measured in a five-step scale with 5 corresponding to very good; and the dummy for whether an individual is in employment. Household characteristics include; the income ladder, which is the location of the household income subjectively expressed in a 10-step scale with 10 corresponding to the richest in the country; the dummy for a rural household; the dummy for the access to internet; and the household size. To control the political background of individuals, we include the dummy giving 1 if the individual is currently a member of a political party, and the dummy giving 1 if any of the household members was a member of the communist party prior to 1989 or 1991.

An advantage of this type of a multi-level analysis is that the main explanatory variables of interest, remittance flows, are unlikely correlated to individual-level unobservable factors. However, we could expect that these macro-level remittance flows are correlated to the macroeconomic status in each country that would also affect the supports. Also, both migration and the supports could be path dependent, and differences in the background and progress of transition across countries can be confounding factors. These factors need to be controlled to obtain precise estimates of the impacts of macro-level emigration and immigration.

This chapter tackles this issue mainly with the country fixed effects,  $\eta_j$ , that control any time-

invariant macro-level characteristics, such as background, institutional characteristics and relatively stable economic factors. Then we can effectively focus on estimating how changes in migration within each country affect individuals' supports for a market economy and democracy. In addition, as  $w_{jt}$ , we use the log of per capita GDP (constant PPP), the net FDI inflow as the percentage of GDP, and the unemployment rate because these macroeconomic statuses vary by country and year and cannot be fully controlled by the country and year fixed effects.

While the country fixed effects control any country-specific confounding factors, a caveat to use them needs to be addressed. That is, the country fixed effects could capture the effects of emigration and immigration in countries where remittance flows are fairly stable. If this occurs in many country, then the estimated effects of immigration and emigration would sensitively depend on a small number of countries where remittance flows varied over time.

Considering this, we also examine the following alternative specification. We drop the country fixed effects,  $\eta_j$ , but add the following factors to  $w_{jt}$ : the number of armed force personnel as the percentage of the total labor force; life expectancy; the log of population; the logs of exports and imports; and the index of political rights (PR) of Freedom House (2018). In addition, we control the fixed effects for the four areas, CEB, SEE, EEC and CA, that at least control unobservable factors at the area level. Since we cannot fully control country-specific factors, the estimates in this way could be less precise than the one with the country fixed effects. Nevertheless, this would at least provide a robustness check.

Meanwhile, common in both the two specifications, there also exist strengths and weaknesses in the use of macroeconomic factors. On one hand, macroeconomic factors, such as per capita GDP and unemployment, would be confounding factors that affect both migration and the individuals' politico-economic views. From this perspective, these factors need to be adequately controlled. On the other hand, the effects of migration on the supports through macroeconomic channels can be absorbed to some extent if these factors are used as control variables. For example, the unemployment rate would absorb the effects of receiving immigrants on the supports through its effect on labor market condition. However, we presume that controlling some macroeconomic factors does



not fully eliminate the macroeconomic channels of the effects of immigration and emigration. Taking unemployment for example once again, fear for unemployment in the future due to receiving immigration may not be fully controlled solely by including the current unemployment rate. With this view, and considering the roles of the macroeconomic statuses as confounding factors, we decide to use the macroeconomic factors as control variables.

The summary statistics of these individual, household and macro-level factors are provided in the appendix of this chapter. Note that, because of data availability, macro-level variables are replaced by the information in the adjacent years in some cases. The explanations on these cases and the definitions of some of the atypical variables are also provided in the appendix.

With these settings, we first conduct estimations by OLS. Since the main explanatory variables of interest, remittance inflow and outflow, vary only by country and year, we cluster standard errors at these levels. That is, we employ 81 clusters (27 countries times 3 years) for the calculation of standard errors. However, the use of OLS has the following two shortcomings. First, the dependent variables are categorical variables rather than purely continuous variables. Considering this, we also run ordered probit estimations. The second issue is related to the interpretation of the results. That an individual having supported planned economy becomes indifferent in the economic system and that an indifferent individual begins supporting a market economy have different implications, but both cases will be expressed as a positive coefficient in OLS and ordered probit. Analogous issues for democracy and authoritarian can also occur. Considering this issue, a supplementary analysis also examines multi-nomial probit to separately examine the effects of emigration and immigration for the probabilities to support a market economy (democracy), be indifferent, and support a planned economy (authoritarian).

In addition to these estimations, supplementary analyses examine the heterogeneous effects of remittance flows. Alternative measurements for the politico-economic views will also be used. The details for these supplementary analyses will be discussed with the results.

## 5.6 Results

### 5.6.1 The main results

We begin examining the effects of emigration and immigration on support for a market economy by OLS and ordered probit. Table 5.2, extended to two pages, shows the results. The first two columns are results without the country fixed effects. Remittance inflow has a positive but insignificant coefficient whereas remittance outflow has a negative and significant coefficients. Among other macro-level factors, the unemployment rate and the log of imports have negative and significant coefficients for support for a market economy, which are intuitive. Population has a significant and negative coefficient, and the percentage of armed force personnel has a positive and weakly significant coefficients. These coefficients are not necessarily intuitive, but they may capture the difference in the countries' background and characteristics correlated to these factors to some extent — we do not use the country fixed effects here. For example, population can capture the effect of living in Russia instead of Montenegro, where the former has more than 230 times larger population than the latter.

Then the next two columns show the results with the country fixed effects. Remittance outflow remains to have a negative effect that is significant at the 1% level, but the volumes of its coefficients become larger than the ones estimated without the country fixed effects. Meanwhile, the coefficients of remittance inflow also become significant here. These results suggest that sending emigrants fosters support for a market economy but that receiving immigrants impedes it. Comparing the results with and without the country fixed effects, the use of the country fixed effects seems important for controlling country-level unobservable factors and obtaining the precise estimates. The risk that the estimates with the country fixed effects are sensitive does not seem greatly prevalent because the coefficients have the same signs and their volumes do not differ largely regardless of the use of the country fixed effects.

