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The Structure of Migration in Estonia: Survey-Based Evidence

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Martti Randveer and Tairi Rõõm*

Abstract

This paper presents new evidence from a unique survey of firm managers on migration patterns in Estonia in 2007. An average emigrant from Estonia was most likely a young person between 15–34 years of age, a blue-collar worker and male. Contrary to evidence from other countries and/or earlier time periods, employees with a low level of education were more likely to emigrate than highly educated workers. We assessed which enterprises were more exposed to the cross-border movement of workers. The vast majority (97%) of emigrants left from private sector enterprises. Most immigrant workers were employed by private sector companies as well. Firms hiring a larger share of low-skilled blue-collar workers were more exposed to the mobility of international labour. The regression results indicated that the tendency to emigrate was the strongest among construction sector employees, whereas immigrant workers were most likely hired by manufacturing companies.

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Non-technical summary

The gradual opening of the EU-15 labour markets to migrants from other EU member states from 2004 onwards has significantly increased the influx of EU-8 workers to Western European countries. This recent increase in East-West mobility has intensified research on European migration patterns. The aim of the current paper is to analyze the structure of emigration from Estonia based on a survey that was designed by the authors of this article and carried out by the Bank of Estonia in January 2008.

The survey targeted company managers and its aim was to collect information on cross-border migration to and from employment in 2007. The main focus of the survey was on emigration patterns: Which types of workers emigrate from Estonia? Are they predominantly young people? What is their average level of education? Are they mostly men or women, native Estonians or people of other nationalities? The survey covered a significant portion of the Estonian labour force. The companies that participated in the survey employed 54.5 thousand people, which corresponded to approximately 9% of Estonian wage earners.

The most common problem associated with the analysis of recent migration trends is the lack of reliable data. Although information on cross-country migration volumes exists (it is available from Eurostat), these data are often inaccurate. The aim of the survey is to fill in this gap at least partially. We used a new approach to collect migration data: the information was obtained via questioning enterprise managers. The limitation of this approach is that the sample is not representative of the population as a whole, since it covers only employed people. However, it allows for the assessment of the gross flow of workers into and out of employment, which is relevant for the macroeconomic modelling of changes in the supply of labour.

According to our results, the average emigrant from Estonia was most likely a young person between 15–34 years of age, a blue-collar worker and male. Contrary to evidence from other countries and/or earlier time periods, employees with a low level of education were more likely to emigrate than highly educated workers. Evidence from the current survey for Estonia is in line with the finding that a large part of recent migration from new EU member countries to old EU member countries is temporary in nature. We assessed which enterprises were more exposed to the cross-border movement of workers. The vast majority (97%) of emigrants left from private sector enterprises. Most immigrant workers were employed by private sector companies as well. Firms hiring a larger number of low-skilled blue-collar workers were more exposed to the mobility of international labour. The regression results indicated that the tendency to emigrate was the strongest among construction

sector employees, whereas immigrant workers were most likely hired by manufacturing companies.

Our most interesting result is related to the fact that in 2007 employees with a low level of education were more likely to emigrate than persons with a higher level of education. This is in contradiction with the broad international evidence, which overwhelmingly shows that the tendency to migrate is greater among highly educated people. We argue that the contradictory finding regarding recent trends in emigration from Estonia is due to several reasons.

An important reason why highly educated individuals have been more internationally mobile is that they face lower entry barriers: in the majority of countries there are legal restrictions on immigration that explicitly favour the inflow of more educated people. In addition, there has been a world-wide trend in increasing relative demand for highly-skilled labour during recent decades. This trend has also favoured the international movement of highly educated people, since it means that they have better employment opportunities in high-income countries than do workers with a lower level of education. Moreover, this has been the main reason why countries created higher entry barriers against low-skilled labour rather than against high-skilled labour.

The emigration of low-skilled people from Estonia (as well as from other new EU member states) is made easier by the fact that within the EU there are currently no significant differences in the entry barriers against lowly and highly educated people. The opening of the labour markets to employees from the EU-8 countries also meant that the bureaucratic procedures related to acquiring work permits were considerably eased. Finding legal employment in the EU-15 member states was made easier by the establishment of work intermediation firms, which intensified considerably after the accession of the EU-8 member states. Additionally, the real costs of travelling have decreased over recent years, reducing the significance of emigration-related costs as an entry barrier, which is more important for lesser educated persons.

The greater tendency for lowly educated people to emigrate from Estonia in 2007 was related to the structure of labour demand for immigrant workers in Western Europe. Evidence based on earlier studies on immigration to the EU-15 countries since 2004 implies that the jobs which were available for Eastern European immigrants mostly required low-skilled labour. Even though most of the previous evidence shows that highly educated workers were more likely to emigrate, the majority of highly educated emigrants ended up trading down; i.e., they accepted jobs that were below their level of qualification.

In addition, it is possible that lowly educated people were more likely to emigrate because they experienced a larger relative growth in earnings after moving abroad. The difference in relative income gains in favour of lowly educated workers was caused by the tendency of highly-skilled immigrants to accept lower-skilled jobs. When highly and lowly educated workers from the EU-8 countries competed for similar low-skilled jobs and the highly educated ones had higher earnings potentials back home, then moving abroad offered them lower relative gains. Some recent studies have compared the wages of native workers and immigrants across all skill levels. It has been found that the difference in earnings is substantial between highly educated natives and migrants, whereas it is practically non-existent for people with low-skill levels.

Contents

1. Introduction

The gradual opening of the EU-15 labour markets to migrants from other EU member states from 2004 onwards has significantly increased the influx of EU-8 workers to Western European countries.[1] This recent increase in East-West mobility has intensified research on European migration patterns. The aim of the current paper is to contribute to this rapidly increasing stream of literature. We analyze the structure of emigration from Estonia on the basis of a survey that was designed by the authors of this article and carried out by the Bank of Estonia in January 2008.

The survey targeted company managers and its aim was to collect information on cross-border migration to and from employment in 2007. The main focus of the survey was on emigration patterns: Which types of workers emigrate from Estonia? Are they predominantly young people? What is their average level of education? Are they mostly men or women, native Estonians or people of other nationalities? The survey covered a significant part of the Estonian labour force. The companies that participated in the survey employed 54.5 thousand people, which corresponded to approximately 9% of Estonian wage earners.

The common problem associated with the analysis of recent migration trends is the lack of reliable data. Although information on cross-country migration volumes exists (it is available from Eurostat), these data are often inaccurate. The aim of the survey which is analyzed in the current article is to fill in this gap at least partially. We used a new approach to collect migration data: this information was obtained via questioning enterprise managers. The limitation of this approach is that the sample is not representative of the population as a whole, since it covers only employed persons. However, it allows for the assessing of the gross flow of workers into and out of employment, which is relevant for the macro-economic modelling of changes in the supply of labour.

The most widely used data that provide information on cross-border migration in the EU and cover the socio-demographic characteristics of migrants are the Labour Force Surveys (LFS) of EU member states. In comparison to the LFS, the main advantage of the survey data analyzed in the current article is that it is especially targeted at gathering information on migration

[1] The EU-8 denotes the group of post-socialist countries that joined the EU in 2004 (the Czech Republic, Hungary, Latvia, Lithuania, Estonia, Slovenia, Slovakia and Poland). The EU-15 denotes the group of states that joined the EU before 2004 (France, Belgium, the Netherlands, Germany, Luxembourg, Austria, Italy, Greece, Portugal, Spain, Denmark and Sweden).

and is therefore less subject to selection bias than the LFS.[2] For smaller EU member states, the LFS samples are often not large enough to assess migration flows with sufficient preciseness. Obtaining accurate migration statistics is difficult since cross-border changes of location are relatively rare. The migration survey analyzed in the current article targeted enterprises rather than individual workers as the LFSs do. This made it possible to cover a substantial share of the Estonian labour force with fewer resources than would be needed to collect a sample of the same size via questioning individuals.

The current migration survey enables us to assess the educational profile of an average emigrant. Differently from the findings of several previous studies covering a wide range of countries, the Estonian survey's results imply that highly educated employees were less likely to emigrate in 2007 than workers with a lower level of education. This is in contradiction with the broad international evidence, which overwhelmingly shows that the tendency to migrate is greater among highly educated people.[3] An important reason why highly educated individuals are more internationally mobile is that they face lower entry barriers: in the majority of countries there are legal restrictions on immigration that explicitly favour the inflow of more educated people (Carrington and Detragiache, 1999). In addition, understanding the bureaucratic procedures related to acquiring work permits in potential receiving countries is often complicated, which can discourage people with a lower level of education. Yet another reason favouring the international movement of more educated people is that they usually have more financial resources available. The costs of migration are not negligible, which means that the poorest individuals might not have the ability to cover them.

Besides the abovementioned factors, the structure of educational attainment among emigrants depends on the supply and demand of labour across skill groups in the country of origin and in potential recipient countries. During recent decades, there has been a world-wide trend of increasing relative demand for highly-skilled labour. This trend was apparent among the OECD countries, most of which were net recipients of migrants. Since the 1980s, almost all OECD countries have experienced either an increase in the wage gap between education levels or a decrease in the employment of low-skilled workers (Katz and Autor, 1999; Bach et al., 2007). The increase in the relative demand for highly-skilled labour has also favoured the international movement of highly educated people from developing countries, since this means that they have better employment opportunities in high-income countries than do workers with a lower level of education. Moreover, this has

[2] The LFS tends to underestimate the stock of recent immigrants in a given country (Bonin et al., 2008).

[3] Carrington and Detragiache (1999); Docquier and Marfouk (2004), etc.

been the main reason why countries created higher entry barriers for low-skilled labour than for high-skilled labour.

All the abovementioned reasons that hinder the international movement of lowly educated people have gradually lost their relevance in Estonia during recent years and especially so after 2004 when Estonia joined the EU. Eight out of fifteen old EU member states had lifted all restrictions on the free movement of labour from the EU-8 by the beginning of 2007.[4] Consequently, with respect to most EU-15 countries, the formal differences in the entry barriers for lowly and highly educated people no longer existed by the time the current migration survey was conducted. The opening of the labour markets for employees from the EU-8 countries also meant that the bureaucratic procedures related to acquiring work permits were considerably eased. Finding legal employment in the EU-15 member states was made easier by the establishment of work intermediation firms, which intensified considerably after the accession of the EU-8 member states. Finally, the real cost of travelling has decreased over recent years, reducing the relevance of emigration-related costs as an entry barrier. This trend has been hastened due to the entry of low-cost carriers, such as EasyJet, to the international flight market.

Besides the abovementioned reasons, the greater tendency for lowly educated people to emigrate from Estonia in 2007 was related to the structure of labour demand for immigrant workers in Western Europe. Evidence on the basis of the earlier studies on immigration to the EU-15 countries since 2004 implies that the jobs which are available for Eastern European immigrants mostly required low-skilled labour.[5] Even though most of the previous evidence shows that highly educated workers were more likely to emigrate, the majority of the highly educated emigrants traded down; i.e. they accepted jobs that were below their level of qualification (Dustmann et al., 2007).

In addition, it is possible that lowly educated people were more likely to emigrate because they experienced a larger relative growth in earnings after moving abroad. The difference in relative income gains in favour of lowly educated workers was caused by the tendency of highly-skilled immigrants to accept lower-skilled jobs. When highly and lowly educated workers from the EU-8 countries competed for similar low-skilled jobs and the highly educated ones had higher earnings at home, then moving abroad offered them lower relative gains. Several recent studies have compared the wages of native

[4] Ireland, the UK and Sweden lifted all restrictions on the free movement of labour simultaneously with the enlargement of the EU on 1 May 2004. Finland, Greece, Italy, Portugal and Spain lifted all restrictions on 1 May 2006 and the Netherlands on 1 May 2007.

[5] See Bonin et al. (2008) for migration from the EU-8 to the EU15; Barrett, McGuiness and O'Brien (2008) and Riley and Weale (2006) for Ireland; and Blanchflower and Shadforth (2007), Dustmann, Frattini and Preston (2007) and Drinkwater, Eade and Garapich (2006) for the United Kingdom.

workers and immigrants across skill levels, coming to the conclusion that a wage gap in favour of natives exists.[6] One recent study by Barrett, McGuinness and O'Brien (2008) on Ireland found that the earnings difference was substantial between highly educated natives and migrants, whereas it was practically non-existent for people with low skill levels.

The reduction in the real value of international travelling costs has changed the nature of migration. In earlier decades, migration usually referred to long-term or permanent changes of location. On the other hand, recent international labour movement within the EU has to a large extent been caused by short-term changes of employment location. A substantial share of recent emigrants from EU-8 countries went abroad with the intention of working in a foreign country temporarily.[7] The tendency to accept mainly low-skilled jobs was related to the temporary nature of migration. Evidence from the current survey for Estonia supports the finding that a large share of recent cross-border movement was caused by short-term changes in employment. Approximately one-third of immigrants to Estonia in 2007 were returning emigrants.

Other findings on the basis of the current migration survey were more in line with the previous literature. We found that approximately three-fourths of migrants were young (15–34 year-old people). The greater propensity among young people to emigrate is a universal finding that is common to all migration studies that we are aware of. Similarly to most other recent papers on East-West migration in Europe, we found that males were more likely to emigrate than females. The survey's statistics implied that although non-native Estonians were somewhat more likely to leave than natives, this difference was not significant.

The current Estonian migration survey collected information on the individual characteristics of the average emigrant that were covered by previous emigration studies analyzing the structure of emigration: education, nationality, age and sex. In addition to that, since the survey targeted enterprises, it enabled us to analyze the occupational and firm-related characteristics of migration. The sample statistics implied that blue-collar workers (and especially highly-skilled blue-collar workers) were more likely to leave the country than people from other occupational groups. We used probit and Tobit regressions to analyze the characteristics of enterprises that were exposed to the international movement of labour. The regression analysis covered both emigration and immigration. The implications of the regression analysis are described in more detail in the sixth section of this article.

