

The Structure of Migration in Estonia: Survey-Based Evidence

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Abstract

This paper presents new evidence from a unique survey of firm managers on migration patterns in Estonia in 2007. An 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. 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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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. The structure of emigration from Estonia was analysed 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 that is analysed in the current article is to fill in this gap at least partially. A new approach was used 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 provides information on cross-border migration in the EU and covers 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 analysed in the current article is that it is especially targeted at gathering information on migration 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 analysed 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 the emigrants. 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

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, Sweden, United Kingdom, Finland and Ireland).

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

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

All the above mentioned 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 to the international flight market.

Besides the above mentioned 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 were available for Eastern

³ Carrington and Detragiache (1999); Docquier and Marfouk (2004).

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.

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 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 et al. (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; whereas, 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 years old). 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 emigrants that were covered by previous emigration studies analysing the structure of emigration: education, nationality, age and sex. In addition to that, since the survey targeted enterprises, it enabled us to analyse 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 analyse the characteristics of enterprises that were exposed to the international movement of labour. The regression analysis covered both emigration and immigration.

⁵ See Bonin et al. (2008) for migration from the EU-8 to the EU15; Barrett et al. (2008) and Riley and Weale (2006) for Ireland; and Blanchflower and Shadforth (2007), Dustmann et al. (2007) and Drinkwater et al. (2006) for the United Kingdom.

⁶ Wadensjö (2007); Barrett et al. (2008); Dustmann et al. (2007).

⁷ Fihel et al. (2006); Pollard et al. (2008); Blanchflower and Shadforth (2007).

The current article is structured as follows. The next section analyses the sample design and presents an assessment of the volume of migration in 2007. The third section focuses on the evaluation of the individual profile of the emigrants from Estonia. The fourth section describes the results of the regression analysis on firm characteristics related to immigration and emigration. The final section presents the conclusions.

2. Sample Design and Assessment of the Volume of Migration in Estonia in 2007

2.1. 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 was collected in January 2008, with the questions referring to 2007. The survey covered 592 enterprises employing 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 1 presents the breakdown of the data by sectors, size groups and regions. The overview of the survey questions which obtain information on the number of emigrants and immigrants is given in Appendix 2.⁸

The most widely used data source that provides information on cross-border migration in the EU and covers the socio-demographic characteristics of migrants are the Labour Force Surveys (LFS). Currently, standardised LFSs are carried out in all EU member states. Their main advantage is the 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 enables 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 analysed 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 surveys. For smaller EU member states, the LFS samples are often not large enough to assess migration flows with sufficient preciseness. The

⁸ We also collected information about the characteristics of emigrants, such as their age, sex, education, etc. No such questions were asked in relation to immigration. For the group of immigrant workers, the survey only enables us to assess the share of immigrant workers in employment and to analyse the characteristics of companies where they work.

migration survey analysed in the current article targeted enterprises rather than individual workers as the LFSs do.

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 current sample only makes it possible to analyse the characteristics of emigrants who are employed. 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.

Table 1. Share of “Do Not Know” Answers across Size Groups

Enterprise size group	Share of “do not know” answers	
	Emigration	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%

Source: Bank of Estonia’s migration survey, authors’ calculations

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 1 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.

2.2. 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 3,800 to 5,800 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 4,900 to 7,500 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.⁹ However, it is important to note that this result cannot be generalised 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.

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.

3. The Structure of Emigration

3.1. Emigration by Educational Level and Occupational Group

In the questionnaire the firms were asked to indicate the educational level of the employees who left their organisation 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

⁹ 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.

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 (see Table 2). 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 2. Emigration by Educational Level in 2007

	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, Bank of Estonia's migration survey and authors' calculations

Table 3. 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%

Source: Bank of Estonia's migration survey and authors' calculations

In the survey we asked the firms to answer, what was the occupational group of the employees that left their organisation 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 (see Table 3). 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.

