ERASMUS UNIVERSITY ROTTERDAM

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When Does FDI Reduce Emigration from Central and Eastern European Countries?

Only Interacting With Human Capital

Master Thesis

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Abstract

This paper investigates the relationship between emigration flows and foreign direct investments (FDI) in Central and Eastern European countries (CEEC). This link is addressed through the following questions: are outgoing labour force and incoming foreign direct investments in those countries complements or substitutes and how does the human capital situation in the country change the effect FDI has on emigration? For the empirical analysis, data from eight CEE countries for the period of 1998-2010 was employed. The estimation results revealed that FDI and the level of educational attainment in the country work as push factors of emigration; however, when interacting, they discourage people from leaving. This suggests that only simultaneous programs should be implemented in the improvement of the educational quality and in the attraction of foreign investors in order to reduce excessive emigration from CEECs.

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1. Introduction

Recent labour force growth projections estimated that the decrease of the labour force in Central and Eastern European countries (CEEC) will be far more dramatic than in the rest of the European Union (EU). It is predicted that the forthcoming decades will face a 19% loss in CEEC compared to 3% in the rest of the EU between 2010 and 2050. High emigration rates of young individuals and poor policies attracting immigrants are largely responsible for this loss (World Bank, 2012).

Theories of international labour mobility claim that labour force flows to those countries where the marginal product of labour (MPL) is higher. This process continues until full MPL equalisation between the respective countries. The average net migration rate observed in the Organisation for Economic Co-operation and Development (OECD) countries is around 3 per thousand inhabitants (OECD data). Some emigration, even of skilled labour, can be beneficial as it creates: productivity opportunities for the emigrants as well as international networks which can work as channels of knowledge transfer stimulating trade between countries. Moreover, there is a possibility that a migrant will return with enhanced skills contributing to the human capital formation of the sending country. Despite these benefits, there is also a fiscal loss from the leave of high income earners and the deterioration of productivity and growth due to the loss of human capital. Knowing this, the situation in certain countries could be regarded as worrisome: in, for example, Lithuania the net migration rate in 2010 was – 23.7 per 1 000 inhabitants – the lowest in the EU (OECD data). This leads to thinking that wage difference is perhaps not the only motive for migration.

One might say that in CEEC there have always been a vast amount of individuals who would rather migrate to other countries in search of security and wellbeing, than stay in their home country and strive for the personal and national welfare. This was prominent when the Soviet Union collapsed and the opportunity to migrate was regained after a long period of political isolation and suppressed spatial mobility (Kaczmarczyk and Okólski, 2005). This tendency was observed again when CEEC entered the EU in 2004. Due to one of the four Common Market's freedoms – free movement of people – a large wave of emigrants left home seeking for a brighter future abroad. In addition to wage differences, the search for a better environment to market professional abilities also played a role. Emigration was steadily increasing, but not to a dramatic level yet as around 2006 global economy was in its temporary highs. CEE countries were not exceptional. Some sectors were blooming above

all: the financial sector, providing numerous mortgages for individuals, who were buying real estate at sky rocketing prices; and the construction sector, that was able to pay their workers wages that were closely comparable to Western Europe. However, the extent of migration was enhanced by the financial crisis in 2008 and peaked in 2010 indicating that people lost hope that the crisis will be over soon and the economy will return to 2006 levels.

Currently there is a topic in the public debate: if FDI inflows might be a viable way to tackle excessive flows of emigrants, as investments provide jobs, training and usually higher wages. Moreover, it can set guidelines of required skills for local education systems, which programmes should be supported in order to attract and please the foreign investor. Not to mention the fact, that the side effect of that – improved quality and the level of human capital – is confirmed by the number of empirical studies to reduce the incentives to emigrate. Why would companies invest in CEEC? Facing the crisis, companies are forced to search for the new business possibilities and solutions. In the press, one can occasionally notice articles that Baltic countries are coping with financial difficulties consistently and cautiously. One might wonder that this ability to survive downturns is not surprising, as those countries not in a far past have experienced tougher times, when they suddenly had to emerge after the fall of the Soviet Union. They had to learn the market rules from scratch in order to compete in a capitalistic world. This previously demonstrated capability to rise up could encourage international players to invest in these countries.