[6] Wadensjö (2007); Barrett, McGuinness and O'Brien (2008); Dustmann, Frattini and Preston (2007).

[7] Fihel et al. (2005); Pollard et al. (2008); Blanchflower et al. (2007).

The current article is structured as follows: The second section describes recent findings from the previous literature that are related to our study. The third section presents an analysis of recent migration trends from the EU-8 to the old EU member countries, where the volume of migration is assessed on the basis of the statistics from the recipient countries. The following sections give an overview of the main findings on the basis of the migration survey that we have conducted. The fourth section analyses a sample design and presents an assessment of the volume of migration in 2007. The fifth section focuses on the evaluation of the individual profile of an average emigrant from Estonia. The sixth section describes the results of the regression analysis on firm characteristics related to immigration and emigration. Finally, the seventh section presents the conclusions.

2. Overview of the literature

2.1. The determinants of migration

In general, the decision to migrate depends on the expected benefits and costs of the move. The higher the expected benefits and/or lower the costs are, the more likely people are to migrate. There are both economic and non-economic benefits and costs. The economic benefits depend on the expected income difference between the source and destination countries, which is influenced by the general wage level and possibilities for employment in these countries.

According to the 2007 Eurobarometer survey, the main motives for past geographic moves (local, in-country and international) among respondents from the EU-8 member states were overwhelmingly economic. By far the most important mobility drivers were higher income and better working conditions. Similar results are also evident on the basis of the 2006 Estonian survey on the intentions to work abroad (Järv, 2007). The most important reason for working abroad was the possibility of earning higher wages. 95% of respondents who planned to emigrate considered this important.

As regards macroeconomic variables, Gilpin et al. (2006) show that while immigration from the EU-8 to the UK is strongly correlated with the GDP-per-capita level of these countries, the correlation is slightly weaker with the unemployment rate and low regarding the employment rate. The survey's evidence on moving intentions supports these results. According to the 2007 Eurobarometer survey on the moving intentions of EU citizens, the plans to migrate declined in most new member countries during 2005–2007, especially in the Baltic countries, where the increases in wage levels have been the highest in the EU. These countries have also witnessed a significant de-

crease in unemployment rates. A decline in the willingness to migrate is also evident from the 2000, 2003 and 2006 Estonian surveys on the intentions to work abroad (Järv, 2007).

2.2. The structure of migration

The empirical literature shows that individual and household characteristics have a strong effect on migration decisions. In order to identify the most important factors, we will review the individual characteristics of immigrants from the new member states (NMS)[8] to other EU member states. Specifically, we will look at the age, gender, educational level and labour market status of the immigrants, as these are the main individual characteristics in our survey. The international experience of migration reveals that men, the young and people with a higher education are more likely to emigrate. Supporting evidence is provided by, among others, Carrington and Detragiache (1999); and Docquier and Marfouk (2004). The empirical results concerning labour market status are not so clear.

As expected, studies analysing immigration from the NMS to the EU-15 show that younger people are more likely to move than older people. The main reason why young people are more likely to emigrate is that they can reap the economic benefits of moving for a longer time and the various costs related to emigration are smaller for them. However, a study by the World Bank (2007) argues that if there are restrictions on immigration that favour people with higher qualifications, the share of young people is smaller among immigrants. This could influence the recent migration patterns within the EU as well. Prior to EU membership, citizens from the Central and Eastern European (CEE) countries faced strong barriers of entry regarding the international movement of labour. After the NMS joined the EU, the entry restrictions for labour have been considerably lowered. As a result, it can be expected that the share of young people will increase among immigrants from the NMS to the EU-15. In addition, it is likely that the share of people with a low level of education has increased among immigrants after the EU enlargement of 2004, since prior to this, the restrictions on immigration were more pronounced for lowly educated than for highly educated people.

Bonin et al. (2008) report that nearly four-fifths of the working age citizens (15–64) who moved from the NMS to the EU-15 countries during 2001–2006 were less than 35 years old. This is more than twice their respective share (37%) among working-age citizens. The prevalence of young people among migrants is also evident in the surveys about moving intentions. Bonin

[8] NMS (also referred to as the EU-12) includes Bulgaria, Romania, Cyprus and Malta in addition to the EU-8 countries.

et al. (2008) estimate the individual and household characteristics of moving intentions within the EU using Eurobarometer data from 2007. They find that expected mobility (local, in-country and international) declines with age and the negative marginal impact of age is statistically significant.

The United Kingdom opened its labour market to immigrants from the EU-10[9] member countries right after their accession to the EU in May 2004 and has since then been one of the main recipients of immigrants from these countries. Since it lowered its barriers of entry, the share of young people among immigrants has been even larger than the EU-15 average. According to Blanchflower and Shadforth (2007), the share of immigrants aged 18–34 from the NMS who registered with the Worker Registration Scheme between May 2004 and March 2007, was 83%, of which 44% of them were aged 18–24.

The importance of younger people among emigrants is also evident in Estonia. According to a survey of emigration intentions, 70% of respondents who had plans to leave Estonia were aged 15–34 in 2006; whereas, their respective share of the total population amounted to 43% (Järv, 2007).

Men are more likely to move from the NMS to the EU-15 countries than women. Pollard, Latorre and Sriskandarajah (2008) report that 57% of migrant workers from EU-8 member countries to the United Kingdom who registered with the Worker Registration Scheme between May 2004 and December 2007 were men. Barret et al. (2008) report that based on the 2006 National Employment Survey of Ireland, the share of men among immigrants from the EU-10 was even higher (66%). Data on the emigration intentions from Estonia shows that although the share of women and men who express the desire to emigrate within the next five years is equal, men are more certain in their emigration intentions (Järv, 2007). A similar result was obtained by Bonin et al. (2008), who estimate the individual and household characteristics of moving intentions within the EU-27 and find that men have a higher propensity to emigrate than women.

The recent estimates of the structure of migration by educational level from the NMS to the EU-15 countries mostly support earlier evidence that highly educated people are more likely to emigrate. The only exception is one recent study for Ireland, which shows that the share of highly educated people is lower among immigrants than among native people (Barrett et al., 2008).[10] This is in accordance with broad international evidence, which overwhelmingly shows that the tendency to migrate is higher among highly edu-

[9] The group of EU-10 countries includes Cyprus and Malta in addition to the EU-8 countries.

[10] This finding can be driven by the fact that in Ireland a relatively large share of the population is highly educated.

cated people. Carrington and Detragiache (1999), and Docquier and Marfouk (2004) indicate that there are very few countries in the world where the emigration rates of persons with a tertiary education are lower than the average for the population. There are two main reasons why the migration of highly educated people has been higher. First, in several countries there are legal restrictions on immigration that explicitly favour the immigration of highly-skilled people. Second, the absolute economic benefits for moving are considered to be larger for people with a higher education, though the costs of migration are not dependent on the attainment of education. In addition, the high share of educated people from low-income countries is also explained by the fact that the costs of migration are not negligible, which means that the poorest might not have the resources to cover the costs of migration.

Bonin et al. (2008) use Labour Force Surveys to calculate the structure of active working age immigrants from the NMS to the old EU-15. Specifically, they consider NMS citizens who have resided for less than five years in another country and were aged 15–64 in 2006. The shares of immigrants in that group with a low, medium or higher education were 26%, 58% and 16%, respectively. This is quite similar to the division of working age population in the NMS by educational attainment. According to Eurostat, the shares of the working age population in the NMS in 2006 with a low, medium or higher education were 24%, 62% and 14%, accordingly.

The studies that compare the educational attainment of recent immigrants from the NMS to the UK, Sweden and Ireland with their native populations produce mixed results. Wadensjö (2007) reports that immigrants from the NMS had a higher level of educational attainment than natives in Sweden in 2005. The share of immigrants from the NMS with two or more years of higher education was 33%,[11] whereas the corresponding segment for the natives was 25%. Similar results are obtained for the structure of immigration from the NMS to the UK. Dustmann et al. (2007) show that the share of immigrants with a higher education from the EU-8 to the United Kingdom in 2004–2005 was around 35%. This is twice higher than the corresponding share for natives. However, Barrett et al. (2008) report that in Ireland the immigrants from new member states have a lower level of educational attainment than the natives. In 2006, the shares of immigrants from the EU-10 and natives with a higher education were 37% and 45%, respectively.

The data from the Eurobarometer surveys on moving intentions from the EU-10 to the other EU countries indicate that people with a better education are more likely to move. Based on these data, Zaiceva and Zimmermann (2008) estimate the individual characteristics of potential migrants from the EU-10 to the other EU countries and find that potential migrants are positive-

[11] The share for people born in Estonia was even higher – 41 %.

ly selected with respect to their education. In contrast, the results from the 2006 Estonian survey on moving intentions point to the opposite direction. The intentions to move abroad were highest among those with a primary education and lowest among people with a tertiary level of education. It is noteworthy that compared to previous surveys from 2000 and 2003, moving intentions were lower in general and the decrease in the intentions to move abroad was strongest for respondents with a higher education.

Data on the labour market status of the immigrants from the NMS to the EU-15 is limited. Bonin et al. (2008) estimate that the mobility intentions (both in-country and international) in the EU-27 in 2007 was higher for unemployed than employed people. Similar results can be seen from the survey of the intentions to work abroad in Estonia in 2007 (Järv, 2007). The share of both employed and inactive (excluding students) persons who had plans to leave Estonia to work abroad was 21%. These ratios were higher for the unemployed (33%) and students[12] (53%).

2.3. The duration of migration, return migration

The structure of immigration from the NMS to the old EU member states could also be influenced by the importance of return migration and the duration of migration. For example, Fihel et al. (2005) point out that the tendency for NMS immigrants to take up relatively low-skilled jobs may be the result of the transitory nature of their migration. Pollard et al. (2008) find that those immigrants from the NMS to the UK who plan to stay for a short time tend to be young and with a low level of education.

Indeed, the available evidence shows that immigration from the NMS to the EU-15 is mostly return migration and the duration of an average migration spell is short. Blanchflower et al. (2007) report that according to the Worker Registration Scheme, 55% of the immigrants from the EU-8 registering in the twelve months leading up to March 2007 only intended to stay in the UK for up to three months. Only 9% intended to stay for more than 2 years. The 2006 Estonian survey on the intentions to work abroad reports that 5% of the respondents planned to migrate permanently, 70% planned to work abroad temporarily (of those, slightly more than 60% planned to stay for less than one year), and 25% had not decided. Compared to the previous surveys, the share of those who planned to migrate permanently has decreased; in 2000 and 2003, the respective shares were 15% and 8% (Järv, 2007).

[12] The students interviewed for the survey were aged 15 and above.

2.4. The labour market success of immigrants

A general conclusion from the recent literature on immigration from the NMS to the older EU member countries is that these immigrants are concentrated in low-skill jobs and there is an immigrant-native wage gap that is attributed to the partial non-transferability of human capital.

Bonin et al. (2008) find that immigration from the new EU member countries to the old EU member countries is mainly related to low-skill employment. The same results are also found in studies documenting the structure of immigration from the NMS to the UK and Ireland.[13] Somewhat different results are obtained for Sweden, where immigrants from the new member states are overrepresented in the healthcare sector (Wadensjö, 2007).

A more uniform result is obtained about the immigrant-native wage gap. In all of these three countries, the recent immigrants from the NMS are receiving lower wages than the natives. Barrett et al. (2008) estimate Mincer-type wage models for immigrants and natives in Ireland and conclude that the average-earnings difference between migrants from the NMS and natives is between 10% and 18%, depending on the control variables used. An interesting result emerges concerning the size of the wage gap for immigrants with different skill levels. The earnings difference is found to be non-existent for people with a low-skill level and for people at the lower end of the earnings distribution; however, it is higher for those at the upper ends of the skills and earnings distributions. Barrett et al. (2008) argue that the immigrant-native wage gap is due to differences in the transferability of human capital. Wadensjö (2007) uses the same methodology to quantify the immigrant-native wage difference and concludes that the relative wages of immigrants compared to natives are the lowest for recent immigrants. The Baltic countries and Poland, which have the highest share of recent immigrants to Sweden, also have the highest negative country-specific effects. Dustmann et al. (2007) find that recent immigrants to the UK in all educational groups have to trade down regarding employment; i.e., are in occupations that are lower in terms of wages than native born workers with the same level of education.

Similar results are also evident from the 2006 Estonian survey on intentions to work abroad. Almost one-fifth of the respondents who planned to leave the country said that they were willing to take positions that require lower qualifications than they themselves had. In addition, one-sixth answered that they were ready to accept any position abroad. Based on these results,

[13] See Barrett et al. (2008) and Riley and Weale (2006) for Ireland; Blanchflower and Shadforth (2007), Dustmann et al. (2007) and Drinkwater et al. (2006) for the United Kingdom.

Järv (2007) concludes that the possibilities of working abroad are more attractive for persons with lower qualifications.

3. Volume of recent emigration from the EU-8 to the EU-15: assessment on the basis of statistics from receiving countries

3.1. Description of cross-country migration statistics within the EU

In this section, we provide an overview of migration from the EU-8 to the EU-15 countries on the basis of the available international statistics (other than the Estonian migration survey that is analysed in this article). The data on migration and migrants were compiled from the databases of Eurostat and the national statistical offices of the relevant EU member states. Not all countries covered in this section provide data on migration. The completeness of the data differs widely between different countries and data for some counties (e.g., Estonia, Hungary and France) are insufficient. However, data on migration for these countries can be gathered from the statistical databases of the EU member states receiving/sending migrants to/from these countries. In the cases of Germany, Spain, Italy and France, the data is provided only in their national languages, which limited our access.