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 (see Table 4). 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 4. Median Income by Educational Level in the EU and Estonia in 2004-2006
(as a Percent of the Median Income among People with Tertiary Education)

	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

Source: Eurostat

Table 5. 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 (*)	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	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	2.3	4.9	2.4
2007	4.1	4.5 (*)	3.3 (*)	2.7	3.6	2.6

Note: * data from 2006

Source: Eurostat

In 2007, the unemployment rate in Estonia was one of the lowest in the enlarged European Union (see Table 5). 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.

The share of emigrants was higher among blue-collar workers than among 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 workers¹⁰ (see Table 6). In Estonia, the relative income level of low-skilled blue-collar workers was significantly lower than in the UK, Ireland and Finland. The relative incomes of both highly-skilled blue-collar workers¹¹ and low-skilled white-collar workers¹² were quite similar to the respective levels in the three main destination countries. The relative income of highly-skilled white-collar workers¹³ was somewhat higher in Estonia.

Table 6. Annual Earnings by Occupational Groups in the EU in 2005–6
(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

¹⁰ Low-skilled blue-collar workers belong to the group “elementary occupations”.

¹¹ 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”.

¹² Low-skilled white-collar workers belong to the following groups: “clerks” and “service workers and shop and market sales workers”.

¹³ Highly-skilled white-collar workers belong to the following groups: “legislators, senior officials and managers” and “professionals”.

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 (see Table 7). 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.

Table 7. Unemployment Rates by Occupational Groups in Estonia (%) for 2003–07

	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

Source: Eurostat

3.2. 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%) (see Table 8). 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 the 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 (see Table 9).

Table 8. 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	3.4%	0.5%
Secondary	223	63.2%	1.1%
Tertiary	105	29.7%	0.4%
Public sector	13	3.7%	0.2%
Total	353	100%	

Source: Bank of Estonia's migration survey and authors' calculations

Table 9. 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%
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%
Total	54,471	353	0.6%

Source: Bank of Estonia's migration survey and authors' calculations

Table 10. Emigration Structure by Selected Characteristics in 2007

		Number of emigrants	Share in the sample	Share in the population*
Age	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%	
Gender	Male	246	69.7%	50.3%
	Female	106	30.0%	49.7%
	Total	352	100.0%	100.0%
Nationality	Estonian	224	63.5%	67.6%
	Other	129	36.5%	32.4%
	Total	353	100.0%	100.0%

Notes: * Sources for population shares: Age – Estonian Labour Force Survey (2006/2); other characteristics – Statistics Estonia

Source: Statistics Estonia, Bank of Estonia's migration survey, Estonian Labour Force Survey and authors' calculations

As was concluded in the overview of the literature, the international experience of migration reveals that men and young people are more likely to emigrate. A similar result is formed on the basis of our survey. The emigration of workers in 2007 was heavily dominated by younger individuals (see Table 10). 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 (see Table 10). Although in Estonia the share of males and females is roughly equal in the labour force, men comprised 70% of the emigrants.

In addition, the firms were also asked 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 (see Table 10), and that emigration was relatively more intense from South and North-East Estonia and less so from Tallinn (see Table 11).

Table 11. Emigration Structure by Regions in 2007

	Number of emigrants	Share of total number of emigrants	Emigrants out of regional employment
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%