Individual and household-level control variables have intuitive but interesting coefficients. Young, male, wealthy, highly educated and healthy individuals tend to support a market economy, with

Table 5.2 The estimation results of the support for a market economy

	Market economy: 3 market; 2 indifferent; 1 planned			
	OLS	O probit	OLS	O probit
Log remittance inflow	0.0314 (0.0267)	0.0458 (0.0382)	0.0787** (0.0360)	0.114** (0.0517)
Log remittance outflow	-0.0557*** (0.0164)	-0.0790*** (0.0236)	-0.0856*** (0.0159)	-0.124*** (0.0244)
Age	-0.00160*** (0.000421)	-0.00221*** (0.000590)	-0.00146*** (0.000396)	-0.00200*** (0.000558)
Male respondents	0.0233*** (0.00881)	0.0344*** (0.0126)	0.0222*** (0.00834)	0.0329*** (0.0120)
Secondary education	-0.00664 (0.0115)	-0.00975 (0.0160)	0.00939 (0.0104)	0.0137 (0.0145)
Vocational education	0.0211 (0.0142)	0.0295 (0.0199)	0.0417*** (0.00924)	0.0596*** (0.0129)
Tertiary education	0.0498*** (0.0149)	0.0764*** (0.0212)	0.0628*** (0.0117)	0.0956*** (0.0170)
Muslim	0.0718** (0.0277)	0.102** (0.0405)	0.0663*** (0.0240)	0.0962*** (0.0347)
Atheistic	0.00839 (0.0184)	0.0135 (0.0260)	-0.00451 (0.0177)	-0.00668 (0.0252)
Subjective health	0.0493*** (0.00692)	0.0700*** (0.00967)	0.0479*** (0.00688)	0.0680*** (0.00966)
In employment	0.00889 (0.00955)	0.0139 (0.0137)	0.0114 (0.00935)	0.0173 (0.0135)
Income ladder	0.0164*** (0.00388)	0.0238*** (0.00553)	0.0178*** (0.00366)	0.0258*** (0.00523)
Rural	-0.000336 (0.0119)	-0.000472 (0.0168)	0.00485 (0.0115)	0.00693 (0.0164)
Internet access	0.0247* (0.0130)	0.0346* (0.0186)	0.0342*** (0.0122)	0.0491*** (0.0174)
Household size	0.00322 (0.00307)	0.00421 (0.00438)	-0.000950 (0.00300)	-0.00172 (0.00430)
Currently political member	0.0256 (0.0173)	0.0420 (0.0257)	0.00427 (0.0176)	0.00975 (0.0264)
Communist members in the past in households	-0.0534*** (0.0114)	-0.0744*** (0.0161)	-0.0572*** (0.0112)	-0.0806*** (0.0159)

Table 5.2 continued.

	Market economy: 3 market; 2 indifferent; 1 planned			
	OLS	O probit	OLS	O probit
Net FDI	-0.000282 (0.00113)	-0.000539 (0.00168)	-0.00103 (0.000753)	-0.00163 (0.00116)
Log per capita GDP	-0.0856 (0.0602)	-0.124 (0.0861)	0.169 (0.118)	0.243 (0.183)
Unemployment rate	-0.0104*** (0.00231)	-0.0149*** (0.00332)	-0.00970*** (0.00362)	-0.0137** (0.00540)
Armed force personnel	0.0251* (0.0128)	0.0358* (0.0183)		
Life expectancy	0.00439 (0.00869)	0.00575 (0.0123)		
Log population	-0.0537** (0.0256)	-0.0758** (0.0366)		
Log exports	0.0550 (0.0770)	0.0781 (0.113)		
Log imports	-0.253** (0.0981)	-0.358** (0.143)		
PR	-0.00645 (0.0117)	-0.00941 (0.0170)		
Constant	4.670*** (1.389)		0.634 (1.282)	
Area fixed effects	yes	yes	no	no
Country fixed effects	no	no	yes	yes
Observations	78,651	78,651	78,651	78,651
$R^2$	0.034		0.041	

Standard errors clustered by country and year in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . The year fixed effects are used in all estimations.

these effects significant at the 1% level. Being Muslim also raise support for a market economy. The access to internet also raises support for a market economy, particularly when the country fixed effects are controlled, supporting the view that information plays an important role in promoting transition. Having household members who were in the communist party in the communist era reduces support for a market economy, suggesting the persistence of the individuals' belief and views.

Then Table 5.3 shows the effects of emigration and immigration on support and preference