The data on migration that we use for the following overview of East-West migration within the EU most likely underestimates the actual volume of cross-border movement of people as many migrants do not register their arrival/departure and the data on the actual movement of people is not easily accessible. In addition, the definitions of migration, data collecting and processing methodologies of different statistical offices vary quite substantially, which makes cross-country comparisons difficult.[14]

Although Eurostat provides data on migration for most of the EU countries, it does not provide consistent data and no metadata is available for statistics on international migration flows. Data mismatches can be seen when looking at the figures for emigrants from the EU-8 countries to the EU-15 countries declared by the EU-8 countries and comparing it to the figures of immigrants from the EU-8 to the EU-15 as declared by the EU-15 countries. The migration figures for the same country and time period obtained from alternative data sources (statistics declared by receiving country vs. sending country) differ quite substantially, sometimes more than tenfold. As a general

[14] Appendix 1 gives an overview of the definitions and data sources related to migration statistics for the countries covered in this section.

rule, the estimated volumes of immigration from the EU-8 to the EU-15 tend to be much larger when declared by the receiving country than the corresponding volumes declared by the sending country's statistical authorities.

The likely reason for the above-described discrepancy in statistics is related to the source of migration estimates. Most of the countries under examination use the data on registration/deregistration of residence (employment) as a basis for estimating migration volumes.[15] Although emigrants from the EU-8 may not give notice of their departure from their homelands, they have to give notice of their arrival in the destination country (EU-15) to be eligible for work and social security programmes (The World Bank, 2006). Thus, the estimated emigration volumes tend to be smaller when declared by the EU-8 countries.

Another important reason for the data mismatch is that different definitions and methodologies are used by countries when collecting data on migration. According to a study by the World Bank (2006), the EU-8 had a uniform and specific migration registration system during the pre-transition times that linked migration to permanent residency in a given country. Although most national statistical offices of the EU-8 have started to include the duration of stay criteria in the concept of emigration/immigration, the reported migration statistics still underestimate the actual flow of people since the international movement of labour has become much more short-term than it was in earlier times. This is especially relevant for the recent changes in employment location, which to a large extent are of a temporary nature.

As mentioned above, the statistical offices of different countries derive their data on migration from various sources. In addition, the definitions of migration, as well as the data collecting and processing methodologies of national statistical offices vary quite substantially, which makes cross-country comparisons difficult. Based on our judgement, we used the most reliable and least diverging data sources to estimate the cumulative migration volumes between the EU-8 and selected EU-15 countries. Still, it is likely that the migration flows within the EU we present in the following subsections underestimate the actual volume of migration. As we have described above, most of the countries under examination estimate the migration volumes on the basis of the data on registration/deregistration of residence (employment), which in most cases leads to an underestimation of the actual level of migration.

[15] Notable exceptions are the UK and Ireland. These countries provide estimations of migration on the basis of international passenger surveys (UK) and labour force surveys (Ireland).

3.2. Migration from the EU-8 to the EU-15 countries in 2002–2007

Table 1 presents an overview of the gross emigration from the EU-8 countries to the 12 old EU member states. Due to problems with data availability, we did not compose measures of outflow from the EU-8 to all of the EU-15 countries. Emigration from the EU-8 to the countries that were left out (France, Belgium and Greece) was relatively modest during 2004–2007. Thus, leaving out these countries should not have a substantial effect on the emigration statistics presented in Table 1. The statistics presented in the table imply that emigration from most EU-8 countries accelerated after these Central and Eastern European countries joined the EU in 2004. The only exception in this respect is Slovenia, from where the average share of emigrants in the total population to the given 12 Western European countries shrank after 2003. During 2004–2007, the share of population who emigrated was the largest in Lithuania, from where the average outflow was 1.26% of the population per year. The second largest share of emigrants was in Poland (1%), which was followed by Latvia (0.87%). This share was the smallest in Slovenia (0.14%) and the Czech Republic (0.25%).

In the three Baltic countries, the largest outflow of emigrants occurred in 2005. The share of emigrants increased substantially during 2004 and 2005, but diminished in 2006 and 2007. This shrinkage was most likely the consequence of domestic labour market tightening in the Baltics in 2005–2007. During this time Latvia, Lithuania and Estonia experienced the largest increases in the level of wages among all EU member states.

The trends in migration presented in Table 1 are in accordance with the 2007 Eurobarometer survey on the moving intentions of EU citizens. According to this survey, plans to migrate declined in most new EU member states during 2005–2007, and this decline was the strongest in the Baltic countries.

Table 1: Gross emigration from the EU-8 to 12 of the EU-15 countries[16] (measured in % of origin country's inhabitants)

	2002	2003	2004	2005	2006	2007	Average 2004–2007
Czech Republic	1.43	1.33	2.40	2.70	2.44	2.30	2.46
Estonia	2.64	2.51	5.39	6.16	5.31	4.66	5.38
Latvia	2.05	1.94	8.02	11.34	9.13	6.31	8.70
Lithuania	2.98	2.78	12.20	15.32	12.67	10.29	12.62
Hungary	2.09	2.14	2.81	3.41	3.71	4.03	3.49
Poland	3.00	3.53	6.81	9.91	12.03	11.31	10.02
Slovenia	1.48	1.49	1.77	1.34	1.26	1.16	1.38
Slovakia	2.78	2.77	6.48	8.99	9.24	8.96	8.42

Sources: Eurostat, Accession Monitoring Report May 2004- June 2008 (the UK), the Department of Social and Family Affairs (Ireland); authors' calculations.

Notes: Emigration to Germany in 2003 is missing and substituted with the arithmetic mean for 2002 and 2004. Emigration to Germany, Spain, Austria, Luxembourg, the Netherlands and Portugal in 2007 are estimates, assuming that emigration was the same as in 2006.

The outflow of people in the aftermath of the EU enlargement was higher in these EU-8 countries where the average per capita income level was lower. Figure 1 illustrates the relationship for the EU-8 countries between the share of emigrants and the relative per capita GDP level, measured as a share of the EU average. The sample presented on the graph covers the years 2004–2007. As can be expected, this relationship is significant and negative. We plotted a simple OLS regression line on the graph where the LHS variable is the relative per capita GDP level, measured in PPP terms as a percentage of the EU average. The RHS variable is the share of emigrants, measured in % of the sending country's population. The estimated slope coefficient is –2.39 and its standard error is 0.35. The correlation coefficient between the gross emigration rate and per capita income level is –0.78.

[16] Germany, Ireland, Spain, Italy, Austria, Finland, Sweden, the UK, Denmark, the Netherlands, Luxembourg and Portugal.

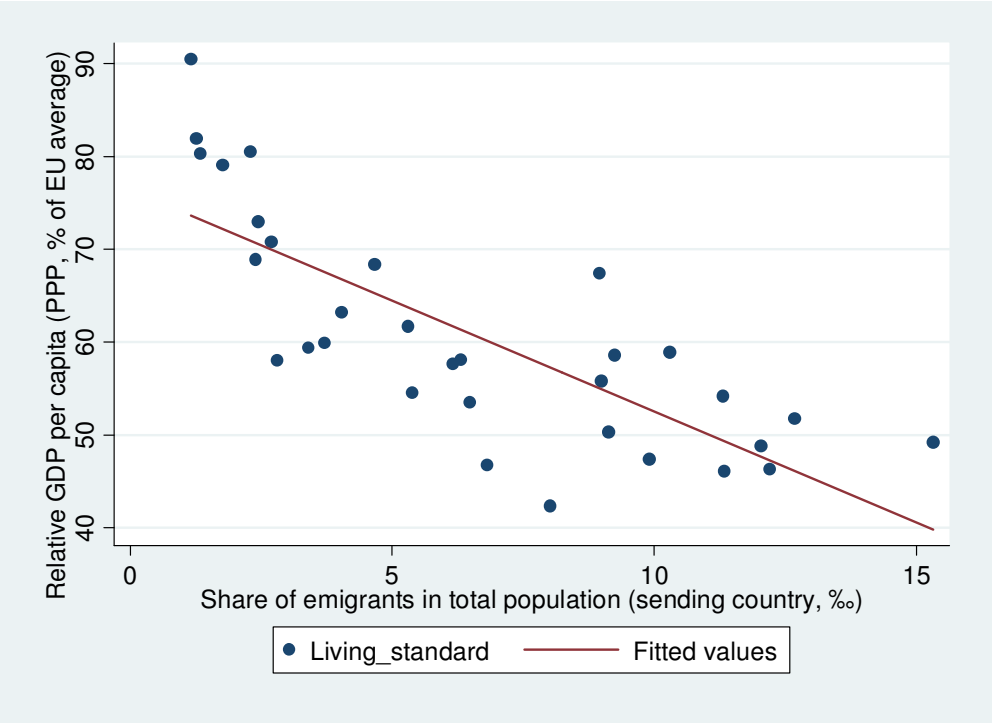

Figure 1: Relative income level and emigration in the EU-8 countries (2004–2007)

Table 2 gives an overview of the gross immigration rates from the EU-8 to eight of the EU-15 countries. The selection of countries included in the table was based on data availability. The figures presented show the share of immigrants in the receiving country's population. In the aftermath of the EU enlargement in 2004, the inflow was by far the largest in Ireland. The share of immigrants moving to Ireland was on average 2.5% per year during 2004–2007. The inflow of immigrants from the EU-8 was also quite substantial in the UK (0.31% of the population on average) and in Germany (0.25%).

Three EU-15 countries — the UK, Ireland and Sweden — opened their labour markets without restrictions to EU-8 workers right after the EU enlargement in 2004. Whereas the UK and especially Ireland experienced a substantial acceleration in the inflow of immigrants from the EU-8 after opening their borders, the inflow to Sweden was quite modest. The average share of gross immigration was only 0.08% of Sweden's population per annum during 2004–2007. Why was the East-West migration directed mostly at the UK and Ireland, and much less so at Sweden? The most likely reason is related to the command of languages. Movement to Ireland and the UK requires a knowledge of English, which is the lingua franca of Europe, whereas it is necessary to learn Swedish in order to work in Sweden. Secondly, there was a ro-

bust demand for (mainly low-skilled) labour in the UK and Ireland that outmatched the domestic supply during the years following the EU enlargement in 2004. Immigrants had easy access to jobs (mostly in the manufacturing and agricultural sectors), which encouraged the inflow. During the same time period, there were only a few unfilled vacancies in Sweden which could not be matched by the domestic labour supply (they mostly existed in the medical sector). A third likely reason was the protectionist behaviour of Swedish labour unions, which objected to the employment of immigrant workers.

Table 2: Gross immigration from the EU-8 to selected EU-15 countries (measured in % of origin country's inhabitants)

	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**Average 2004–2007**
Germany	1.83	2.06	2.29	2.54	2.57	2.57	2.49
Ireland	2.33	2.33	14.54	27.19	32.97	26.23	25.23
Spain	0.18	0.15	0.27	0.29	0.47	0.47	0.38
Italy	0.10	0.25					
Austria	1.08	1.20	1.99	2.08	1.95	1.94	1.99
Finland	0.34	0.31	0.45	0.49	0.63	0.79	0.59
Sweden	0.28	0.26	0.46	0.61	1.00	1.17	0.81
United Kingdom			2.11	3.41	3.77	3.46	3.19

Sources: Eurostat, Accession Monitoring Report May 2004-June 2008 (the UK), the Department of Social and Family Affairs (Ireland); authors' calculations.

Table 3 gives an overview of gross immigration from the EU-8 to selected EU-15 countries in absolute numbers of immigrants. This table is added here in addition to the previous table to illustrate that although Ireland has witnessed the largest inflow as a share of population, in absolute numbers the inflow was the largest in Germany and the UK. Both of these countries took in more than 200,000 immigrants per year in 2005–2007. In Germany, the inflow of immigrants from the EU-8 was already substantial before the EU enlargement in 2004, exceeding 150,000 people per year. Unfortunately, the same figures for the UK are not available prior to 2004, but it can be expected that the inflow was smaller than after the enlargement.

Table 3: Gross emigration from the EU-8 to selected EU-15 countries (number of emigrants)

	2002	2003	2004	2005	2006	2007	Average 2004 - 2007
Germany	150,629	169,993	189,357	209,712	211,629	211,629	205,582
Ireland	9,089	9,254	58,554	111,712	138,763	113,188	105,554
Spain	7,435	6,220	11,416	12,482	20,686	20,686	16,318
Italy	5,687	14,511					
Austria	8,745	9,697	16,214	17,107	16,094	16,094	16,377
Finland	1,754	1,629	2,330	2,588	3,318	4,163	3,100
Sweden	2,496	2,304	4,151	5,493	9,075	10,628	7,337
United Kingdom			125,880	204,975	227,870	210,775	192,375

Sources: Eurostat, Accession Monitoring Report May 2004-June 2008 (the UK), the Department of Social and Family Affairs (Ireland), Statistics Finland, Statistics Sweden, authors' calculations.

3.3. Emigration from the three Baltic countries in 2002–2007

Table 4 presents a more detailed overview of emigration from Estonia, Latvia and Lithuania in 2002–2007. In addition to the total volume of gross emigration, this table shows the emigration trends separately for the seven main Western European recipient countries. The volume of emigration is the largest from Lithuania, followed by Latvia and Estonia. The average yearly volume of gross emigration after the three Baltic states joined the EU in 2004 was approximately 42,300 people from Lithuania, 19,800 from Latvia and 7,100 from Estonia.