It is not clear, however, whether FDI reduces emigration in CEEC: the literature on this topic shows ambiguous results and little empirical research has been conducted on these particular countries. Based on mentioned anecdotal speculation in the media, this paper hypothesises that in CEEC emigration and FDI are substitutes. This study is also interested whether the interaction between higher education attainment and FDI has a joint effect on emigration rates. In addition, the understanding of CEEC migration trends would value from finding other push and pull factors contributing to emigration decision and from examining the difference between men and women migration behaviour. To address these questions this study makes use of the interaction model that helps dealing with conditional hypothesis regarding FDI and human capital relationship and its effect on emigration. A panel of 8 CEE countries (the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, and Slovenia) spanning from 1998 to 2010 is employed, running an OLS estimation with country fixed effects. In addition, an extensive overview of migration, FDI and educational attainment trends is presented.

The paper is organised as follows. Firstly the relevant literature on the relationship of the factor flows and the connection between FDI and human capital is reviewed. Then after the relevant trends of CEEC economies are presented, section 4 provides information on the employed data and estimation specifications. Lastly, the results are reported following by the conclusions and implications.

2. Literature

The understanding whether FDI and migration are complements or substitutes is important for policy formation targeted to manage migration flows. The majority of empirical studies argue for a complementarity relationship between labour and capital flows. This result is especially prevalent if a gravity model is employed to investigate the existence of networks created by migrants. However, there are studies that obtain evidence of substitution effect mainly in the least developed countries where FDI improves labour market conditions by creating jobs, providing training or giving incentives to invest in the human capital formation. Therefore, the literature review is constructed in the following sequence: firstly the overview of the studies that contribute to the literature proving that FDI and migration flows are complements; then follow authors verifying the substitution effect and lastly the short glimpse on the literature investigating the FDI effect on human capital formation as a possible channel of labour and capital movement relationship.

A large strand of literature is devoted to the topic of business and social networks investigating whether migrants promote cross border investments. The bilateral or the one fold data is analysed to answer the question if the stock of migrants in the foreign country creates necessary connections and eases the way for foreign capital to reach the migrants' home country. Or on the contrary – the migrant creates relevant environment for home capital to reach the foreign country. In both ways complementarity relationship is generated between flows of labour and capital.

Most of the studies analyse the causality direction going from migration to capital flows. Kugler and Rapoport (2005) using US data on bilateral labour inflows (distinguished by education level) and capital outflows for 1990 and 2000 find that skilled as well as unskilled emigration outflows are followed by FDI inflows. The authors discuss that unskilled labour is acting as an indicator of a high quality labour force in a sending country and consequently attracting investors. Regarding the skilled diaspora, the complementarity effect is explained

with the reasoning of networks. Docquier and Lodigiani (2010) address the issue of the same relationship by analysing cross-section and panel data models focusing on the period 1990–2000 with a sample of 114 countries. They control for a share of high-skilled workers in the country which captures the effect of human capital on capital accumulated from FDI. The effect of the human capital might be ambiguous depending on what investors are looking for in the country – a productive skilled or cheap unskilled labour. The results of both cross section and panel analysis reveal the existence of strong network effects, mainly associated with the skilled diaspora.

A paper of Javorcik et al. (2011) is devoted to investigate the link between the presence of migrants in the US and the US FDI in the migrants' countries of origin in 1990 and 2000. The authors use a number of control variables: proxies for potential market size, purchasing power of consumers in the partner country, macroeconomic stability and the political conflicts in the area. Also a dummy for English speaking countries, distance measure and the proxy for the fixed costs of setting business in the country. Javorcik et al. take care of the endogeneity problem by using the instrumental variables technique. The results suggest that US FDI abroad is positively correlated with the presence of migrants from the host country when the analysis is concentrated on the college graduates, but no significance is found when regressing on the aggregate stock of migrants. Moreover authors make a distinction between sectors and find a positive relationship between FDI in a given sector in a partner country and the stock of migrants from that partner country employed in this sector in the US.