Source: Bank of Estonia migration survey, authors' calculations

4. Characteristics of Firms Exposed to Migration: Regression-based Analysis

4.1. Estimation Methodology

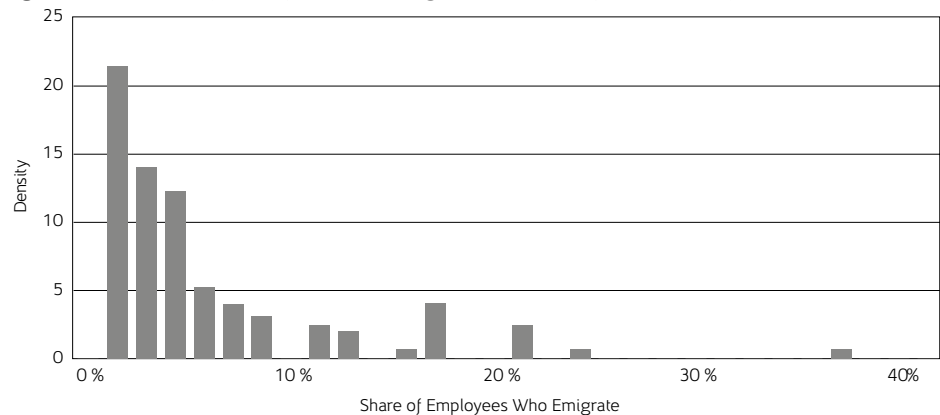
In the following, a regression analysis is employed to assess the characteristics of the firms who hire immigrants and from where workers emigrate. The dataset that is based on the migration survey contains firm-level data. Therefore, regressions to analyse the immigration or emigration profile of an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

Two alternative estimation methods are used for regression analysis: probit and Tobit regressions. Probit can be used for a binary dependent variable. For that purpose, a dummy variable was created that equals one if at least one employee has left the firm because of emigration. An analogous dummy variable was constructed for immigration. Assessments were made on 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 1, it can be observed that the density distribution for values that are above zero for this variable can be approximated by a truncated normal distribution. This justifies the use of the Tobit model in the current analysis.¹⁴

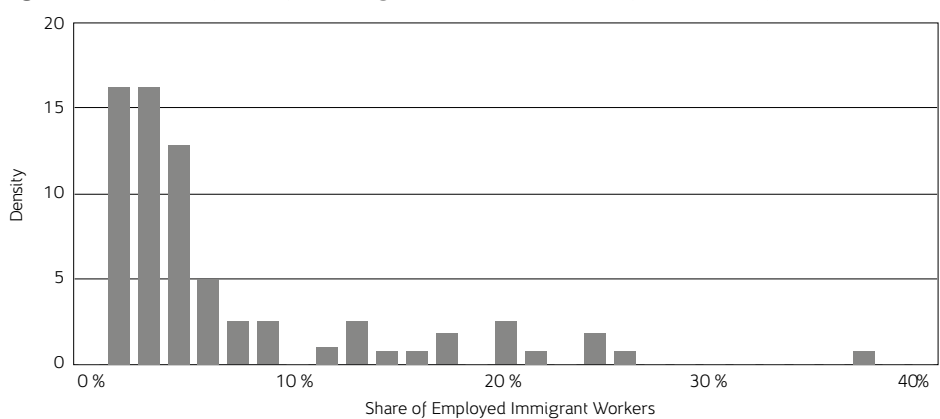
Figure 1. The Share of Employees Who Emigrate – Frequency Distribution for Above-Zero Values



Source: Authors’ calculations

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 2). On the basis of this, the Tobit model was used to analyse the characteristics of firms who hire immigrants, analogously to the analysis of emigration.

Figure 2. The Share of Employed Immigrant Workers – Frequency Distribution for Above-Zero Values



Source: Authors’ calculations

¹⁴ 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.

4.2. Analysis of Emigration

Table 12 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. The current article reports 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.

The current study reports on the regression results for four different specifications. The first one includes two sets of control variables: occupational groups and regions. The variables characterising 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 12. 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%.

The estimated marginal effects presented in Table 12 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.

Table 12. Characteristics of Firms from Which Workers Emigrate: Probit Regression Estimates