The structure of emigration from Estonia differs from the two other Baltic countries. During 2004–2007, the largest number of emigrants from Estonia moved to Finland, which was followed by the UK and Ireland. The main destination country for emigrants from Latvia and Lithuania was the UK, followed by Ireland and Germany. The emigration volume to the UK and Ireland varied quite a lot during 2002–2007, whereas it was more stable to other countries. Notably, emigration to Germany did not vary much during these years.

Table 4: Emigration from Estonia, Latvia and Lithuania to selected destination countries (number of emigrants)

	2002	2003	2004	2005	2006	2007	Average 2004–2007
Estonia							
Denmark	234	169	161	191	114	85	138
Germany	991	925	859	773	621	621	719
Ireland	463	546	1,788	2,011	1,407	648	1,464
Spain	98	60	114	123	184	184	151
Finland	1,378	1,292	1,854	2,063	2,734	3,145	2,449
Sweden	345	311	421	424	466	471	446
United Kingdom	-	-	1,860	2,560	1,475	965	1,715
Total	3,509	3,303	7,057	8,145	7,001	6,119	7,081
Latvia							
Denmark	455	381	394	439	323	216	343
Germany	2,195	2,307	2,419	2,502	2,092	2,092	2,276
Ireland	1,538	1,230	6,266	9,328	7,954	4,674	7,056
Spain	218	207	263	288	380	380	328
Finland	53	63	80	113	93	120	102
Sweden	189	182	218	249	370	377	304
United Kingdom	-	-	8,670	12,960	9,490	6,285	9,351
Total	4,648	4,370	18,310	25,879	20,702	14,144	19,759
Lithuania							
Denmark	835	701	941	1,117	783	615	864
Germany	4,135	4,550	4,964	5,468	4,927	4,927	5,072
Ireland	2,782	2,379	12,817	18,717	16,039	10,728	14,575
Spain	2,003	1,401	2,736	2,514	2,562	2,562	2,594
Finland	66	44	89	73	90	73	81
Sweden	261	232	444	709	889	906	737
United Kingdom	-	-	19,270	22,990	17,065	14,260	18,396
Total	10,082	9,307	41,261	51,588	42,355	34,071	42,319

Sources: Statistics Finland, Statistics Sweden, Accession Monitoring Report May 2004-June 2008 (the UK), the Department of Social and Family Affairs (Ireland), Eurostat, Statistics Denmark.

Note: Gross emigration to Germany and Spain in 2007 is estimated to be the same as in 2006.

4. Sample design and assessment of the volume of migration in Estonia in 2007

4.1. Sample design and main characteristics of the current migration survey

The sample that forms the basis of the following analysis of migration patterns from Estonia was collected via internet-based questionnaires that were filled out by company managers (CEOs or managers of human resources). The data were collected in January 2008, with the questions referring to 2007. The survey covered 592 enterprises, which employed 54,471 workers. This represented 9.13% of the total number of wage and salary earners in Estonia in 2007.

The questionnaire was designed by the authors of the current article and the implementation of the survey was outsourced to TNS Emor. The selection of the companies who participated in the survey was based on a stratified random sampling. The response rate was 35.4%. Stratification was based on enterprise size (measured on the basis of employment), sector and region. The sample covered all sectors and regions. Enterprises with less than five employees were not included in the sample. Appendix 2 presents the breakdown of the data by sectors, size groups and regions.

The most widely used other data source that provides information on cross-border migration in the EU and covers the socio-demographic characteristics of migrants are the Labor Force Surveys (LFS). Currently, standardized LFSs are carried out in all EU member states. Their main advantage is their large and extensive coverage. However, the LFS datasets have several shortcomings for the assessment of migration flows. First, measuring migration is difficult since cross-border changes of location are relatively rare. The LFS samples are often not large enough to assess migration flows with sufficient preciseness. This problem is especially relevant for smaller countries since their LFS samples cover less people. Second, LFS data enable one to assess the stocks of immigrants and nationals and the associated net migration flows. However, it is not possible to get an overview of gross migration flows. The third shortcoming is the selection bias. LFSs tend to under-report recent immigrants, since it is difficult to include newly arrived people within the sampling frame. In addition, there is a high non-response rate among people who have just arrived in the country (Bonin et al., 2008).

In comparison to the LFS, the main advantage of the survey data analyzed in the current article is that it is especially targeted at gathering information on migration and is therefore less subject to a selection bias than the LFS sur-

veys. For smaller EU member states, the LFS samples are often not large enough to assess migration flows with sufficient preciseness. The migration survey analyzed in the current article targeted enterprises rather than individual workers as the LFSs do. This made it possible to cover a large number of workers with fewer resources than would be needed to collect a sample of the same size via questioning individuals.

However, the limitation of targeting enterprises is that the sample is not representative of the population as a whole since it covers only employed persons. Thus, the assessment of the profile of an average emigrant cannot be generalized to the entire population. The current sample only makes it possible to analyse the characteristics of emigrants who are employed. (This analysis is presented in the next section of this article.) One of the implications of the current survey is that lowly educated workers are more likely to emigrate than highly educated employees. If the sample covered the entire population rather than employees only, then this finding would probably be even stronger since the lowly educated are overrepresented among unemployed and inactive people. Another finding on the basis of the current survey is that young people are more likely to emigrate. In this case, it is also possible that the share of young emigrants among the entire population is even larger than this share is in the sample of employees, since the young are also overrepresented among unemployed and inactive people.

In the case of the current survey, the assessment of the migration volumes into and out of employment can be biased if the share of respondents who do not know the number of emigrants or immigrants in the given company differs systematically within the sample. To analyse the likelihood that the evaluation of migration volume is biased, we computed the percentages of "do not know" answers across different sample characteristics (enterprise size groups, sectors, regions, etc.). The total share of "do not know" answers was 6.6% in the case of emigration and 12.3% in the case of immigration.

Table 5 gives an overview of the share of companies for which the amount of emigrants or immigrants is not known across the size groups. The shares of "do not know" answers presented in the table imply that there is no systematic pattern in the case of emigration, whereas smaller enterprises are more likely to answer "do not know" in the case of immigration. Consequently, it is likely that the estimated volume of immigration (which is presented in the following subsection) is overvalued, since the number of employees hired is positively related to the size of the enterprise (the correlation coefficient between these two variables is 0.65). In addition to the size groups, we also computed the shares of "do not know" answers across sectors and regions. Since no systematic biases could be detected, these results are not reported here.

Table 5: Share of “do not know” answers across size groups

Enterprise size group	% of "Do not know" Emigration	% of "Do not know" Immigration
5–9 employees	0.0%	30.4%
10–19 employees	7.3%	20.2%
20–49 employees	6.7%	7.7%
50–99 employees	6.4%	6.4%
100 or more employees	11.0%	5.0%

4.2. Volume of emigration from employment and immigration to employment in Estonia in 2007

The current migration survey enabled us to evaluate the volume of both gross emigration from employment and gross immigration to employment in 2007. We estimated the weighted average shares of emigrants and immigrants, using in-sample employment weights. Somewhat unexpectedly, we found that the point estimate for the share of employees who immigrated to Estonia exceeded the point estimate for the share of emigrants.

The estimated share of employees who emigrated in 2007 was 0.0076, with a standard error of 0.0007987. Consequently, the share of emigrants in employment remained between 0.60% and 0.92%, with a 95% probability. This corresponds to the estimated range of approximately 3800 to 5800 emigrants. The estimated share of workers who immigrated to Estonia in 2007 was 0.0098, with a standard error of 0.0010755. This implies that the estimated share of immigrants in employment remained between 0.78% and 1.19%, with a 95% probability. The corresponding number of immigrants was within the range of 4900 to 7500 people.

We performed the t-test to assess whether the estimated share of immigrants was significantly different from emigrants. The value of the t-statistic was 1.65 and the corresponding probability value was 0.099. Consequently, our survey estimates imply that with a 90% probability, immigration to employment was larger than emigration from employment.[17] However, it is important to note that this result cannot be generalized to the population as a whole. Due to the nature of our survey, we were only able to assess the magnitude of immigration and emigration to and from employment. We do not have an overview of the emigration and immigration rates of unemployed and inactive people.

[17] We were able to reject the null hypothesis that the two means are equal at the 90% probability level, but not able to reject this hypothesis at a higher probability level.

It was also possible to assess the magnitude of re-emigration to employment on the basis of the current survey. The estimation implied that 32% of employed immigrants were Estonians returning to their homeland after residing abroad. This estimate shows that a substantial part of Estonian emigration during recent years was short-term by nature.

5. The structure of emigration

5.1. Emigration by educational level and occupational group

In the questionnaire we asked the firms to indicate the educational level of the employees who left their organization to work abroad in 2007. Specifically, we inquired whether the emigrants had a (1) primary education, (2) secondary education, (3) vocational education or (4) tertiary education. For the comparison and analysis of the composition of the emigrants by educational level with the entire workforce in Estonia and other EU countries, we use the International Standard of Classification of Education (ISCED) 1997. As the data for the structure of the labour force in EU countries (e.g., income, the unemployment rates of employees with different levels of education) by educational attainment is mostly divided into three categories — (1) pre-primary, primary and lower-secondary education – levels 0–2, (2) upper-secondary and post-secondary non-tertiary education – levels 3–4 and (3) tertiary education – levels 5–6, we classify the responses from the survey into these three categories. As primary education in Estonia lasts nine years, the first choice in our questionnaire („primary education“) corresponds to the first category (ISCED 1997 levels 0–2). We classify the second and third option („secondary education“ and „vocational education“) to the second category (ISCED 1997 levels 3–4) and the fourth option („tertiary education“) to the third category (ISCED 1997 levels 5–6).

The educational attainment of the emigrants in 2007 was considerably lower than the average for employed persons in Estonia (cf. Table 6). The share of emigrants with a primary or lower-secondary education was significantly higher and with a tertiary education lower than the average for employment. The relative importance of emigrants with an upper-secondary or post-secondary education was quite similar to its share among employed persons. The result that emigrants have a lower-than-average educational attainment is in contrast with the findings from previous studies, which mostly indicated that emigrants were on average better educated than the rest of the population.

Table 6: Emigration by educational level in 2007

Education level	Number of emigrants	Share of emigrants (excluding "do not know")	Share of workers with given educational level in total employment*
Primary education	57	17.3%	9.8%
Secondary education	124	37.7%	23.8%
Vocational education	103	31.3%	42.2%
Tertiary education	45	13.7%	24.2%
Total (known)	**329**	**100.0%**	**100.0%**
Do not know	24	7.3%	

Source: Statistics Estonia.

In the survey we asked the firms to answer, what was the occupational group of the employees that left their organization to work abroad during 2007. We presented four options for the occupational groups: (1) low-skilled blue-collar workers, (2) highly-skilled blue-collar workers, (3) low-skilled white-collar workers and (4) highly-skilled white-collar workers. According to the responses, emigration was dominated by blue-collar workers (cf. Table 7). The share of blue-collar workers who emigrated out of the total employment of this occupational group in our sample was 1.1 %, which was much higher than the corresponding share for white-collar workers (0.4 %). The differences in the rate of emigration within these two groups by skill level — high-skilled or low-skilled — were negligible.

Table 7: Emigration by occupational group in 2007

Occupation	Number of emigrants	Share of total number of emigrants	Share of total occupational employment in the sample of firms (excluding "do not know")
Low-skilled blue collar	115	34.6%	1.2%
High-skilled blue collar	169	50.9%	1.1%
Low-skilled white collar	15	4.5%	0.3%
High-skilled white collar	29	8.7%	0.4%
Other	4	1.2%	0.1%
Total (known)	**332**	**100.0%**	**0.7%**
Do not know	21	6.3%	0.7%

As discussed in the second chapter of this article, the main motives for emigration from the new EU member countries are overwhelmingly economic. By far the most important mobility drivers are higher income and better working conditions. Due to data limitations, a thorough examination of these factors is not possible. However, we can compare the relative income and unemployment by educational level and occupational group in Estonia with the EU-15 and the main destination countries of Estonian emigration (Finland, the UK and Ireland).

As mentioned earlier, emigration from Estonia by educational level has been the highest among workers with a primary or lower-secondary education and lowest among workers with a tertiary education. The data for 2006 indicates that the relative median income of people with a primary or lower-secondary education in Estonia is quite similar to the EU-15, Ireland and the UK (cf. Table 8). The differences are greater with Finland, where the relative income of people with a lower level of educational attainment is higher than in Estonia.

Table 8: Median income by educational level in the EU and Estonia in 2004–2006

	EU-15	**NMS-10**	**Estonia**	**Ireland**	**Finland**	**UK**
Pre-primary, primary and lower-secondary education — levels 0–2 (ISCED 1997)						
2004			56%	53%	66%	
2005	60%	55%	56%	54%	65%	
2006	59%	52%	58%	54%	65%	56%
Upper-secondary and post-secondary non-tertiary education — levels 3–4 (ISCED 1997)						
2004			72%	74%	77%	
2005	81%	66%	73%	75%	76%	78%
2006	78%	66%	78%	75%	77%	77%
Tertiary education — levels 5–6 (ISCED 1997)						
2004			100%	100%	100%	
2005	100%	100%	100%	100%	100%	100%
2006	100%	100%	100%	100%	100%	100%

Source: Eurostat.

In 2007, the unemployment rate in Estonia was one of the lowest in the enlarged European Union (cf. Table 9). As compared to the three main destination countries, unemployment in Estonia was clearly lower than in Finland and quite similar to the unemployment rates in Ireland and the UK. The unemployment rates in 2007 by educational attainment show that unemployment in Estonia for people with a primary or lower-secondary education was

higher than the average for the EU-15; it was considerably higher than the corresponding rates for Ireland and the UK and slightly smaller than in Finland. The unemployment rate of people with a tertiary education in Estonia was slightly higher than in Ireland and the UK and quite similar to the level in Finland. Altogether, we can conclude that there is weak evidence that the differences between the relative income and unemployment rates by educational level in Estonia and in our three main destination countries favour the emigration of workers with a lower level of educational attainment.