Table 5.3 The estimation results of the support for democracy

	Democracy: 3 democracy; 2 indifferent; 1 authoritarian			
	OLS	O probit	OLS	O probit
Log remittance inflow	-0.0107 (0.0321)	-0.0190 (0.0488)	0.0164 (0.0419)	0.0246 (0.0637)
Log remittance outflow	-0.0189 (0.0191)	-0.0263 (0.0291)	-0.0680*** (0.0199)	-0.104*** (0.0318)
Age	-0.000245 (0.000392)	-0.000304 (0.000586)	-0.000291 (0.000367)	-0.000312 (0.000551)
Male respondents	0.00992 (0.00669)	0.0185* (0.0103)	0.00840 (0.00645)	0.0169* (0.0100)
Secondary education	0.0508*** (0.0113)	0.0780*** (0.0163)	0.0602*** (0.0104)	0.0933*** (0.0155)
Vocational education	0.0833*** (0.0145)	0.130*** (0.0211)	0.104*** (0.0107)	0.164*** (0.0159)
Tertiary education	0.137*** (0.0161)	0.227*** (0.0246)	0.149*** (0.0130)	0.248*** (0.0205)
Muslim	0.0299 (0.0306)	0.0462 (0.0479)	0.0326 (0.0229)	0.0537 (0.0363)
Atheistic	-0.0127 (0.0170)	-0.0139 (0.0254)	-0.0115 (0.0156)	-0.0156 (0.0238)
Subjective health	0.0417*** (0.00689)	0.0651*** (0.0103)	0.0423*** (0.00703)	0.0661*** (0.0105)
In employment	-0.000206 (0.0104)	0.00377 (0.0159)	0.00635 (0.00963)	0.0135 (0.0149)
Income ladder	0.00801* (0.00404)	0.0141** (0.00611)	0.00899** (0.00381)	0.0155*** (0.00580)
Rural	0.00660 (0.0110)	0.00952 (0.0167)	0.0127 (0.0100)	0.0185 (0.0152)
Internet access	0.0352** (0.0134)	0.0552*** (0.0203)	0.0440*** (0.0122)	0.0693*** (0.0186)
Household size	0.0124*** (0.00301)	0.0187*** (0.00466)	0.00604* (0.00305)	0.00929* (0.00479)
Currently political member	0.0244 (0.0159)	0.0498* (0.0264)	0.0142 (0.0160)	0.0339 (0.0267)
Communist members in the past in households	-0.0311*** (0.0110)	-0.0413** (0.0168)	-0.0295*** (0.0110)	-0.0398** (0.0167)

Table 5.3 continued.

	Democracy: 3 democracy; 2 indifferent; 1 authoritarian			
	OLS	O probit	OLS	O probit
Net FDI	0.00388** (0.00161)	0.00582** (0.00246)	0.00126 (0.000956)	0.00191 (0.00150)
Log per capita GDP	-0.0312 (0.0719)	-0.0557 (0.110)	0.253** (0.117)	0.377* (0.193)
Unemployment rate	0.000232 (0.00280)	0.000150 (0.00435)	-0.00649 (0.00494)	-0.00984 (0.00788)
Armed force personnel	0.0361*** (0.0129)	0.0614*** (0.0210)		
Life expectancy	0.0137* (0.00823)	0.0198 (0.0124)		
Log population	-0.0417 (0.0286)	-0.0572 (0.0435)		
Log exports	-0.0808 (0.0910)	-0.133 (0.141)		
Log imports	-0.0645 (0.119)	-0.0857 (0.181)		
PR	-0.0173 (0.0131)	-0.0280 (0.0197)		
Constant	3.230** (1.490)		0.844 (1.388)	
Area fixed effects	yes	yes	no	no
Country fixed effects	no	no	yes	yes
Observations	80,158	80,158	80,158	80,158
$R^2$	0.037		0.048	

Standard errors clustered by country and year in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . The year fixed effects are used in all estimations.

for democracy. Without the country fixed effects, neither remittance inflow nor outflow has a significant effect. With them, although the remittance inflow remains insignificant, the remittance outflow becomes significantly negative. The signs of the coefficients of remittance outflow are the same in all estimations. Therefore, while the effect of emigration on support for democracy is limited, receiving immigrants reduces that support. The effects of individual characteristics are similar to those on a market economy. Wealthy, highly educated, and healthy individuals tend to support democracy whereas those in households with communist members tend to support

authoritarian. Internet access promotes democracy. Unlike a market economy, the ages, genders and religions of individuals do not affect support for democracy, but the household size raises support for democracy.

Then we estimate the probabilities that an individual supports a planned economy (authoritarian) or a market economy (democracy) or is indifferent by multinomial probit. Table 5.4 shows the marginal effects of remittance inflow and outflow on these probabilities, estimated either without or with the country fixed effects. On the economic system, regardless of whether the country fixed effects are used, remittance inflow reduces the probability that an individual prefers a planned economy. It also has a positive marginal effect on the probability to support a market economy although this effect is not significant. Conversely, remittance outflow significantly raises the probability that to support a planned economy and reduces that to support a market economy. On the political system, remittance inflow does not have a significant effect, but remittance outflow significantly reduces support for democracy and increases both the probabilities of supporting authoritarian regimes and being indifferent if estimated with the country fixed effects.

The results so far suggest that (i) sending emigrants reduces support for a planned economy rather than, for example, turning indifferent individuals into supporters of a market economy and (ii) receiving immigrants reduces support for a market economy and democracy and raises support for planned economy and authoritarian regimes. The negative effects of receiving immigrants suggest the possibility that individuals worry about the economic pressures or ethnic tensions that immigrants provide. Regarding the effects of remittance inflow on economic views, it is not straightforward to derive an interpretation at this moment. That effect is consistent to both the roles of economic benefits and those of information flows or *cultural remittances* associated with sending emigrants.

Table 5.4 Marginal effects of remittance flows in multi-nomial probit estimations

	(I)			(II)		
	planned	indifferent	market	planned	indifferent	market
Log remittance inflow	-0.0264** (0.0118)	0.0235 (0.0161)	0.00289 (0.0192)	-0.0500*** (0.0161)	0.0157 (0.0162)	0.0343 (0.0241)
Log remittance outflow	0.0306*** (0.00859)	-0.00421 (0.00961)	-0.0264** (0.0106)	0.0442*** (0.00935)	0.00113 (0.00813)	-0.0453*** (0.00934)
Area fixed effects		yes			no	
Country fixed effects		no			yes	
Observations		78,651			78,651	
	(III)			(IV)		
	authoritarian	indifferent	democracy	authoritarian	indifferent	democracy
Log remittance inflow	-0.00562 (0.0131)	0.0235 (0.0166)	-0.0179 (0.0228)	-0.0199 (0.0163)	0.0177 (0.0211)	0.00218 (0.0287)
Log remittance outflow	0.00790 (0.00927)	0.00255 (0.00913)	-0.0104 (0.0124)	0.0260** (0.0102)	0.0146* (0.00796)	-0.0406*** (0.0118)
Area fixed effects		yes			no	
Country fixed effects		no			yes	
Observations		80,158			80,158	

Standard errors clustered by country and year in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Covariates shown in Tables 5.2 and 5.3 are used but omitted. The year fixed effects are used in all estimations.