Gheasi et.al (2011) paper investigates the relationship between the stock of foreign population by nationality living in the UK and the bilateral volume of FDI, both inward FDI into the UK and outward FDI from the UK from 2001 to 2007 for 22 partner countries. The authors use traditional gravity model and control variables like GDP per capita, geographical distance between the UK and a migrant's sending country and institutional quality. They find that there is a significant relationship only between the stock of migrants and the outward investments from the UK. After correcting for education level, results indicate that the relationship between both inward and outward FDI and migrants stock is stronger when the level of education rises. De Simone and Manchin (2012) explore the same bilateral relationship between EU 15 and 2004 accession countries. They also focus on the network benefits and find evidence of how networks' created removal of informational, cultural and reputational barriers spur high income countries' investments in immigrants' economies of origin. The effect is enhanced with the increase of migrants' education level as better educated individuals are more capable of creating necessary connections. To sum up, the

complementary relationship seems to be stimulated by the networks and connections that migrants make in the host countries with the effect being stronger when education level of migrants is higher. Factors that are positively affecting the network effect, as evident from these works, are: political and institutional stability, high development of the country, good quality of business climate, lower price of entering the market, trade openness (especially for the vertical investments) and, finally, larger market size. Factors that affect investments negatively are: large distance between countries, high inflation and conflicts in the receiving country.

Differently from the studies mentioned above, there are authors interested in the opposite causality, regressing the emigration flows on the lagged value of FDI flows. One of these studies is by D'Agosto et al. (2006). According to their panel analysis assessing the effect of FDI from OECD countries on emigration flows from developing countries, there still is a complementarity between the two variables despite the opposite causality. The authors also run a cross section analysis trying to find out whether there is also an indirect effect of FDI on migration via human capital formation channel. Authors, utilising their theoretical framework, argue that FDI can have a direct positive effect on migration flows by increasing the wealth in developing countries and enhancing the network effects. On the other hand, negative – substitution – effect will increase labour demand in developing countries. As for the indirect effect, FDI in developing countries in different ways can boost human capital formation improving internal labour market conditions and reducing incentives to migrate. In this case substitution effect will prevail and offset the incentive for high skilled workers to migrate to take advantage from better opportunities abroad. The results confirm the direct positive (complementarity effect) and indirect negative (substitution effect) of FDI on emigration flows from developing countries with complementarity effect being stronger. However, the negative effect via human capital formation confirms that human capital accumulation negatively affects the migration of highly skilled labour.

On the contrary to studies proving complementary relationship between capital and labour movements, Wang and Wong (2011) get somewhat different results. They are investigating international migration using the bilateral data for the 35 least developed countries in 1990 and 2000. They found that inward FDI tends to deter the out-migration of individuals with secondary and tertiary education, but has no significant impact on the outward migration of individuals with primary education. Thus only the skilled, educated diaspora proves the substitution hypothesis. However, one must note, that the authors' dataset of migrants contained the least developed countries. Possibly due to the same reasons related to the lower

level of development as in the Wang and Wong (2011) paper, Aroca and Maloney (2004) analysing Mexican states' data also find substitution effect between FDI and labour flows after controlling for general level of amenities, costs of living, networks and trade variables. The reason why in the least developed areas FDI and migration flows are substitutes can be explained by the channel of human capital: more specifically, the FDI effect on human capital formation. This effect is analysed by the papers mentioned below.

Zhuang (2008) presented evidence about the change in stock of educated people in China after the investment liberalisation which started in the 1980s. In the beginning of the liberalisation period the share of educated Chinese people declined and this is because most of the multinational firms that started their activities back then were export oriented, therefore, the demand of low skilled labour increased. Foreign firms were paying higher wages for the unskilled labour compared to the local ones and it made workers overcome opportunity to invest in their education as the payment was satisfying anyway. Only the increase in middle school education was observed as foreign companies largely required a basic level of education. In the 1990s, the profile of the foreign investments changed and more firms engaged in capital and technology intensive sectors where Chinese firms had no comparative advantage. As such, it raised the demand for highly educated labour and led to a higher stock of skilled labour in China. He (2011) with his analysis for the period from 1981 to 1998 found a proof in line with the one of Zhuang's (2008), namely, that FDI promotes human capital accumulation in China, and higher degree of financial deregulation enhances the promoting effect. Research by Soltanpanah and Karimi (2011) presents similar evidence of positive effect in Malaysia, Thailand and Indonesia. The authors discuss that the presence of multinational enterprises in developing countries act as guidelines for the local authorities of the skills demanded by the market. Therefore, it is possible that governments will promote the education in those fields by higher financing. Empirical study of Mughal and Vechiu (2010) investigated the determinants of tertiary and secondary education for the period 1999 to 2006 in two datasets: low income and middle income developing countries. The main independent variables are FDI and economic growth. Differently from the above mentioned studies, the impact of FDI is found to be negative for both secondary and tertiary education levels for both datasets. The authors explain this by the unreadiness of developing countries for liberalised trade and financial sectors: the lack of needed infrastructure and institutions that would be responsible for the safety and stabilisation measures during the times of transition and volatility. They also point out their short period of observation that does not grasp the shock of the short term adjustment costs.