	(1)	(2)	(3)	(4)
Occupational group (Reference = low-skilled blue-collar)				
High-skilled blue-collar	0.014	-0.037	-0.031	-0.017
	(0.824)	(0.550)	(0.617)	(0.770)
Low-skilled white-collar	0.033	0.068	0.081	0.170*
	(0.711)	(0.466)	(0.387)	(0.067)
High-skilled white-collar	-0.175**	-0.059	-0.041	0.048
	(0.032)	(0.497)	(0.630)	(0.561)
Region (Reference = Lääne)				
Harju	0.076	0.049	0.041	0.010
	(0.157)	(0.357)	(0.435)	(0.851)
Viru	0.032	0.054	0.047	0.002
	(0.636)	(0.414)	(0.473)	(0.970)
Kesk	0.054	0.048	0.039	0.025
	(0.393)	(0.432)	(0.519)	(0.675)
Lõuna	0.059	0.083	0.082	0.049
	(0.411)	(0.253)	(0.254)	(0.464)
Sector (Reference = private services)				
Agriculture		-0.040	-0.036	-0.020
		(0.497)	(0.547)	(0.732)
Utilities		-0.038	-0.039	-0.055
		(0.674)	(0.664)	(0.499)
Construction		0.067	0.066	0.097*
		(0.195)	(0.195)	(0.067)
Manufacturing		0.059	0.059	0.034
		(0.281)	(0.274)	(0.511)
Public services		-0.185***	-0.025	-0.059
		(0.007)	(0.864)	(0.641)
Education		-0.091*	0.187	0.167
		(0.100)	(0.156)	(0.156)
Medical		-0.059	0.010	-0.028
		(0.417)	(0.907)	(0.728)
Private sector			0.212***	0.193***
			(0.003)	(0.003)
Ln(employment)				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.

Source: Authors' calculations

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 service companies and most education sector organisations are publicly owned.

The final finding on the basis of the probit regressions presented in Table 12 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 A3.1 in Appendix 3); where the dependent variable is the share of workers who emigrate, which indicates that it is not entirely driven by the above mentioned regularity.

In addition to evaluating the propensity to emigrate on the basis of the probit models, the current article estimates 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 A3.1 in Appendix 3). The current article also reports 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.

4.3. Analysis of Immigration

Next, is the analysis of the relationship between various firm characteristics and the tendency to hire immigrant workers. Table 13 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, the calculations use heteroscedasticity-robust standard errors and evaluate the marginal effects at mean values. For consistency, the choice of RHS variables in the regressions analysing 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%.

Table 13. Characteristics of Who Hires Immigrant Workers: Probit Regression Estimates

	(1)	(2)	(3)	(4)
Occupational group (Reference = low-skilled blue-collar)				
High-skilled blue-collar	0.018	-0.006	0.000	0.005
	(0.748)	(0.912)	(0.999)	(0.924)
Low-skilled white-collar	-0.021	-0.017	-0.007	0.061
	(0.812)	(0.847)	(0.940)	(0.498)
High-skilled white-collar	-0.190**	-0.061	-0.042	0.029
	(0.013)	(0.477)	(0.616)	(0.732)
Region (Reference = Lääne)				
Harju	0.124**	0.091*	0.085*	0.067
	(0.022)	(0.083)	(0.095)	(0.152)
Viru	0.036	0.037	0.035	0.005
	(0.605)	(0.588)	(0.601)	(0.938)
Kesk	0.078	0.063	0.059	0.062
	(0.222)	(0.296)	(0.318)	(0.267)
Lõuna	0.062	0.066	0.071	0.062
	(0.397)	(0.354)	(0.314)	(0.347)
Sector (Reference = private services)				
Agriculture		-0.106**	-0.102**	-0.089*
		(0.028)	(0.030)	(0.051)
Utilities		-0.089	-0.086	-0.080
		(0.270)	(0.267)	(0.298)
Construction		-0.036	-0.035	-0.006
		(0.370)	(0.371)	(0.892)
Manufacturing		0.080*	0.079*	0.061
		(0.083)	(0.080)	(0.150)
Public services		-0.120*	0.073	0.087
		(0.054)	(0.661)	(0.618)
Education		-0.111**	0.076	0.096
		(0.034)	(0.544)	(0.412)
Medical		-0.083	-0.042	-0.056
		(0.199)	(0.602)	(0.432)
Private sector			0.168**	0.160**
			(0.022)	(0.021)
Ln(employment)				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.

Source: Authors' calculations

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 hire immigrant workers (in comparison to firms hiring mostly low-skilled blue-collar workers). The coefficient for this variable is rendered insignificant when sector controls are added to the regression. The results also show 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).¹⁵ 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 10% level when the employment-based measure of firm size is not added to the regressions.