Table 9: Unemployment rates by educational attainment in the EU in 2004 and 2007

	EU-15	**NMS-10**	**Estonia**	**Ireland**	**Finland**	**UK**
Total (ISCED 1997)						
2004	8.3	14.5	10.4	4.6	10.4	4.6
2007	7.1	11.0 (*)	4.8	4.6	6.9	5.4
Pre-primary, primary and lower-secondary education — levels 0–2 (ISCED 1997)						
2004	11.3	25.1	21.1	7.8	19.7	7.7
2007	10.5	21.5 (*)	11.7	7.7	13.0	9.5
Upper-secondary and post-secondary non-tertiary education — levels 3–4 (ISCED 1997)						
2004	8.1	14.9	10.7	3.9	10.1	4.3
2007	6.7	11.2 (*)	4.9	4.4	7.1	5.2
Tertiary education — levels 5–6 (ISCED 1997)						
2004	5.1	5.5	6.0	2.3	4.9	2.4
2007	4.1	4.5 (*)	3.3 (*)	2.7	3.6	2.6

Source: Eurostat.
Notes: (*) data from 2006.

Emigration was relatively high for low- and highly-skilled blue-collar workers and relatively low for low- and highly-skilled white collar workers in 2007. The comparison of the relative income levels of occupational groups in Estonia and the three main destination countries shows that the biggest differences are in the relative pay of low-skilled blue-collar workers[18] (cf. Table 10). In Estonia, the relative income level of low-skilled blue-collar workers was significantly lower than in the UK, Ireland and Finland. The

[18] Low-skilled blue-collar workers belong to the group "elementary occupations".

relative incomes of both highly-skilled blue-collar workers[19] and low-skilled white-collar workers[20] were quite similar to the respective levels in the three main destination countries. The relative income of highly-skilled white-collar workers[21] was somewhat higher in Estonia.

Table 10: Annual earnings by occupational groups in the EU in 2005–2006 (as a percent of average annual earnings)

	Ireland (2005)	**Finland (2006)**	**UK (2006)**	**Estonia (2005)**
Total	100%	100%	100%	100%
Legislators, senior officials and managers	146%	180%	163%	163%
Professionals	139%	127%	128%	146%
Technicians and associate professionals	103%	101%	100%	117%
Clerks	78%	83%	65%	87%
Service workers and shop and market sales workers	72%	75%	63%	66%
Craft and related trades workers	91%	93%	82%	82%
Plant and machine operators and assemblers	81%	92%	72%	80%
Elementary occupations	74%	72%	61%	56%

Source: Eurostat.

The unemployment rates by occupational groups in Estonia show that the unemployment rate was lower for white-collar workers (especially highly-skilled white-collar workers) and higher for blue-collar workers (cf. Table 11). Among the latter group, unemployment was the highest for low-skilled blue-collar workers. Similarly to the conclusion for emigration by educational attainment, we can conclude that there is some evidence that the differences between the relative income by occupational group in Estonia and in our three main destination countries and the unemployment rates by occupational group within Estonia favour the emigration of blue-collar workers, especially those with low-skill levels.

[19] Highly-skilled blue-collar workers belong to the following groups: "technicians and associate professionals", "craft and related trades workers" and "plant and machine operators and assemblers".

[20] Low-skilled white-collar workers belong to the following groups: "clerks" and "service workers and shop and market sales workers".

[21] Highly-skilled white-collar workers belong to the following groups: "legislators, senior officials and managers" and "professionals".

Table 11: Unemployment rates by occupational groups in Estonia (%) for 2003–2007

	2003	2004	2005	2006	2007
Total	10.0%	9.6%	7.9%	5.9%	4.7%
Legislators, senior officials and managers	4.4%	2.4%	2.5%	1.0%	1.1%
Professionals	2.6%	2.5%	2.7%	1.0%	
Technicians and associate professionals	7.6%	5.9%	2.2%	2.0%	1.7%
Clerks	5.6%	5.8%	5.8%	4.1%	
Service workers and shop and market sales workers	10.6%	12.1%	8.5%	5.4%	5.0%
Skilled agricultural and fishery workers	9.1%	7.2%	5.9%	4.9%	
Craft and related trades workers	11.0%	10.1%	9.7%	7.6%	5.6%
Plant and machine operators and assemblers	8.3%	9.1%	8.9%	7.2%	5.1%
Elementary occupations	13.9%	11.2%	8.5%	7.0%	5.8%

5.2. Emigration by economic sector, age, gender, nationality, firm size and region

In 2007, the propensity to emigrate was higher in the private sector (0.7%) and lower in the public sector (0.2%) (cf. Table 12). As the majority of public sector employees are white-collar workers and the average level of their education is higher than in the private sector, these results are in line with the previous findings about the structure of emigration by educational attainment and occupational group. Within the private sector, the propensity to emigrate was highest in the secondary sector. By fields of activity, the propensity to emigrate was higher in five areas: (1) hotels and restaurants, (2) electricity, gas and water supply, (3) construction, (4) financial intermediation and (5) manufacturing (cf. Table 13).

As we concluded in the overview of the literature, the international experience of migration reveals that men and young people are more likely to emigrate. We get a similar result on the basis of our survey. The emigration of workers in 2007 was heavily dominated by younger individuals (cf. Table 14). The share of emigrants below the age of 35 amounted to 76% of all emigrants, while the share of those workers in our sample of firms was just 26%. Most of the emigrants were men (cf. Table 15). Although in Estonia the share of males and females is roughly equal in the labour force, men comprised 70% of the emigrants.

Table 12: Emigration by economic sector in 2007

Sector	Number of emigrants	Share of total number of emigrants	Share of total employment within the sector in the sample of firms
Private sector	340	96.3%	0.7%
Primary	12	34.0%	0.5%
Secondary	223	63.2%	1.1%
Tertiary	105	29.7%	0.4%
Public sector	13	3.7%	0.2%
Total	**353**	**100.0%**	

Table 13: Emigration by field of activity in 2007

	Employment in the sample of firms	Number of emigrants	Percentage of emigrants in given sector
Hotels and restaurants	1,091	16	1.5%
Electricity, gas and water supply	1,255	17	1.4%
Construction	4,311	58	1.3%
Financial intermediation	805	9	1.1%
Manufacturing	13,593	129	0.9%
Total	**54,471**	**353**	**0.6%**
Transport, storage and communication	3,705	24	0.6%
Agriculture, hunting and forestry	2,489	13	0.5%
Other	9,198	48	0.5%
Real estate, renting and business activities	1,737	9	0.5%
Education	2,472	8	0.3%
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	5,597	13	0.2%
Health and social work	4,310	9	0.2%
Fishing	8	0	0.0%
Mining and quarrying	131	0	0.0%
Public administration and defence; compulsory social security	3,769	0	0.0%

Table 14: Emigration by age group in 2007

Age	Number of emigrants	Share of total number of emigrants (excluding "do not know")	Share of workers within given age group in total employment*
Up to 24	81	24.1%	9.2%
24–34	174	51.8%	17.2%
35–44	58	17.3%	25.9%
45–54	21	6.3%	28.4%
55 or more	2	0.6%	19.4%
Total (known)	**336**	**100.0%**	**100.0%**
Do not know	*17*	*5.1%*	

Notes: (*) Estonian Labour Force Survey 2006/2.

Table 15: Emigration by gender in 2007

Gender	Number of emigrants	Share of total number of emigrants	Share in total labour force *
Male	246	69.7%	50.3%
Female	106	30.0%	49.7%
Total	**352**		

Notes: (*) Statistics Estonia.

In addition, we also asked the firms to indicate the structure of emigration by nationality (the firms were presented with two options — "Estonian" and "others") and region. Our results show that the share of Estonians who emigrated in 2007 was slightly lower than their share in the labour force (cf. Table 16) and that emigration was relatively more intense from South and North-East Estonia and less so from Tallinn (cf. Table 17).

Table 16: Emigration by nationality in 2007

Nationality	Number of emigrants	Share of total number of emigrants	Share in total labour force *
Estonian	224	63.5%	67.6%
Other	129	36.5%	32.4%
Total	**353**		

Notes: (*) Statistics Estonia.

Table 17: Emigration by region in 2007

	Number of emigrants	Share of total number of emigrants	Emigrants out of regional employment (in the sample of firms)
Tallinn	119	33.7%	0.5%
Põhja - Lääne	64	18.1%	0.6%
Tartu - Lõuna	98	27.8%	1.0%
Virumaa	72	20.4%	0.7%
Total	**353**	**100.0%**	**0.6%**

6. Characteristics of firms exposed to migration: Regression-based analysis

6.1. Estimation methodology

In the following section, we employ a regression analysis to assess the characteristics of the firms who hire immigrants and from where workers emigrate. The dataset that is based on the migration survey contains firm-level data. Therefore, we cannot use regressions to analyse the immigration or emigration profile of an average worker, since this type of analysis requires employee-level data.

We use two alternative estimation methods for regression analysis: probit and Tobit regressions. Probit can be used for a binary dependent variable. For that purpose, we create a dummy variable that equals one if at least one employee has left the firm because of emigration. An analogous dummy variable was constructed for immigration. We assessed the characteristics of firms from which workers emigrate and to which workers immigrate on the basis of probit regressions.

Another estimation methodology that can be used in the current context is the Tobit model. It is applicable if the dependent variable in the regressions is the share of employees who emigrate from a given firm. The Tobit model (or more precisely, the Type I Tobit model) can be used if the dependent variable is censored; i.e., it has no values below a certain level and behaves as a (roughly) continuous variable for all values that are above this level. The share of workers who emigrate from a given firm has a value of zero for the majority of observations (443 out of 553 or 80% of observations). On the basis of the histogram presented on Figure 2, it can be observed that the density distribution for values that are above zero for this variable can be approx-

imated by a truncated normal distribution. This justifies the use of the Tobit model in the current analysis.[22]

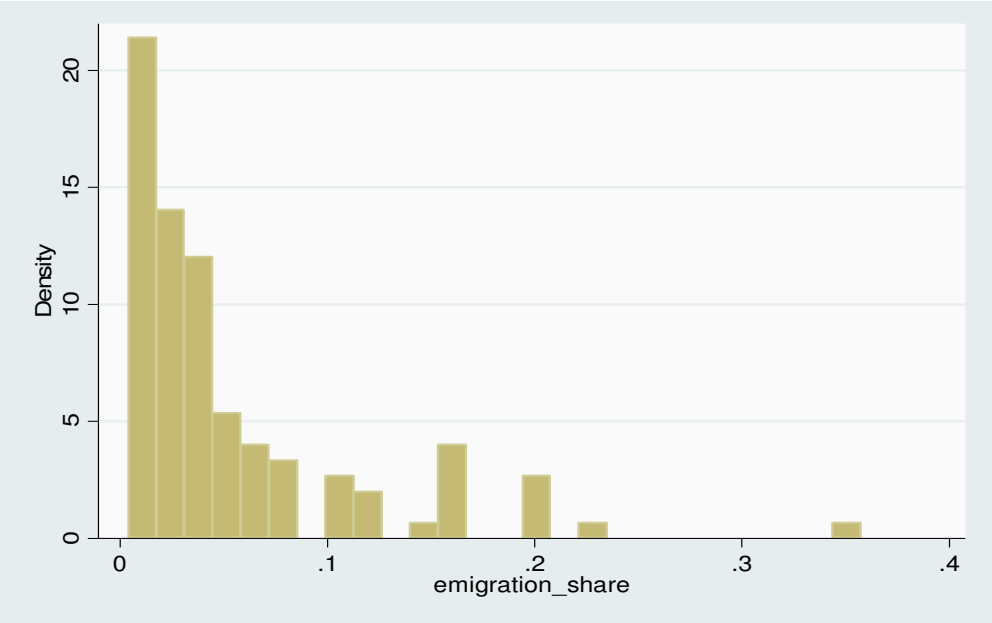

Figure 2: The share of employees who emigrate — frequency distribution for above-zero values

The variable that measures the share of immigrant workers who are hired by the firm has a density distribution with similar properties to the share of workers who emigrate. This variable has a value of zero in 439 cases out of 519 (84% of observations) and is roughly continuous for above-zero values (see Figure 3). On the basis of this, we use the Tobit model to analyze the characteristics of firms who hire immigrants, analogously to the analysis of emigration.

[22] On the basis of the „eyeball tests", we concluded that the truncated normal fits the density distribution of the dependent variable better than the Poisson distribution. Thus, we opted to use the Tobit rather than the Poisson estimation method.