To sum up, the consensus in the field is that the effect of FDI on human capital formation depends on the level of development in the country. How FDI and human capital formation affects the migration flows in a particular country is a matter of empirical analysis.

3. Case study – Central and Eastern European Countries

3.1. Migration trends

That migration in CEEC deserves more scholarly attention becomes apparent when one is introduced with migration trends in those countries. Observing the analysed period 1998-2010 (Fig. 1), one will notice that emigration flows go up by a factor ranging from 1.2 in Latvia to 10.3 in Lithuania. At the same time, emigration doubles in the Czech Republic, Estonia, and Slovenia, triples in Hungary and Poland and in Slovenia goes up by factor 6. This and following information is based on Eurostat data on emigration flows if it is not noted differently.

Figure 1. Emigration rates in given countries (% of total population) 1998-2010
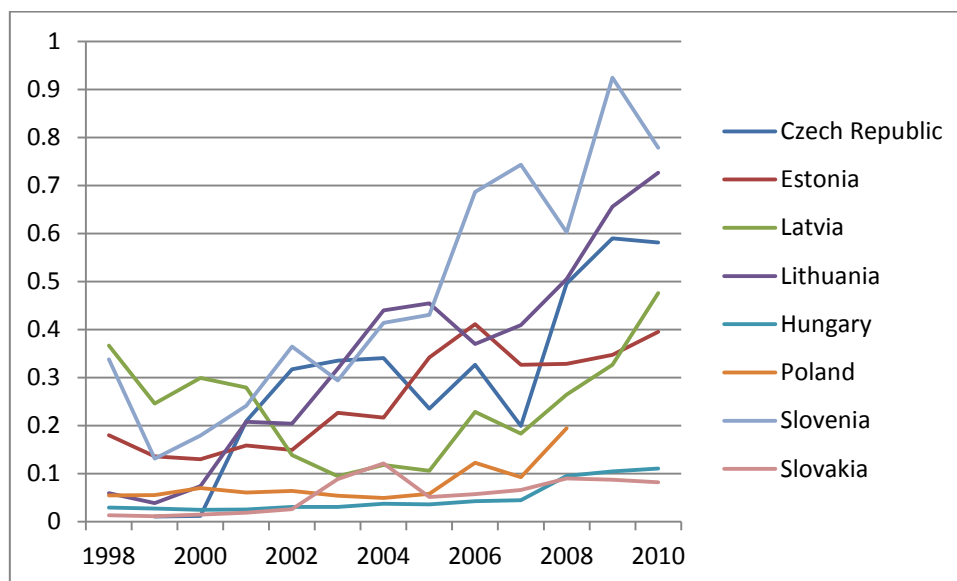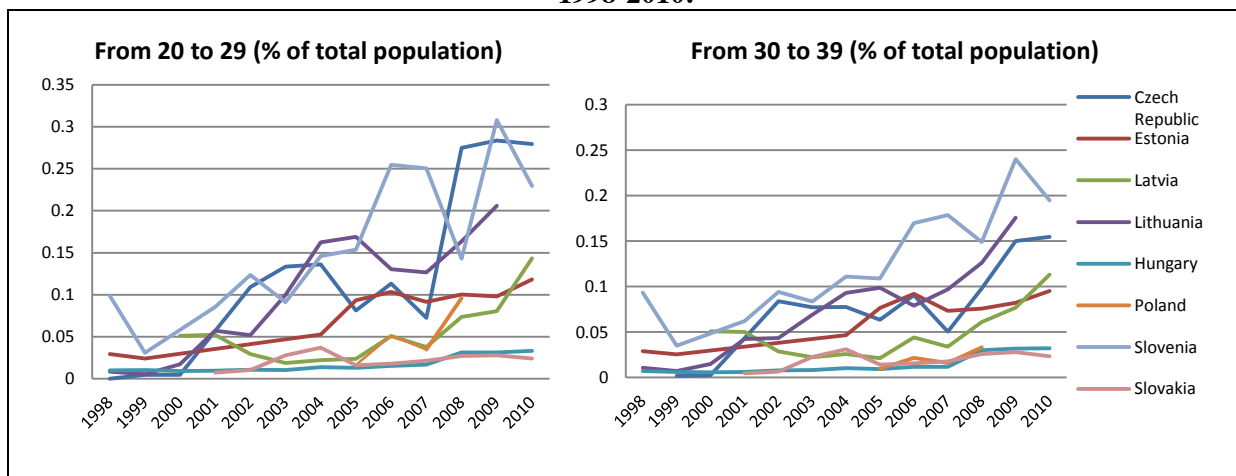