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 is positive and highly significant in the probit as well as in Tobit regressions.

Table A3.2 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.

¹⁵ The Harju region is the North-Western area of Estonia, including Tallinn, the capital of the country.

5. Conclusion

This paper presents new evidence from a unique survey of firm managers on the migration patterns in Estonia in 2007. An 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 generalised 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 analysed 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. 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.

References

- Bach, S., Corneo, G. and Steiner, V. 2007. The Entire Distribution of Market Income in Germany, 1992 – 2001. *CEPR Policy Insight*, No. 4, June 2007.
- Barrett, A., McGuinness, S. and O'Brien, M. 2008. The Immigrant Earnings Disadvantage across the Earnings and Skill Distributions: The Case of Immigrants from the EU's New Member States in Ireland. *IZA Discussion Paper*, No. 3479.
- Blanchflower, D. and Shadforth, C. 2007. Fear, Unemployment and Migration. *NBER Working Paper*, No. 13506.
- Bonin, H., Eichhorst, W., Florman, C., Hansen, M., Skiöld, L., Stuhler, J., Tatsiramos, K., Thomasen, H. and Zimmermann, K. 2008. Geographic Mobility in the European Union: Optimising Its Economic and Social Benefits. *IZA Research Report*, No. 19.
- Carrington, W.J. and Detragiache, E. 1998. How Big is the Brain Drain? *IMF Working Paper*, No 102.
- Docquier, F. and Marfouk, A. 2004. Measuring the International Mobility of Skilled Workers (1990-2000). *World Bank Policy Research Paper*, No. 3381.
- Drinkwater, S., Eade, J. and Garapich, M. 2006. Poles Apart? EU Enlargement and the Labour Market Outcomes of Immigrants in the UK. *IZA Discussion Paper*, No. 2410.
- Dustmann, C., Frattini, T. and Preston, I. 2007. A Study of Migrant Workers and the National Minimum Wage and Enforcement Issues that Arise. *Research Report Commissioned by the Low Pay Commission*.
- Fihel, A., Kacmarczyk, P. and Okolski, M. 2006. Labour Mobility in the Enlarged European Union: International Migration from the EU8 Countries. *CMR Working Paper*, No. 14(72), Centre of Migration Research, Warsaw.
- Katz, L. and Autor, D. 1999. Changes in the Wage Structure and Earnings Inequality. *Handbook of Labour Economics*, Vol. 3, pp. 1463–1555.
- Pollard, N., Latorre, M. and Srisakandarajah, D. 2008. Floodgates or Turnstiles? Post-EU Enlargement Migration Flows to (and from) the UK. *Report of the Institute of Public Policy Research*.
- Riley, R. and Weale, M. 2006. Immigration and its Effects. *National Institute Economic Review*, No. 198.
- Wadensjö, E. 2007. Migration to Sweden from the New EU Member States. *IZA Discussion Paper*, No. 3190.

Appendix 1. Sample Statistics

Table A1.1. 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

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Table A1.2. 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 A1.3. 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 2. The Number of Emigrants and Immigrants: Related Survey Questions

1. How many employees left your company during 2007 in relation to starting a new job in a foreign country?

(Please indicate the number of employees):

- a) Temporarily (employment contract was suspended)
- b) Permanently (employment contract was terminated)
- c) Do not know

Note: Ask question 2 if the answer to 1. b) was larger than zero.

2. For what time period was the employment contract suspended for these workers who moved abroad temporarily?

(Please indicate the number of employees):

- a) Up to 6 months
- b) From 6 to 12 months
- c) More than 12 months
- d) Do not know

3. How many employees who started the employment in your company in 2007 lived abroad previously or had a previous job outside Estonia?

(Please indicate the number of employees):

- a) Number of employees
- b) Do not know

Note: Ask question 4 if the answer to 3 was larger than zero.

4. What was the country of origin for these employees who lived abroad previously and/or had a previous job outside Estonia?