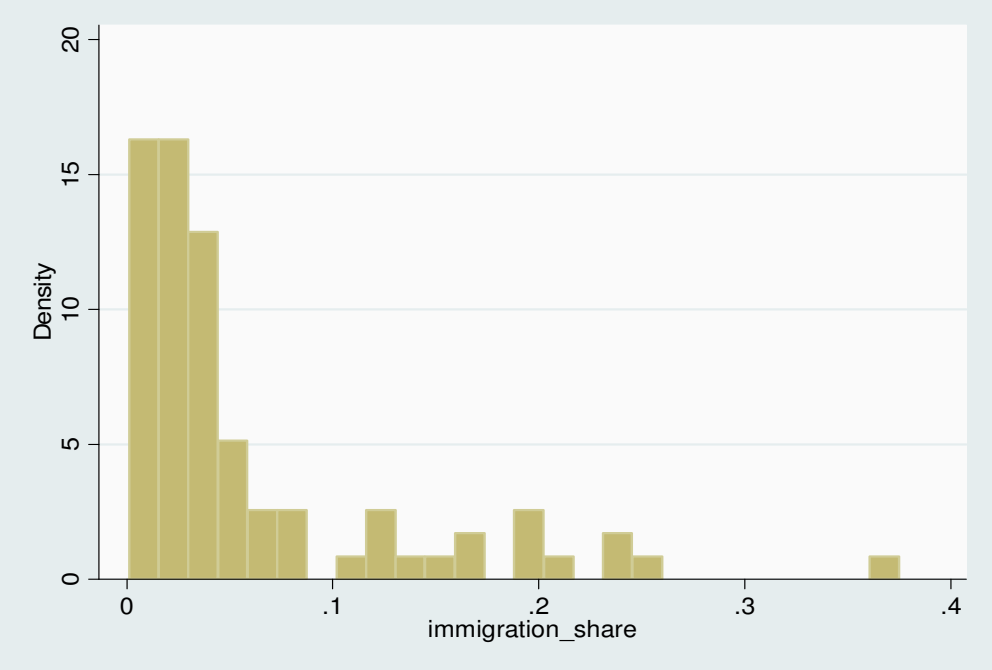

Figure 3: The share of employees who immigrate — frequency distribution for above-zero values

Appendix 3 presents an overview of the differences in group means for all four dependent variables that are used in the regressions. The first column presents a mean value for the dependent variable across all observations for which the given control variable equals one. The second column shows the same measure for all observations for which the given control variable equals zero. In the first table that is presented, the mean value of the dependent variable is equal to the share of firms losing at least one worker due to emigration within a given group. The mean values presented in the other tables are constructed in a similar manner. The third and fourth columns show the number of observations within a given group. The last two columns present the value of the *t*-statistic and the associated probability value for testing the difference in group means. With a few exceptions, the implications that can be made on the basis of the group means and the t-tests presented in the appendix are similar to the implications that are based on the regression analysis and described below.

6.2. Analysis of emigration

Table 18 gives an overview of the probit regression results which evaluate the propensity to migrate from a given firm. The significance tests for coefficients are based on heteroscedasticity-robust standard errors. We report marginal effects, evaluated at mean values. The estimated marginal effects multiplied by 100 measure the percentage-point change in the probability of losing workers due to emigration in response to an infinitesimal change in the given control variable. For dummy RHS variables, the reported marginal effects correspond to an estimated discrete change in the dependent variable if a given control variable changes from zero to one.

We report the regression results for four different specifications. The first one includes two sets of control variables: occupational groups and regions. The variables characterizing different occupational groups measure the share of workers belonging to one of the five groups (low-skilled blue-collar, high-skilled blue-collar, low-skilled white-collar, high-skilled white-collar and other). Two categories — low-skilled blue-collar workers and other — are excluded from the regressions. The Lääne region (Western Estonian region) is the excluded category for regional dummy variables.

The following regressions contain more control variables. The second specification includes sectoral effects in addition to the two first sets of variables. The excluded category for this set of dummy variables is the private services sector. The third specification includes a dummy for private sector enterprises in addition to the above-described variables and the fourth contains an employment-based measure of enterprise size (the logarithm of the number of workers).

The results of the probit regressions are presented in Table 18. The regression estimations indicate that all significant marginal effects remain in absolute value between 8 and 21 pp (not considering the confidence bounds). They are quite sizeable given that the average observed probability that a firm loses at least one employee due to emigration is 20%.

Table 18: Characteristics of firms from which workers emigrate:
Probit regression estimates

	(1)	**(2)**	**(3)**	**(4)**
occ_hbc	0.014	–0.037	–0.031	–0.017
	(0.824)	(0.550)	(0.617)	(0.770)
occ_lwc	0.033	0.068	0.081	0.170*
	(0.711)	(0.466)	(0.387)	(0.067)
occ_hwc	–0.175**	–0.059	–0.041	0.048
	(0.032)	(0.497)	(0.630)	(0.561)
region_harju	0.076	0.049	0.041	0.010
	(0.157)	(0.357)	(0.435)	(0.851)
region_viru	0.032	0.054	0.047	0.002
	(0.636)	(0.414)	(0.473)	(0.970)
region_kesk	0.054	0.048	0.039	0.025
	(0.393)	(0.432)	(0.519)	(0.675)
region_louna	0.059	0.083	0.082	0.049
	(0.411)	(0.253)	(0.254)	(0.464)
sector_agriculture		–0.040	–0.036	–0.020
		(0.497)	(0.547)	(0.732)
sector_utilities		–0.038	–0.039	–0.055
		(0.674)	(0.664)	(0.499)
sector_construction		0.067	0.066	0.097*
		(0.195)	(0.195)	(0.067)
sector_manufacturing		0.059	0.059	0.034
		(0.281)	(0.274)	(0.511)
sector_public_services		–0.185***	–0.025	–0.059
		(0.007)	(0.864)	(0.641)
sector_education		–0.091*	0.187	0.167
		(0.100)	(0.156)	(0.156)
sector_medical		–0.059	0.010	–0.028
		(0.417)	(0.907)	(0.728)
private_sector			0.212***	0.193***
			(0.003)	(0.003)
ln_empl				0.076***
				(0.000)
Observations	553	553	553	553

*Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1.*
Marginal effects (evaluated at mean values) are reported.

The estimated marginal effects presented in Table 18 imply that unconditional on the sector, firms hiring a larger proportion of high-skilled white-collar workers are 18 pp less likely to lose workers because of emigration (in comparison to firms hiring mostly low-skilled blue-collar workers). The marginal effect of this variable is rendered insignificant when sector controls

are added to the regression. All estimated regional effects are insignificant. We further find that the emigration of employees is 19 pp less likely in public services and 9 pp less likely in the education sectors (in comparison to the private services sector, which is the reference group). The coefficient estimate for the construction sector dummy variable is significant at the 10% level for the last regression estimation, which implies that conditional on the size of the firm, construction sector enterprises are 10 pp more likely to lose workers due to emigration.

Private sector firms are approximately 20 pp more likely to lose employees because of emigration than public sector firms. Adding a dummy variable to the private sector renders the sectoral effects of public services and education insignificant. This can be expected since all public services companies and most education sector organisations are publicly owned.

The final finding on the basis of the probit regressions presented in Table 18 is that large firms are more likely to lose workers because of emigration. The related marginal effect is 7 pp. In the case of the probit regressions, this result can be expected since large firms are in general more likely to lose or hire at least one worker during a particular time period than are small enterprises. However, this finding is present in the Tobit regressions as well (please refer to Table 1 in Appendix 4), where the dependent variable is the share of workers who emigrate, which indicates that it is not entirely driven by the abovementioned regularity.

In addition to evaluating the propensity to emigrate on the basis of the probit models, we estimate the Tobit regressions where the dependent variable is the share of workers who emigrated from a given firm. The estimated effects are very similar to the probit estimates (see Table 1 in Appendix 4). We report the probability values for the significance tests that are based on heteroscedasticity-robust standard errors. Marginal effects, evaluated at mean values, are reported. In the context of the Tobit model, the marginal effects (multiplied by 100) measure the percentage point change in the share of workers who emigrate in response to an infinitesimal change in the given control variable. For dummy RHS variables, the reported marginal effects correspond to an estimated discrete change in the dependent variable if a given control variable changes from zero to one.

Regression results on the basis of Tobit regressions yield implications that are analogous to probit regressions. There is only one exception: the coefficient estimate is positive for the construction sector in all regression specifications at the 10% confidence level, whereas it was significantly positive only in the last regression specification for the set of probit regressions.

6.3. Analysis of immigration

Next, we analyse the relationship between various firm characteristics and the tendency to hire immigrant workers. Table 19 presents the estimated marginal effects of probit regressions where the dependent variable is a dummy that equals one if at least one immigrant worker is hired by a given firm. Similarly to the previous set of probit regressions, we use heteroscedasticity-robust standard errors and evaluate the marginal effects at mean values. For consistency, the choice of RHS variables in the regressions analyzing immigration replicates the structure of regressions where the dependent variable is a dummy for emigration.

The estimated marginal effects for this set of regressions are similar in magnitude to the estimated effects for the regressions analysing emigration. They range in absolute value from 6 to 19 percentage points, whereas the average observed probability that a firm hires immigrant workers is 16%.

On the basis of the probit regression results, it is possible to imply that unconditional on the sector, firms hiring a larger proportion of high-skilled white-collar workers are 19 pp less likely to lose workers because of emigration (in comparison to firms hiring mostly low-skilled blue-collar workers). The coefficient for this variable is rendered insignificant when we add sector controls to the regression. We also find that unconditional on the sector, firms operating in the Harju region are 12 pp more likely to hire immigrant workers. (Comparison group: firms operating in the Lääne region; i.e., Western Estonia.)[23] The marginal effect of the dummy variable of the Harju region becomes somewhat smaller when the sectoral effects are included in the regression. The estimated marginal effect is significantly different from zero for all but the last regression specification, indicating that conditioning on firm size renders all regional effects (including the estimate for the Harju region) insignificant.

The immigration of employees is less likely in the agricultural, public services and education sectors (in comparison to the private services sector). Unconditional on the private sector dummy and firm size, the marginal effects are –10, –12 and –11 percentage points, accordingly. The estimated marginal effects for the manufacturing sector dummy variable indicate that unconditional on firm size, the propensity to hire immigrants is the greatest in the manufacturing sector. Manufacturing sector enterprises are approximately 8 pp more likely to hire immigrants than firms in the reference group (the private services sector). The estimated marginal effect is significant at the

[23] The Harju region is the north-western area of Estonia, including Tallinn, the capital of the country.

10% level when the employment-based measure of firm size is not added to the regressions.

Table 19: Characteristics of who hires immigrant workers: Probit regression estimates

	(1)	**(2)**	**(3)**	**(4)**
occ_hbc	0.018	–0.006	0.000	0.005
	(0.748)	(0.912)	(0.999)	(0.924)
occ_lwc	–0.021	–0.017	–0.007	0.061
	(0.812)	(0.847)	(0.940)	(0.498)
occ_hwc	–0.190**	–0.061	–0.042	0.029
	(0.013)	(0.477)	(0.616)	(0.732)
region_harju	0.124**	0.091*	0.085*	0.067
	(0.022)	(0.083)	(0.095)	(0.152)
region_viru	0.036	0.037	0.035	0.005
	(0.605)	(0.588)	(0.601)	(0.938)
region_kesk	0.078	0.063	0.059	0.062
	(0.222)	(0.296)	(0.318)	(0.267)
region_louna	0.062	0.066	0.071	0.062
	(0.397)	(0.354)	(0.314)	(0.347)
sector_agriculture		–0.106**	–0.102**	–0.089*
		(0.028)	(0.030)	(0.051)
sector_utilities		–0.089	–0.086	–0.080
		(0.270)	(0.267)	(0.298)
sector_construction		–0.036	–0.035	–0.006
		(0.370)	(0.371)	(0.892)
sector_manufacturing		0.080*	0.079*	0.061
		(0.083)	(0.080)	(0.150)
sector_public_services		–0.120*	0.073	0.087
		(0.054)	(0.661)	(0.618)
sector_education		–0.111**	0.076	0.096
		(0.034)	(0.544)	(0.412)
sector_medical		–0.083	–0.042	–0.056
		(0.199)	(0.602)	(0.432)
private_sector			0.168**	0.160**
			(0.022)	(0.021)
ln_empl				0.059***
				(0.000)
Observations	519	519	519	519

*Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1.*
Marginal effects (evaluated at mean values) are reported.

Private sector firms are approximately 16 pp more likely to hire immigrants than public sector firms. Similarly to the previous set of probit regressions, adding a dummy variable to the private sector renders the coefficient estimates for the public services and education sectors insignificant. Another finding that is analogous to the regressions on emigration is related to firm size: the coefficient estimate for a variable that measures employment (ln_empl) is positive and highly significant in the probit as well as in Tobit regressions.

Table 2 in Appendix 3 presents the results of Tobit regressions where the dependent variable is the share of immigrant workers a given firm has hired. The implications on the basis of Tobit regression estimates are similar to the probit regression results. There are only some differences. First, the estimated marginal effect of the dummy variable of the Harju region is not significant in the third Tobit regression specification, whereas it is marginally significant at the 10% level in an analogous probit regression. Second, the estimated effect for the medical sector is significantly negative when the regression does not include the private sector dummy variable. It was insignificant in the probit regression that had the same set of control variables. Third, the estimated marginal effect of the manufacturing sector is insignificant, whereas it was significantly positive (at the 10% level) in three out of four probit regression specifications.

7. Conclusion

This paper presents new evidence from a unique survey of firm managers on the migration patterns in Estonia in 2007. An average emigrant from Estonia was most likely a young person between 15–34 years of age, a blue-collar worker and male. Contrary to evidence from other countries and earlier time periods, employees with a low level of education were more likely to emigrate than highly educated workers.

On the basis of the survey, we estimated the employment-weighted average shares of emigrants and immigrants in 2007. Somewhat unexpectedly, we found that the estimated share of employees who immigrated to Estonia exceeded the share of emigrants. The point estimate for the share of immigrants in total employment was 0.98%, whereas it was 0.76% for the share of emigrants. We performed the t-test to assess whether the estimated share of immigrants was significantly different from emigrants. The results implied that with a 90% probability, immigration to employment was larger than emigration from employment. However, it is important to note that this result cannot be generalized to the general population as a whole. Due to the nature of our survey, we were able to assess the magnitude of immigration and emigration

to and from employment only. We do not have an overview of the emigration and immigration rates of unemployed and inactive people.