### 5.6.2 Heterogeneous effects of migration

We now consider potential heterogeneous effects of emigration and immigration across countries. The extents to which emigration and immigration affect support for a market economy and democracy could be different by the levels of the transition progress and performances or by background characteristics. Also the effects, particularly those through the information flows, can vary by the origins and destinations of immigrants and emigrants.

We first examine the potential heterogeneous effects by interacting the remittance variables to the dummies for the four areas, CEB, SEE, EEC and CA. The results are shown in Table 5.5. On support for a market economy, the regional heterogeneity is limited among CEB, SEE and CA countries, where remittance inflow raises support for a market economy but the outflow reduces it in similar magnitudes. However, both the effects of remittance inflow and outflow are negligible in EEC. The effects on support for democracy are more complex. Remittance inflow has a positive and significant effect in SEE, but the effects for other areas are negative (but insignificant). The effect of remittance outflow on support for democracy is similar to that on support for a market economy: significantly negative except for EEC. However, the volume of the effect for EEC is close to those for other areas, and the null hypothesis that the effect of remittance outflow is the same for any area cannot be rejected.

Then we group countries according to two alternative criteria. The first one is the origins and destinations of remittance flows. Among transition countries, some send emigrants more to Western Europe while others more to transition countries. Using the bilateral remittances flow data of Migration and Remittance Data (The World Bank 2017) for the remittance flows in 2016, we separate the countries into ones receiving remittances more from transition countries versus ones receiving more from other countries, and ones sending remittances more to transition countries versus ones sending more to other countries. Transition countries in this categorization include Uzbekistan, Turkmenistan and China in addition to the sample countries in the present chapter, whereas non-transition countries include any other country but the majority of the money flows are with Western European countries. Only the data for 2016 are used, but the patterns of remittance

Table 5.5 The heterogeneous effects of emigration and immigration by geographic area

	Market		Democracy	
	OLS	O probit	OLS	O probit
Log remittance inflow in				
CEB	0.121** (0.0500)	0.172** (0.0711)	-0.0436 (0.0538)	-0.0652 (0.0826)
SEE	0.104** (0.0417)	0.153** (0.0622)	0.142*** (0.0492)	0.203*** (0.0782)
EEC	-0.0273 (0.0994)	-0.0374 (0.141)	-0.0919 (0.0840)	-0.122 (0.128)
CA	0.110** (0.0480)	0.159** (0.0712)	-0.0217 (0.0718)	-0.0288 (0.112)
Log remittance outflow in				
CEB	-0.0882*** (0.0206)	-0.122*** (0.0298)	-0.0774*** (0.0237)	-0.112*** (0.0369)
SEE	-0.0798** (0.0343)	-0.120** (0.0532)	-0.0876** (0.0418)	-0.131* (0.0671)
EEC	-0.0375 (0.103)	-0.0532 (0.149)	-0.0655 (0.0895)	-0.113 (0.143)
CA	-0.113*** (0.0305)	-0.174*** (0.0481)	-0.0764* (0.0397)	-0.139** (0.0669)
Observations	78,651	78,651	80,158	80,158

Standard errors clustered by country and year in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Covariates shown in Tables 5.2 and 5.3 are used but omitted. All estimations use the year and country fixed effects.

flows tend to be constant over time.<sup>35</sup> Then we interacted the logs of remittance inflow and outflow with these categorizations. Note that, while the numbers of countries receiving more remittances from transition versus non-transition countries are roughly balanced, that of countries sending more remittances to non-transition countries is limited — only Poland, Romania and Bulgaria. Therefore, heterogeneity in the effect of remittance outflow, if any, needs to be interpreted with caution.

The second alternative grouping is according to the level of political rights. From the political right index (PR) of the Freedom House (2018), we define a country whose political right index

<sup>35</sup>In addition, the data are not available for 2006. This data availability and the constant pattern over years do not allow us to use the bilateral data directly, such as using the log of remittance inflow from transition countries and that from non-transition countries simultaneously as independent variables.

as of 2006 is either 1 or 2 as one with greater political rights. Information or “lessons” from migrants can have limited effects in countries with greater political rights because individuals can learn liberal politics and economy within their own countries. The pressure from immigrants can affect the individuals’ support strongly if their rights have already been suppressed.

The results are shown in Table 5.6. Panel A shows the heterogeneity with respect to the origins and destinations of remittance flows, and Panel B shows the heterogeneity with respect to the level of political rights as of 2006. For a market economy, remittance inflow has a positive and strongly significant effect if a country receives remittances more from non-transition countries than from transition countries, but does not have a significant effect otherwise. The difference is significant at the 10% level. These results are consistent to the literature (Barsbai et al. 2017; Docquier et al. 2016), and the information flow from the West, rather than simple money flows, appears to promote support for a market economy. Similarly, remittance inflow has a significantly positive effect if a country boasts greater political rights, but does not otherwise. However, the difference of the coefficients is not significant here, and the heterogeneity in terms of the level of political rights is not supported. Regarding democracy, remittance inflow does not have any significant effect. The roles of emigration in shaping support and preference for democracy is limited.

Meanwhile, remittance outflow reduces support for a market economy regardless of the destinations or the levels of political rights in the remittance-sending countries. Although the volume of the effect is larger in countries sending remittances to transition countries than those sending to non-transition countries, and in countries with less political rights than those with greater political rights, the difference of the volumes is not significant in either case. The effects of remittance outflow on supports for democracy appear heterogeneous. In terms of the origins and destinations of remittances, the effect is significant only in countries sending remittances to transition countries. However, this is not as strong as an evidence for a systematic heterogeneity because only three countries send remittances more to non-transition countries. In terms of the level of political rights, the volumes of the coefficients are significantly different in 10% level for OLS and 5% level for ordered probit, and the negative effect is stronger in countries with less political rights.