(Please indicate the number of employees):

- a) Estonia
- b) Other
- c) Do not know

Appendix 3. Emigration and Immigration: Regression Analysis on the Basis of the Tobit Estimation Method

Table A3.1. Characteristics of Firms from which Workers Emigrate: Tobit Regression Estimates

	(1)	(2)	(3)	(4)
Occupational group (Reference = low-skilled blue-collar)				
High-skilled blue-collar	0.001	-0.003	-0.003	-0.002
	(0.806)	(0.429)	(0.481)	(0.533)
Low-skilled white-collar	-0.000	0.002	0.003	0.005
	(0.995)	(0.759)	(0.669)	(0.420)
High-skilled white-collar	-0.014**	-0.004	-0.003	-0.000
	(0.019)	(0.458)	(0.610)	(0.949)
Region (Reference = Lääne)				
Harju	0.005	0.003	0.003	0.002
	(0.220)	(0.416)	(0.485)	(0.656)
Viru	0.001	0.003	0.002	0.001
	(0.875)	(0.567)	(0.609)	(0.821)
Kesk	0.003	0.003	0.002	0.002
	(0.519)	(0.535)	(0.600)	(0.673)
Lõuna	0.002	0.003	0.003	0.002
	(0.738)	(0.482)	(0.492)	(0.625)
Sector (Reference = private services)				
Agriculture		-0.003	-0.002	-0.002
		(0.400)	(0.446)	(0.543)
Utilities		-0.003	-0.003	-0.003
		(0.585)	(0.571)	(0.468)
Construction		0.009*	0.009*	0.010*
		(0.083)	(0.084)	(0.064)
Manufacturing		0.004	0.004	0.003
		(0.303)	(0.298)	(0.392)
Public services		-0.011***	-0.004	-0.005
		(0.000)	(0.463)	(0.319)
Education		-0.006**	0.008	0.007
		(0.015)	(0.328)	(0.340)
Medical		-0.005	-0.002	-0.003
		(0.116)	(0.619)	(0.438)
Private sector			0.011***	0.011***
			(0.000)	(0.000)
Ln(employment)				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 A3.2. Characteristics of Firms that Hire Immigrant Workers: Tobit Regression Estimates

	(1)	(2)	(3)	(4)
Occupational group (Reference = low-skilled blue-collar)				
High-skilled blue-collar	-0.000	-0.003	-0.002	-0.002
	(0.922)	(0.543)	(0.611)	(0.646)
Low-skilled white-collar	0.000	-0.000	0.001	0.003
	(0.995)	(0.990)	(0.929)	(0.626)
High-skilled white-collar	-0.015**	-0.005	-0.003	-0.000
	(0.026)	(0.482)	(0.608)	(0.964)
Region (Reference = Lääne)				
Harju	0.010**	0.007*	0.006	0.006
	(0.034)	(0.091)	(0.102)	(0.135)
Viru	0.003	0.003	0.003	0.002
	(0.613)	(0.607)	(0.604)	(0.742)
Kesk	0.008	0.006	0.005	0.006
	(0.224)	(0.288)	(0.299)	(0.270)
Lõuna	0.008	0.007	0.007	0.007
	(0.335)	(0.311)	(0.290)	(0.299)
Sector (Reference = private services)				
Agriculture		-0.007***	-0.007***	-0.006***
		(0.000)	(0.001)	(0.002)
Utilities		-0.005	-0.004	-0.004
		(0.315)	(0.308)	(0.349)
Construction		0.000	0.000	0.002
		(0.979)	(0.977)	(0.661)
Manufacturing		0.005	0.005	0.004
		(0.162)	(0.161)	(0.214)
Public services		-0.007**	0.006	0.007
		(0.011)	(0.677)	(0.668)
Education		-0.008***	0.002	0.002
		(0.000)	(0.791)	(0.736)
Medical		-0.006**	-0.004	-0.004
		(0.011)	(0.228)	(0.139)
Private sector			0.010***	0.010***
			(0.000)	(0.000)
Ln(employment)				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.