It was also possible to assess the magnitude of re-migration to employment on the basis of the current survey. The estimation implied that 32% of employed immigrants were Estonians returning to their homeland after residing abroad. This estimate shows that a substantial part of Estonian emigration during recent years was short-term by nature.

The structure of immigration and emigration is analyzed on the basis of regression analysis. We employ two alternative estimation methods — the Tobit and probit regressions — which yield similar results. We assess which firm characteristics are associated with a higher tendency to increase or decrease the number of workers due to a cross-border movement of labour. To a large extent the regressions analysing immigration effects have the same implications as the regressions analysing emigration effects. This indicates that firms sharing certain characteristics are more exposed to immigration as well as emigration.

The first finding on the basis of the regressions is that public sector employees are much less internationally mobile than private sector employees. The estimated marginal effects for the private sector dummy are strongly positive and significant in both immigration- and emigration-related regressions. This implies that private sector firms are more likely to lose workers due to emigration and they need to compensate for this by hiring more immigrant workers. This finding is in accordance with the results presented in the fifth section of this article, which also show that emigrants were overwhelmingly private sector workers (only 3% of emigrants had previously been employed in the public sector). The international mobility of employees is the lowest in the public services and education sectors.

Regression results also indicate that firms hiring a large proportion of highly-skilled white-collar workers are less likely to face significant labour turnover due to a cross-border movement of workers. For both emigration and immigration, this relationship is significant only when sectoral effects are not included in the regressions. Finally, we find that employees in large firms are more internationally mobile than workers in small companies.

Within the private sector, the structure of immigration differs from the structure of emigration. The regression results indicate that construction-sector workers are more likely to emigrate. This finding is more persistent in Tobit than probit regressions. However, our regression results do not indicate that construction-sector enterprises would compensate for this outflow of workers by hiring immigrants: the estimated marginal effect for this sector is insignificant in regressions on immigration propensity. Instead, we find that

unconditional on the size of the enterprise, manufacturing-sector enterprises are more likely to hire immigrant workers.

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Appendix 1. Definitions of migration and data sources for migration statistics from the EU countries covered in the current study

Table 1: Definitions of migration by country

Latvia	**Long-term migration** implies movements of the population from one administrative territory to another with the aim of changing the place of residence permanently or for a period of at least a year.
Lithuania	**International migration** statistics accounts for all persons who depart from the Republic of Lithuania or arrive in the Republic of Lithuania with the intention of permanent residence or for a period longer than 6 months (foreigners who have arrived with temporary residence permits for one year and longer) based on the data of the declaration of residence and the results of the Sample Survey on Emigration.
	An **immigrant** is a person arriving from another country with the intention of taking up residence in the Republic of Lithuania perpetually or for more than a 6-month period. It can be a foreigner who has got a temporary residence permit for one year and longer.
	An **emigrant** is a person leaving the Republic of Lithuania with the intention of taking up residence in another country perpetually or for more a than 6-month period. It can be a foreigner whose temporary residence permit for one year or longer has expired and the new permit has not been issued yet.
	Net migration is the difference between the total number of persons arriving and the total number of persons departing.
Poland	**Emigration —** Leaving one's country in order to settle (stay permanently) or to stay temporarily.
	Immigration — Migrations to a country from abroad in order to settle (stay permanently) or to stay temporarily.
	International migration — Trips abroad and arrivals in a country with the purpose of settling there (for permanent residence) or for a temporary stay.
	Long-term migration — The movement of population related to a change of place of residence for at least 12 months.
Czech Republic	**External immigrant —** A. A Czech citizen who establishes their permanent residence again (after cancelling it and reporting it to the authorities some time earlier) in the Czech Republic, or B. A foreigner belonging to one of a selection of categories (see point 5) coming to the Czech Republic from abroad.
	External emigrants — A. A Czech citizen who cancels their permanent residence in the Czech Republic or B. A foreigner belonging to one of a selection of categories (see point 5 – the bold ones) cancelling their residence in the Czech Republic (real emigration) or after the expiration of their visa, permit or permanent residence permit-card (administrative emigration).
	External migration — a change of the permanent stay of a person from the CR to another country or from abroad to the Czech Republic. It does not

	matter whether it applies to a citizen of the CR or a foreigner. A foreigner is a person who does not have Czech Republic citizenship, with the exception of those persons who stay in the CR on the basis of a visa allowing them to stay in the Czech Republic for a period longer than 90 days and those persons with asylum status granted on the territory of the Czech Republic. To distinguish between migration inside or outside a certain territorial unit, the terms in-migrants (in-migration) and out-migrants (out-migration) are used.
Slovakia	**Foreign migration** is defined as a kind of spatial mobility of a person or a group of persons based on crossing international boundaries in order to establish temporary or permanent residence abroad.
	Under the conditions of the Slovak Republic, **foreign (international) migration** refers to a change in a person's country of residence from the Slovak Republic to another country or from abroad to the Slovak Republic regardless of the person's citizenship during the reference year.
	Immigration means an action by which a person establishes his or her usual residence in the territory of a Member State for a period that is, or is expected to be, at least twelve months, having previously been usually resident in another Member State or a third country.
	Emigration means an action by which a person, having previously been usually resident in the territory of a Member State, ceases to have his or her usual residence in that Member State for a period that is, or is expected to be, of at least twelve months.
Slovenia	**Net migration** is the difference between the number of immigrants from abroad and the number of emigrants who leave the country for a given place during the calendar year.
	Net migration per 1000 population is the ratio between the net migration (with foreign countries) during the calendar year and the mid-year population of the same year for a given area, multiplied by 1000.
	An immigrant is a resident of Slovenia who: a) immigrated from abroad and registered his/her residence in Slovenia, b) returned from abroad after temporarily residing there for more than three months and before departure gave notice of his/her departure to the appropriate administrative unit, c) immigrated to another settlement or municipality in Slovenia and registered his/her permanent residence there.
	An emigrant is a resident of Slovenia who: in Slovenia gave notice of leaving his/her residence with the intention of emigrating abroad, 1) emigrated temporarily abroad for more than three months and gave notice of his/her departure to the appropriate administrative unit, 2) emigrated to another settlement or municipality in Slovenia, and registered his/her permanent residence there.
	International migration is a spatial movement where the previous or next residence of the migrant is in another country.
United Kingdom	**Net in-migration —** More people are migrating into a country (for at least 12 months) than are leaving it in a given time period.
	Net migration — The difference between in-migration and out-migration.
	Net out-migration — More people are migrating out of a country (for at

	least 12 months) than are entering that country in a given time period.
Finland	**Net migration** is the difference between immigration and emigration. Persons who have moved to Finland and intend to reside or have resided one whole year in Finland without interruption shall inform the register office of their place of residence (Population Data Act 507/1993).
	Those who intend to leave the country for more than one year are primarily considered **emigrants**, barring diplomats and those working in development co-operation, etc.
Germany	**External immigrant —** Person (regardless of citizenship or length of stay) who registers their main residence in Germany for more than two months (generally) and comes from abroad.
	External emigrant — A person (regardless of citizenship or length of stay) who deregisters their main residence in Germany and moves abroad.
Sweden	The term **migration** is defined as a movement by a person from one address to another. The time of migration is defined as the actual day of migration if it is reported to the Tax Office within one week after the migration. If the migration is reported after one week, it is registered as having taken place the day it is reported. In many cases the actual migration took place before the time of registration.
	Registration as an **immigrant** requires that the intentions of the person must be to stay in Sweden for at least one year. Registration as an **emigrant** requires that the intentions of the person must be to reside abroad for at least one year. Migration between the Nordic countries also requires the existence of a certificate of migration between the Nordic countries. Citizens from countries outside the Nordic countries must obtain residence permits to be registered as immigrants.
Italy	**Net migration:** It is the difference between the number of registration cancellations from the population registers of the resident population.
	Cancellations: are reported as total. They include: **Cancellations to other municipalities:** the number of people cancelled because of a change of residence to another Italian municipality. **Cancellations to another country:** the number of persons cancelled because of a change of residence to another country. **Cancellations for other reasons:** cancellations due to administrative population registers updating their records, including: cancellation of persons previously mistakenly registered because they were missing from the administrative verification of residence; cancellation of persons registered at the Census because they could not\did not want to register at the population register of the municipality where they have been counted by the Census.
Spain	Migration: A change of residence from one municipality to another, moving abroad or arriving from abroad. Since 2004, the entries and exits of foreign nationals have been incorporated in the foreign migration tables, in which the country of origin or destination is not recorded (registrations by omission and cancellations for undue inscription, respectively, registered in the Municipal Registers).When migration is between municipalities within the national territory, we speak of domestic migration.

Table 2 : Data sources: EU-8 and EU-15

Latvia	Data of the Population Register of the Office of Citizenship and Migration Affairs; full-scope survey.
Lithuania	Based on the data of the declaration of residence and the results of the Sample Survey on Emigration.
Poland	The data on internal and international migration for permanent residence have been compiled on the basis of the complete registration of migrants.
	Since 1990, data are obtained from the Ministry of the Interior and Administration (the Department of Registers' Development). Until 2005, the data were compiled by the Ministry on the basis of documents supplied by the registry units of gminas; the scope of data included information on the present and previous places of permanent residence, sex, age, marital status and the levels of education of migrants. Since 2006, the data are taken from PESEL (the Common Electronic System of Population Register); the scope of data does not include the level of education because these data are not collected in PESEL.
	The data on internal and international migration for temporary stays are the results of statistical surveys, regularly conducted by the Central Statistical Office, on the population registered for temporary stays more than 3 months and on the population (persons residing permanently in gmina) absent due to departures abroad for temporary stays for more than 3 months (until 2005 — more than 2 months).
	The results reflect the state as of the day of the survey; since 1992, as of 31 December each year (they concern migration stocks, not migration flows). The sources of this information are the registry units of gminas (documents on notifications).
Czech Republic	The sources of the data on migration are the Alien Information System and the Central Population Register. The CZSO receives data from the Directorate of Alien and Border Police Service and from the Ministry of the Interior of the CR. Foreigners and registration: EU citizens — free movement — registration (within one month of arrival) at the local Foreign and Border Police's Office; Third-country citizens — valid visa or residence permits (within 3 days of arrival) local Foreign and Border Police's Office Directorate of FBP transfers individual records on present foreigners monthly to the "Population Register".
Slovakia	All published data for demographic statistics are the result of the collection and the processing in the SO SR, except primary data relating to abortions, which are obtained from the Ministry of Health's sector surveying of the Slovak Republic realized by the National Health Information Centre (NCZI) in Bratislava and consequently processed by the SO SR. Broader information is provided in the publications State and Population Change, Age Structure of Population, Balance of Population Change by Municipalities, Balance of Population Change by Nationality and Development of Population.
	The methodology and content of demographic statistics are

	internationally comparable. The processing by classification point of the view is done according to the Register of the spatial units, the Statistical code-list of countries and code-lists of ethnic nationalities and marital status. Since 1994, causes of death have been processed according to the International Statistical Classification of Diseases and Related Health Problems, the tenth revision. The names of the countries are used according to international standard ISO 3166-93.
Slovenia	Data on the migration of citizens of the Republic of Slovenia are mediated in electronic form by the Ministry of the Interior to the Statistical Office of the Republic of Slovenia, based on information on the registration/deregistration of permanent residence in Slovenia and registration of temporary residence abroad and returns from other countries. Until the end of 2004, the aggregated data on the immigration of foreigners were supplied to SORS on the basis of the records on foreigners in Slovenia by the Ministry of the Interior. Since then, individual data have been provided by the same data source.
	Data on the international migration of citizens of the Republic of Slovenia also include a temporary absence from Slovenia because of a departure abroad (for more than 3 months) and arrivals after temporarily residing abroad.
	Data on the emigration of foreigners are estimated by the Statistical Office on the basis of the number of foreigners at the beginning and at the end of the calendar year, natural changes and the immigration of foreigners. We also take into account data on the acquisition of Slovenian citizenship.
	Data sources on the migrations of the population of Slovenia are: - annual statistical surveys conducted by the Statistical Office of the Republic of Slovenia on migration; - Aggregated data on the immigration of foreigners, mediated by the Ministry of the Interior — Administrative Internal Affairs Directorate, Ministry of the Interior — Central Population Register (data on the migrations of Slovene citizens).
	Annual statistical surveys cover: The registration and de–registration of permanent or temporary residence in Slovenia and the registration of temporary departure from or return to Slovenia (forms: Registration — De–Registration of Permanent Residence in the Republic of Slovenia, Registration — De–Registration of Temporary Residence in the Republic of Slovenia, and Registration of Temporary Departure from the Republic of Slovenia or Return to the Republic of Slovenia).
	Until the end of 1991, the permanent migration of the citizens of the SFR Yugoslavia was taken into consideration (citizens of all the republics of former Yugoslavia who immigrated to Slovenia or emigrated from Slovenia).
	From 1992 to 1994, only the data of the citizens of the Republic of Slovenia were taken into consideration.
	From 1995 onward, most tables also include the data on the international immigration and emigration of foreigners, when the Ministry of the