Table 5.6 The heterogeneous effects of emigration and immigration by alternative area categorizations

Panel A: Heterogeneity in the origins and destinations of remittance flows	Market		Democracy	
	OLS	O probit	OLS	O probit
Log remittance inflow in countries which receive more remittances from				
Transition countries	0.0231 (0.0498)	0.0355 (0.0713)	-0.0274 (0.0514)	-0.0356 (0.0781)
Other countries	0.122*** (0.0299)	0.176*** (0.0434)	0.0421 (0.0310)	0.0590 (0.0484)
Log remittance outflow in countries which send more remittances to				
Transition countries	-0.106*** (0.0165)	-0.154*** (0.0259)	-0.102*** (0.0186)	-0.157*** (0.0314)
Other countries	-0.0594*** (0.0220)	-0.0857*** (0.0316)	-0.00561 (0.0241)	-0.00934 (0.0369)
Observations	78,651	78,651	80,158	80,158
Panel B: Heterogeneity in the degrees of political rights	Market		Democracy	
	OLS	O probit	OLS	O probit
Log remittance inflow in countries with				
Greater political rights	0.0919*** (0.0378)	0.129** (0.0536)	0.0163 (0.0453)	0.0191 (0.0677)
Less political rights	0.0274 (0.0488)	0.0417 (0.0696)	-0.0197 (0.0502)	-0.0285 (0.0756)
Log remittance outflow in countries with				
Greater political rights	-0.0831*** (0.0185)	-0.117*** (0.0262)	-0.0527** (0.0240)	-0.0774** (0.0359)
Less political rights	-0.125*** (0.0237)	-0.188*** (0.0366)	-0.115*** (0.0273)	-0.188*** (0.0434)
Observations	78,651	78,651	80,158	80,158

Standard errors clustered by country and year in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Covariates shown in Tables 5.2 and 5.3 are used but omitted. All estimations use the year and country fixed effects.

Nevertheless, the negative effect remains significant in countries with greater political rights.

## **5.7 Discussion with alternative measurements of the supports for a market economy and democracy**

While the results so far reveal the effects of immigration and emigration on the benchmark measurements of the individuals' support for a market economy and democracy, what aspects of a market economy and democracy are individuals for or against? Regarding the positive effect of emigration on the supports for a market economy, do individuals support elements of that system, such as competition, or just express aversion to a planned economy? Also, regarding the negative effects of receiving immigrants, do individuals really oppose to a market economy or just point out the risk of full *laissez-faire* economy and the necessity of governmental intervention? Similarly, individuals not expressing the support for democracy may just wish the leading party or president to have strong political powers or leaderships, rather than objecting to the elements of democracy, such as election.

To further explore the effects of immigration and emigration, we examine alternative indicators related to a market economy and democracy. We first focus on the questions asking whether an individual regards inequality as incentives for individual effort, believes that private ownership of business and industry should be increased, and regards competition as beneficial. These questions allow us to discuss what elements of a market economy individuals support or object to. The answers to these questions are expressed in 10-step scales, where 10 corresponds to strong agreement to these issues. Because these questions were not asked in LiTS I, we focus on the sample in 2010 and 2016.

Table 5.7 shows the OLS estimates of the effects of remittance inflow and outflow. Remittance inflow raises support for inequality as incentives for individual effort while remittance outflow reduces support for private ownership. Remittances do not affect support for competition although the mean support for competition is fairly high: the average level of the support for competition is 7.228 in a 10-step ladder, and the level of the support is at least 6 (inclined more to support

Table 5.7 OLS estimates of alternative measurements of support for a market economy

	Support for inequality as incentives for individual effort	Support for increasing private ownership	Support for competition
Log remittance inflow	0.891*** (0.268)	0.0187 (0.200)	-0.00625 (0.140)
Log remittance outflow	-0.0194 (0.204)	-0.584*** (0.113)	0.0901 (0.149)
Observations	57,786	55,482	57,202
Mean	4.642	5.541	7.228

Standard errors clustered by country and year in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Covariates shown in Tables 5.2 and 5.3 are used but omitted. All estimations use the year and country fixed effects.

competition than objecting to it) among 77.1% of individuals. These suggest that emigration does foster support for an element of a market economy, but that the negative effect of immigration on a market economy reflects oppositions to fully *laissez-faire* economy but not those to the basic idea of a market economy.

We then examine how individuals regard immigrants to investigate whether the negative effects of remittance outflow can be attributed to the pressures that immigrants provide. The LiTS II and III asked individuals whether they regarded immigrants as “valuable contribution to the national economy of our country,” “burden for the national social protection system” or as others. We estimate the effects of migration on the probabilities to choose these answers by multi-nomial probit.

Table 5.8 shows the marginal effects of remittance inflow and outflow. We first estimate them, using observations from all countries. Remittance outflow (and hence receiving immigrants) raises the probability that individuals regard immigrants as burden for their countries, and reduces the probability that individuals regard immigrants as valuable contribution. However, similar effects are observed for remittance inflow. We presume that this is partly because of a misinterpretation of the term “immigrants” in the question. That is, the term “immigrants” could be easily misinterpreted as “emigrants” or “migrants” if it is not accompanied by verbs, prepositions or their

Table 5.8 The marginal effects of remittance flows on the attitudes towards immigrants

	Immigrants are valuable contribution	Immigrants are burden for the country	Others
<i>With all countries (N = 52, 519)</i>			
Log remittance inflow	-0.109** (0.0462)	0.0905** (0.0439)	0.0188 (0.0411)
Log remittance outflow	-0.0531* (0.0297)	0.173*** (0.0324)	-0.120*** (0.0275)
<i>Without countries whose remittance inflows <math>\geq</math> 10% of GDP (N = 39, 879)</i>			
Log remittance inflow	-0.0419* (0.0231)	0.0430 (0.0567)	-0.00113 (0.0462)
Log remittance outflow	-0.0648*** (0.0165)	0.197*** (0.0316)	-0.132*** (0.0281)

Standard errors clustered by country and year in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Covariates shown in Tables 5.2 and 5.3 are used but omitted. All estimations use the year and country fixed effects.

equivalents in the interview languages, especially in countries extensively sending emigrants.<sup>36</sup>

Although we cannot tell whether such a misunderstanding really occurred, we take into account that possibility and re-estimate the effects, excluding observations from countries sending emigrants extensively. Excluding such countries could also be justified because these countries would not be greatly relevant for an analysis of the attitudes toward immigrants. Although there is no clear criterion for a country extensively sending emigrants, we exclude the countries whose remittance inflows are equivalent to 10% of GDP or more.<sup>37</sup> Now the effects of remittance outflow on these probabilities become clear and strong whereas the effects of remittance inflow become small and lose their significance. In sum, the results suggest that the negative effects of remittance outflow on the support levels of a market economy and democracy are attributable to the immigrant pressures and the increased anti-immigrant views.

Finally, let us focus on alternative measurements of supports for democracy. The LiTS I and III

<sup>36</sup>Indeed, a large proportion of individuals regard immigrants as valuable contribution in migrant-sending countries, such as Moldova, Kyrgyzstan and Tajikistan, where remittance inflow is equivalent to 20% of GDP or more. This tendency suggests the possibility that the respondents took the question as the one asking about the opinion on emigrants.

<sup>37</sup>This excludes Armenia, Bosnia and Herzegovina, Georgia, Kyrgyzstan, Moldova and Tajikistan for both 2010 and 2016, Albania for 2010, and Serbia for 2016. Because of the country fixed effects, the estimation of the effects of remittance flows effectively excludes the information in Albania and Serbia for the other years.

Table 5.9 The effects of remittance flows on the alternative measurements of support for democracy

	Free and fair election	Law and order	Freedom of speech	Independent press	Strong opposition
<i>Panel A: OLS for 5-step scale measurements</i>					
Log remittance inflow	-0.206 (0.224)	-0.202 (0.203)	-0.0855 (0.165)	-0.0527 (0.133)	-0.107 (0.160)
Log remittance outflow	-0.142*** (0.0489)	-0.135*** (0.0476)	-0.0989** (0.0387)	-0.0971*** (0.0298)	-0.0547 (0.0409)
Observations	57,187	57,569	57,230	56,096	54,827
<i>Panel B: Means</i>					
Remit. outflow >1% GDP	4.222	4.313	4.223	4.085	3.942
Remit. outflow <1% GDP	4.412	4.493	4.382	4.366	4.100
<i>Panel C: Marginal effects on the probabilities of “strongly agree” or “agree”, probit</i>					
Log remittance inflow	-0.0676 (0.0472)	-0.0589 (0.0393)	-0.0311 (0.0409)	-0.0283 (0.0350)	-0.0415 (0.0467)
Log remittance outflow	-0.0336** (0.0148)	-0.0238 (0.0150)	-0.0220 (0.0139)	-0.0195** (0.00871)	0.00149 (0.0131)
Observations	57,187	57,569	57,230	56,096	54,827

Standard errors clustered by country and year in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Covariates shown in Tables 5.2 and 5.3 are used but omitted. All estimations use the year and country fixed effects.

asked whether an individual believes the importance of free and fair election, that of law and order, that of freedom of speech, that of an independent press, and that of a strong political opposition, which could be considered as fundamental elements of democracy. The answers are expressed in 5-step scales with 5 corresponding to “strongly agree,” 4 to “agree”, 3 to “neither agree nor disagree,” 2 to “disagree,” and 1 to “strongly disagree.”

Panel A in Table 5.9 shows the OLS estimates of the effects of remittance inflow and outflow, where the answers to the five questions are directly used. Remittance outflow has negative and significant coefficients except for the importance of strong opposition. In addition, the author checked that, similarly to one on the benchmark democracy measurement, the negative effects are observed in most areas and regardless of the levels of political rights. One may point out that, despite the insignificance, remittance inflow also have negative coefficients and that their volumes are comparable to those of remittance outflow. However, this could be ignored not only because of



the insignificance but also because these coefficients are not robust.<sup>38</sup>

In Panel B, the mean values of the answers are also shown, separately calculated for countries whose remittance outflow exceeds 1% of GDP versus others. This threshold makes the subsamples roughly balanced. The mean values of these five measurements are lower in transition countries with remittance inflow exceeding 1% of GDP than the other transition countries, which is consistent to the negative effects of immigration. However, it could also be noted that the means are fairly high in both groups of countries. Indeed, approximately 70-90% of individuals in transition countries either “agree” or “strongly agree” with the importance of these elements of democracy. This could seem a good sign. Nevertheless, immigration even increases the proportion of individuals not agreeing with these elements. We estimate by probit the probabilities that individuals either “strongly agree” or “agree” with these five elements, and Panel C shows the marginal effects. Remittance inflow has even negative marginal effects for free and fair election and independent press.

These results suggest that the negative effect of immigration on the benchmark democracy measurement does not solely reflect the wish for the governmental power or leadership, but that receiving immigrants also impedes support for certain fundamentals of democracy. This corresponds to the emergence and continuation of authoritarian regimes in some of transition countries. However, it should not be overlooked that, as we saw in Chapter 5.6.2, the negative effect of immigration on support for democracy is observed even in relatively democratic transition countries. The loss of support for democracy is not a problem solely for countries with authoritarian regimes.