	Interior started to supply the Statistical Office with definite aggregated data on the immigration of foreigners.
	Data on international migration do not include the emigration of citizens of the Republic of Slovenia or foreigners in Slovenia who did not give departure notices upon leaving Slovenia.
	Since 1998, data on the international migration of citizens of the Republic of Slovenia also include temporary absences from Slovenia because of departures abroad (for more than 3 months) and arrivals after temporarily residing abroad.
	Data on the country of previous or next residence and the country of citizenship are classified according to ISO Standard 3166. In some tables, data are also presented by continents. For Europe, and North and Central America data are also presented by countries which Slovenia has major migration with.
United Kingdom	The Office for National Statistics (ONS) produces estimates of net migration. This is the balance between people entering the UK (inward migration) and people leaving the UK (outward migration).
	These estimates are mainly derived from data obtained from the International Passenger Survey (IPS) — a sample survey of passengers, including British citizens and other European Economic Area (EEA) nationals, arriving at and leaving air, sea and Channel Tunnel ports in the UK.
	The International Passenger Survey (IPS) data on migrants provides the basis for the Total International Migration estimates. These data are supplemented with the Irish Central Statistics Office data on flows to and from the Irish Republic. Other data sources allow us to adjust the data to cover migrants that are not captured in these sources.
	The data on net migration are subject to sampling and estimation error, and you should not give undue weight to one year's data.
Finland	Temporary moves are not included in the statistics on migration.
	Persons who have moved to Finland and intend to reside or have resided one whole year without interruption in Finland shall inform the register office of their place of residence (Population Data Act 507/1993). For those who intend to live permanently in Finland and have a valid residence permit for at least one year, the place of domicile is generally determined according to the same principles as with Finnish nationals (Act on the Municipality of Domicile 201/1994). The register office then delivers these data to the Population Information System.
Germany	Registration and foreigners: EU citizens: free movement — Local Registration Office — when an EU citizen establishes their main residence in Germany and informs the Local Foreigners Office; from January 2005 — Third-country citizens: residence permits — A foreigner gets a permit from the Local Foreigners Office if the intended length of stay is more than 3 months and the person is establishing their main residence in the area of the Local Registration Office.
Ireland	Source of Migration data: The principal source of information for the estimation of the gross annual migration flows is the Quarterly National

	Household Survey (QNHS – formerly annual Labour Force Survey), which also provides the basis for the classification of the flows by sex, age group, origin/destination and nationality (immigrants only). The migration estimates are compiled against the backdrop of movements in other migration indicators such as the number of PPS numbers allocated to non-Irish nationals, the number of work permits issued/renewed and the number of asylum applications.
Spain	The Residence Variation Statistics (RVS) are compiled by the INE, mainly using information regarding registrations and cancellations due to the changes of residence registered in the Municipal Registers, with variation dates from the reference year, and reflected in the INE register database up to the month of March (inclusive) of the year following the year of the study.

Appendix 2. Sample statistics

Table 1: Sectors

Sector	Number of observations	Percent of observations
Agriculture, hunting and forestry	47	7.9
Fishing	1	0.2
Mining	7	1.2
Manufacturing	119	20.1
Electricity, gas and water supply	8	1.4
Construction	72	12.2
Wholesale and retail trade; repair of motor vehicles, etc.	74	12.5
Hotels and restaurants	11	1.9
Transport, storage and communication	35	5.9
Financial intermediation	3	0.5
Real estate, renting and business activities	58	9.8
Public administration and defence; compulsory social security	4	0.7
Education	20	3.4
Health and social work	11	1.9
Other community, social and personal service activities	122	20.6
Total	592	100.0
Private sector total	470	79.4
Public sector total	122	20.6

Table 2: Size of enterprise

Size of enterprise	Number of observations	Percent of observations
5–9 employees	79	13.3
10–19 employees	109	18.4
20–49 employees	195	32.9
50–99 employees	109	18.4
100 or more employees	100	16.9

Table 3: Regions

Region	Number of observations	Percent of observations
Tallinn	184	31.1
North - Western	176	29.7
Tartu - Southern	152	25.7
Viru county	80	13.5

Appendix 3. Regression variables — differences in group means

Table 1: Differences in mean values for firm_emigr (dummy variable that equals one if at least one worker has emigrated from a given firm)

Variable	**Mean (var=1)**	**Mean (var=0)**	**Obs (var=1)**	**Obs (var=0)**	***t*-stat**	**P (diff=0)**
main_occ_lbc	0.162	0.213	136	403	–1.300	0.194
main_occ_hbc	0.167	0.208	96	443	–0.909	0.364
main_occ_lwc	0.096	0.219	83	456	–2.584***	0.010
main_occ_hwc	0.188	0.202	64	475	–0.274	0.785
region_harju	0.221	0.183	226	327	1.093	0.275
region_viru	0.187	0.201	75	478	–0.285	0.776
region_kesk	0.194	0.200	103	450	–0.133	0.894
region_louna	0.206	0.198	63	490	0.157	0.875
region_laane	0.151	0.208	86	467	–1.207	0.228
sector_agriculture	0.167	0.202	54	499	–0.624	0.533
sector_utilities	0.167	0.200	18	535	–0.348	0.728
sector_construction	0.282	0.184	85	468	2.099**	0.036
sector_manufacturing	0.276	0.187	76	477	1.822*	0.069
sector_public_services	0.025	0.212	40	513	–2.877***	0.004
sector_education	0.104	0.212	67	486	–2.070**	0.039
sector_medical	0.156	0.202	32	521	-0.622	0.534
sector_private_services	0.221	0.188	181	372	0.906	0.365
private_sector	0.237	0.059	435	118	4.348***	0.000

Table 2: Differences in mean values for firm_immigr (dummy variable that equals one if at least one worker has immigrated to a given firm)

Variable	**Mean (var=1)**	**Mean (var=0)**	**Obs (var=1)**	**Obs (var=0)**	***t*-stat**	**P (diff=0)**
main_occ_lbc	0.154	0.157	117	388	–0.088	0.930
main_occ_hbc	0.088	0.169	80	425	–1.853*	0.064
main_occ_lwc	0.070	0.171	71	434	–2.158**	0.031
main_occ_hwc	0.150	0.157	60	445	–0.146	0.884
region_harju	0.198	0.126	217	302	2.246**	0.025
region_viru	0.119	0.162	67	452	–0.885	0.377
region_kesk	0.146	0.159	103	416	–0.325	0.745
region_louna	0.143	0.158	56	463	–0.288	0.774
region_laane	0.092	0.167	76	443	–1.664	0.097
sector_agriculture	0.059	0.167	51	468	–2.019**	0.044
sector_utilities	0.063	0.159	16	503	–1.047	0.296
sector_construction	0.155	0.156	84	435	–0.036	0.971
sector_manufacturing	0.296	0.130	81	438	3.831***	0.000
sector_public_services	0.031	0.164	32	487	–2.012**	0.045
sector_education	0.048	0.171	62	457	–2.500**	0.013
sector_medical	0.080	0.160	25	494	–1.073	0.284
sector_private_services	0.202	0.134	168	351	2.015**	0.044
private_sector	0.187	0.029	417	102	3.984***	0.000

Table 3: Differences in mean values for firm_emigr_share (share of workers who emigrate from a given firm)

Variable	**Mean (var=1)**	**Mean (var=0)**	**Obs (var=1)**	**Obs (var=0)**	***t*-stat**	**P (diff=0)**
main_occ_lbc	0.011	0.011	136	403	0.105	0.917
main_occ_hbc	0.008	0.012	96	443	–0.793	0.428
main_occ_lwc	0.011	0.011	83	456	0.092	0.926
main_occ_hwc	0.017	0.010	64	475	1.378	0.169
region_harju	0.013	0.009	226	327	1.356	0.176
region_viru	0.008	0.011	75	478	–0.657	0.511
region_kesk	0.011	0.011	103	450	–0.064	0.949
region_louna	0.007	0.011	63	490	–0.913	0.362
region_laane	0.010	0.011	86	467	–0.347	0.729
sector_agriculture	0.006	0.011	54	499	–1.025	0.306
sector_utilities	0.006	0.011	18	535	–0.550	0.582
sector_construction	0.027	0.008	85	468	4.665***	0.000
sector_manufacturing	0.015	0.010	76	477	1.035	0.301
sector_public_services	0.000	0.012	40	513	–2.000**	0.046
sector_education	0.002	0.012	67	486	–2.152**	0.032
sector_medical	0.002	0.011	32	521	–1.500	0.134
sector_private_services	0.011	0.011	181	372	–0.084	0.933
private_sector	0.013	0.001	435	118	3.380***	0.001

Table 4: Differences in mean values for firm_immigr_share (share of workers who immigrate to a given firm)

Variable	**Mean (var=1)**	**Mean (var=0)**	**Obs (var=1)**	**Obs (var=0)**	**t-stat**	**P (diff=0)**
main_occ_lbc	0.008	0.010	117	388	–0.409	0.683
main_occ_hbc	0.011	0.009	80	425	0.261	0.794
main_occ_lwc	0.007	0.010	71	434	–0.539	0.590
main_occ_hwc	0.021	0.008	60	445	2.532**	0.012
region_harju	0.012	0.008	217	302	1.232	0.218
region_viru	0.006	0.010	67	452	–0.945	0.345
region_kesk	0.010	0.009	103	416	0.074	0.941
region_louna	0.012	0.009	56	463	0.647	0.518
region_laane	0.004	0.010	76	443	–1.475	0.141
sector_agriculture	0.001	0.010	51	468	–1.712*	0.087
sector_utilities	0.008	0.010	16	503	–0.188	0.851
sector_construction	0.017	0.008	84	435	2.213**	0.027
sector_manufacturing	0.015	0.009	81	438	1.438	0.151
sector_public_services	0.006	0.010	32	487	–0.522	0.602
sector_education	0.001	0.011	62	457	–2.068**	0.039
sector_medical	0.001	0.010	25	494	–1.230	0.219
sector_private_services	0.011	0.009	168	351	0.567	0.571
private_sector	0.011	0.002	417	102	2.260**	0.024

Note: The variables characterizing the occupational structure of a given firm are different in regressions. In the tables presented in Appendix 2, the group means are given for dummy variables that equal one if a given occupational group is the largest in the company. In regressions, we use variables that measure the share of workers in a given occupational group.

Appendix 4. Emigration and immigration — regression analysis on the basis of the Tobit estimation method

Table 1: Characteristics of firms from which workers emigrate: Tobit regression estimates

	(1)	(2)	(3)	(4)
occ_hbc	0.001	−0.003	−0.003	−0.002
	(0.806)	(0.429)	(0.481)	(0.533)
occ_lwc	−0.000	0.002	0.003	0.005
	(0.995)	(0.759)	(0.669)	(0.420)
occ_hwc	−0.014**	−0.004	−0.003	−0.000
	(0.019)	(0.458)	(0.610)	(0.949)
region_harju	0.005	0.003	0.003	0.002
	(0.220)	(0.416)	(0.485)	(0.656)
region_viru	0.001	0.003	0.002	0.001
	(0.875)	(0.567)	(0.609)	(0.821)
region_kesk	0.003	0.003	0.002	0.002
	(0.519)	(0.535)	(0.600)	(0.673)
region_louna	0.002	0.003	0.003	0.002
	(0.738)	(0.482)	(0.492)	(0.625)
sector_agriculture		−0.003	−0.002	−0.002
		(0.400)	(0.446)	(0.543)
sector_utilities		−0.003	−0.003	−0.003
		(0.585)	(0.571)	(0.468)
sector_construction		0.009*	0.009*	0.010*
		(0.083)	(0.084)	(0.064)
sector_manufacturing		0.004	0.004	0.003
		(0.303)	(0.298)	(0.392)
sector_public_services		−0.011***	−0.004	−0.005
		(0.000)	(0.463)	(0.319)
sector_education		−0.006**	0.008	0.007
		(0.015)	(0.328)	(0.340)
sector_medical		−0.005	−0.002	−0.003
		(0.116)	(0.619)	(0.438)
private_sector			0.011***	0.011***
			(0.000)	(0.000)
ln_empl				0.002***
				(0.003)
Observations	553	553	553	553

*Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1*
Marginal effects (evaluated at mean values) are reported.

Table 2: Characteristics of who hires immigrant workers: Tobit regression estimates

	(1)	**(2)**	**(3)**	**(4)**
occ_hbc	−0.000	−0.003	−0.002	−0.002
	(0.922)	(0.543)	(0.611)	(0.646)
occ_lwc	0.000	−0.000	0.001	0.003
	(0.995)	(0.990)	(0.929)	(0.626)
occ_hwc	−0.015**	−0.005	−0.003	−0.000
	(0.026)	(0.482)	(0.608)	(0.964)
region_harju	0.010**	0.007*	0.006	0.006
	(0.034)	(0.091)	(0.102)	(0.135)
region_viru	0.003	0.003	0.003	0.002
	(0.613)	(0.607)	(0.604)	(0.742)
region_kesk	0.008	0.006	0.005	0.006
	(0.224)	(0.288)	(0.299)	(0.270)
region_louna	0.008	0.007	0.007	0.007
	(0.335)	(0.311)	(0.290)	(0.299)
sector_agriculture		−0.007***	−0.007***	−0.006***
		(0.000)	(0.001)	(0.002)
sector_utilities		−0.005	−0.004	−0.004
		(0.315)	(0.308)	(0.349)
sector_construction		0.000	0.000	0.002
		(0.979)	(0.977)	(0.661)
sector_manufacturing		0.005	0.005	0.004
		(0.162)	(0.161)	(0.214)
sector_public_services		−0.007**	0.006	0.007
		(0.011)	(0.677)	(0.668)
sector_education		−0.008***	0.002	0.002
		(0.000)	(0.791)	(0.736)
sector_medical		−0.006**	−0.004	−0.004
		(0.011)	(0.228)	(0.139)
private_sector			0.010***	0.010***
			(0.000)	(0.000)
ln_empl				0.002***
				(0.000)
Observations	519	519	519	519

*Notes: Robust p-values in parentheses; *** p<0.01, ** p<0.05, * p<0.1.*
Marginal effects (evaluated at mean values) are reported.