## 5.8 Conclusion

In this chapter, the author examined the roles of sending emigrants and receiving immigrants at the macro level on the individuals’ beliefs, support and preference on the politico-economic systems in transition countries, controlling the difference in the initial conditions and background of

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<sup>38</sup>The coefficients of the log remittance inflow are sensitive to inclusion or exclusion of particular observations. For example, for some reasons, if we exclude the observations from Armenia, the coefficients of the log remittance inflow on all measurements become positive but insignificant. The coefficients of remittance outflow are robust to exclusion of any single country from the sample. Note that the discussion here does not intend to claim any view for Armenia, but that we just describe a statistical remark.

these countries. During almost three decades since the dissolution of the East Bloc, the trajectory of transition demonstrated diversity. While some countries have achieved full-scale transition to market-based and democratic regimes, there are other countries that maintain authoritarian regimes. Meanwhile, labor migration became common in transition countries, especially in the 2000s. The role of emigration as the source to diffuse information and politico-economic values is widely recognized. However, this role has not been fully examined in transition countries. Also, the existing literature pays relatively little attention to the roles of immigration in low and middle-income countries.

The results show that sending emigrants, especially to non-transition countries, promotes support for a market economy, but that receiving immigrants impedes support for a market economy and democracy. The positive effect of emigration is consistent to the roles of the information and senses of values provided by emigrants to Western Europe. However, the information from Western Europe does not seem to promote democracy. The negative effect of immigration is consistent to the pressure that immigrants provide. The supplementary results suggest that the decreased support for a market economy is associated with the increased support for governmental intervention over a fully *laissez-faire* economy, but that individuals do not appear to lose support for the basic idea of a market economy. However, the decreased support for democracy is associated with the decreased support for fundamentals of democracy.

Before closing, let us remark a few limitations and cautions of the present study. Firstly, the multi-level framework abstracts the degree of interaction with emigrants and immigrants. Those directly connected to emigrants may be affected more by information from abroad than those not. Also, the levels of interaction with immigrants can vary within countries, and those interacting with immigrants might have stronger anti-migrant feelings than those not. The roles of migration shown in the present study might be attenuated by abstracting these issues. Second, the roles of emigration and immigration can change over time, and their effects in the future do not necessarily the same as their effects observed in the present study. The roles of the information could become weak as emigration becomes common. The anti-immigrant feelings could be strengthened as a

country receives more immigrants or, conversely, that feeling might be observed only at the early stage of encounter with foreigners. Finally, the 11-year window of the focus of the analysis does not allow us to discuss how the changes in the grass-root supports eventually translate into the politico-economic systems. A long-term observation would be essential to discuss this issue.

## Appendix for Chapter 5

Table 5A1 List of countries, by area

CEB: Central-Eastern Europe and the Baltic states	SEE: South-Eastern Europe	EEC: Eastern Europe and the Caucasus	CA: Central Asia
Czech Republic	Albania	Armenia	Kazakhstan
Estonia	Bosnia and Herzegovina	Azerbaijan	Kyrgyzstan
Hungary	Bulgaria	Belarus	Mongolia
Latvia	Croatia	Georgia	Tajikistan
Poland	Kosovo*	Moldova	Turkmenistan*
Slovakia	Macedonia	Russia	Uzbekistan*
Slovenia	Montenegro	Ukraine	
	Romania		
	Serbia		

\* Not used in the main analysis.

Table 5A2 Summary statistics and notes on variables

Variables	Mean	Std. dev.	Notes
<i>The levels of the supports for</i>			
Market economy	2.122	0.814	
Democracy	2.330	0.788	
<i>Individual or household characteristics</i>			
Age	47.48	17.34	
Male	0.423	0.494	
Household income ladder	4.380	1.699	The location of the household income subjectively expressed in a ten-step ladder within a country.
Muslim	0.168	0.374	
Atheist	0.103	0.304	
Secondary education	0.310	0.462	
Vocational education	0.221	0.415	
Tertiary education	0.232	0.422	
Rural	0.414	0.493	
Subjective health	3.100	0.956	Subjectively expressed in a five-step scale. 5: very good, 1: very bad.
In employment	0.541	0.498	The dummy for those who had employment within one year prior to the survey.
Currently political member	0.067	0.251	The dummy for those who are political members at the time of the survey.
Communist members in the past in households	0.245	0.430	The dummy giving 1 if at least one family member was a communist party member prior to 1989 or 1991.
Internet access	0.424	0.494	
Household size	2.935	1.650	
<i>Macro-level characteristics</i>			
Log remittance inflow*	21.80	1.032	Constant PPP at 2011. For observations in Serbia and Montenegro in 2006, the values in 2007 are used.
Log remittance outflow*	20.17	1.537	Constant PPP at 2011. For observations in Serbia and Montenegro in 2006, the values in 2007 are used.
Net FDI inflow*	6.355	9.516	The value as % of GDP.
Log per capita GDP*	9.499	0.683	Per capita GDP, constant PPP at 2011.
Armed force personnel*	1.437	1.107	Armed force personnel as % of labor force. For all countries in 2016, the value in 2015 is used.
Life expectancy*	73.33	3.370	For all countries in 2016, the value in 2015 is used.
Log population*	15.66	1.180	
Unemployment rate*	11.07	6.941	
Log exports*	3.813	0.397	The value as % of GDP. For observations in Tajikistan in 2016, the value in 2015 is used.
Log imports*	3.984	0.330	The value as % of GDP. For observations in Tajikistan in 2016, the value in 2015 is used.
PR	3.014	1.955	Political Right index by Freedom House (2018).

$N = 81, 810$ , i.e. observations that appear at least either in the estimations of the supports for a market economy or democracy are used. \* Data source: The World Bank (2018).

## Chapter 6 Concluding remark

The author in this dissertation examined the consequences of labor migration on individuals' and households' behaviors and beliefs with focus on education investment decisions, future migration prospects, remittances and political attitudes. Recently, as labor migration across borders has accelerated, the roles of associated monetary, human and information flows have received attention.

Chapter 2 theoretically analyzes labor migration and education investment for children in a migrant sending-country. Regarding the form of migration, the analysis focuses on negative selection migration, wherein the migration destination does not highly reward migrants' education and unskilled workers tend to migrate. The author constructs a theoretical model that simultaneously examines the roles of parental remittances and children's future migration prospects, which potentially have opposing effects on education investment. That is, parental migration and remittances can encourage education investment for children in the home country while future migration prospects can reduce education incentives in a negative selection circumstance. The results offer two scenarios: the optimistic scenario wherein the effect of parental remittances can outweigh the effect of the prospects and make the overall effect of migration positive, and the pessimistic scenario wherein the effect of the prospects makes the overall effect negative. The latter will occur if the quality of education is low, a condition that seemingly match the circumstance in a developing country.

Chapters 3 and 4 empirically investigate the effects of migration on education investment, using data from Tajikistan. In particular, Chapter 3 focuses on examining the theoretical implication presented in Chapter 2 and estimates the effects of future migration prospects and parental migration on the final education attainments of male children. To identify the effect of the prospects, which is basically unobservable, and the effect of parental migration, which can be endogenous, the estimations utilize the immigration policy change in Russia, the main migration destination for migrants from Tajikistan. The results show that migration overall reduces education investment. Although parental migration encourages education investment if parents have low education levels, future migration prospects reduce education investment regardless of parental education levels and

parental migration status, and this effect outweighs the positive effect of parental migration. These findings support the pessimistic view in the theoretical implication in Chapter 3 and provide an example of an adverse consequence of labor migration.

Chapter 4 further examines the roles of parental migration and sheds light on its effects on educational gender gap. Using the data from Tajikistan and focusing on non-compulsory secondary education, the author shows that parental migration does not affect male enrollment but reduces female enrollment. The neutral effect on male education suggests that investments in male secondary education are inelastic to the effects of parental migration, which is consistent to the high enrollment rate among male children and does not contradict to the results in the previous chapter. The negative effect on female education is attributable to one of the side-effects of parental migration suggested in the literature (Acosta 2011; McKenzie & Rapoport 2011); namely that parental absence during migration episodes forces female children to leave school and engage in household labor. The supplementary results show that female children who are out of school and whose parents are migrating are likely to engage in unpaid family works.

Chapter 5 shifts the focus to the role of labor migration on the grass-root supports for political and economic transitions in former communist countries in Europe, the Caucasus and Central Asia. Almost three decades after the dissolution of the East Bloc, transition to market-based democratic regimes have not been completed universally. In the meantime, labor migration have become increasingly common in these areas, and the associated flows of money and information have accelerated. Migration can potentially affect individuals' support for a market economy and democracy: the information flows, particularly ones from developed, Western countries, can affect the beliefs, senses of values and political and economic views of individuals in migrant-sending countries. Conversely, receiving immigrants can foster anti-migrant views and support for restrictive policies, which can lead to the nostalgic feelings toward the communist era and the decreased support for a liberal market economy and democratic regime. Using survey data measuring individuals' opinions, views and support regarding political and economic systems in transition countries, the author examines how sending emigrants and receiving immigrants affect the levels of individual

support for a market economy and democracy. The results show that sending emigrants, particularly to Western Europe, promotes support for a market economy, which is consistent to the role of information, but is neutral to democracy. However, the results also show that receiving immigrants impedes support for a market economy and democracy. Supplementary analyses suggest that the economic pressures by immigrants develop anti-immigrant views, the desire for governmental intervention, and support for authoritarian regimes.

To summarize, this dissertation sheds light on the roles of labor migration that have not been fully examined in the literature. In particular, regarding education investment, while the literature has viewed *brain drain* and certain side-effects of parental migration as the channels of negative effects of labor migration — and Chapter 4 analyzes in this line — the results in Chapter 2 and 3 present an alternative negative channel: the negative effect of future migration prospects under negative selection migration circumstances. Chapter 5 examines the effects of labor migration for politico-economic views in transition countries, with focus on both the effects of sending emigrants and receiving immigrants. The literature has not fully examined these effects in transition countries despite the prevalence of labor migration and relevance of individuals' politico-economic supports in that region, and paid less attention to the effects of receiving immigrants than those of sending emigrants.

Clearly, despite observing negative effects of migration, the author is not of the opinion that labor migration should be restricted. As is explicitly stated in Chapter 2, labor migration itself can be welfare-improving even if it has negative effects on certain issues. Furthermore, in this modern era, where technological progress facilitates human mobility and where developed countries need immigrant workers to alleviate labor shortages, further development of labor migration is inevitable. The present results point out the need to address the potential negative consequences of migration, rather than focusing on its positive aspects.

This dissertation is not free from limitations. While the theoretical discussions in Chapter 2 employ a static model to examine the effects of labor migration, migration and education circumstances can change over time as the country of focus develops or retrogresses. A dynamic model



that discusses human capital accumulation or incorporates dynamically changing migration and education circumstances would be potentially interesting extensions that would provide further implications for development. Regarding Chapters 3 and 4, the results based on data from Tajikistan can be exceptions rather than general examples. In particular, the results in Chapter 3 based on a unique before-after framework can be considered a benchmark finding rather than a decisive conclusion and needs to be critically examined using evidence derived from other cases and frameworks. Finally, while the analysis in Chapter 5 sheds light on how labor migration affects individuals' politico-economic supports, the 11-year study period does not allow for a discussion on how these individual-level supports will eventually translate into economic and political systems. In addition, it remains unclear whether migration will continue to play similar roles in the future when it is more commonplace. These topics are left for further research.

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