Source: Eurostat data on International Migration

According to OECD study (2012) the emigration growth rate in CEEC is the highest in the OECD countries. In all countries except Hungary, women emigration rate is higher than the one of men. This difference is often explained by the larger demand in wealthier OECD countries in home services sector where women tend to dominate.

3.1.1. Changes of the trend during the observation period

The largest emigration flows are observed in the age group from 20 to 29 years in some countries reaching 0.3 percent of the population (further – %). In the interval between 30 and 39 the trend is very similar; however, the fluctuation in most countries does not exceed the margin of 0.17% (Fig. 2). Other age groups do not present major differences from the first two; just the rates are significantly lower. Due to this reason the remaining age groups are not mentioned in the further overview.

Figure 2. Emigration rates in two main age groups (% of total population) in given countries, 1998-2010.

Source: Eurostat data on International Migration by age, sex

In Slovakia there was a minor increase in 2004. Apart from that the average remained around 0.02% for both age groups.

Slovenia faced a rapidly increasing number of emigrants with extraordinary surges in 2006 with 0.25% for the first age group and 0.17% for the second one; and in 2009 with 0.31% for the first and 0.24% for the second age group.

Not surprisingly, Poland saw a constant increase of emigration rates which rose sharply in 2006 reaching 0.05%.

Hungarian emigration changes were not significant during the period apart from an increase in 2008, coinciding with the commencement of the financial crisis that hit Hungary considerably. As a consequence, emigration numbers doubled and reached around 0.03% for both age groups.

The share of young Lithuanian emigrants was rapidly increasing and skyrocketed in 2004 to 0.15% for the first age group and 0.1% for the second. The number of citizens leaving the

country slowed down for a while till the crisis occurred. Then the emigration exceeded even the highs reached after the accession. Since then, the number keeps increasing every year.

The decreasing trend of Latvian emigrants was reversed in 2004 and after that was increasing rapidly with the acceleration in 2008. The second age group reacted with a short delay, shifting the trend in 2006 and 2008. Apparently the young Latvians were pioneers in this regard.

The rate of Estonian emigration was steady, constantly floating around 0.1% of population for the youngest and twice lower for the other age groups after the accession to the EU, with a peak in 2006 for both age groups. This perhaps relates to the popular stereotype of their calm national character.

The number of Czech emigrants in the first age group was steadily increasing up to 2004 when the Czech Republic became a net immigration country with the emigration trend going downwards. However, the picture changed in the beginning of the crisis when emigration skyrocketed from 0.07% in 2007 to 0.27% and is rising ever since. The behaviour of the second age group showed a slightly different pattern. This group did not react to the 2004 accession maintaining a steady emigration rate of around 0.07% of the population up until 2008. However, this group was highly affected by the financial crisis which sawed numbers nearly double up to 0.15%.

Distinguishing between sexes, Slovak, Hungarian, Lithuanian, Polish, Latvian, men and women have similar emigration trends and levels. Czechs reacted differently to the accession to the EU, where the amount of males leaving the country was double the amount of females. However, the reaction to the financial crisis was more similar. Slovenian women on the other hand reacted totally differently. After the accession to the EU, the number of female emigrants fell, then rose again in 2007 and remained at the same level even during the crisis. Slovenian men, on the other hand, were behaving more pro-cyclically: the number increased in 2004 and 2009.

It is evident that CEE nationals are sensitive to business cycle fluctuations – both peaks and downturns. The game-changers in CEEC migration trends were: 2004 – the accession to the EU; 2006 – when economies where blossoming; and 2008-2009 – the start of the financial crisis. One could speculate that this pattern is related to the weak national recognition which pushes people to leave. Not only when inviting (personal, social or economical) opportunities emerge abroad, but also when the times become difficult in the home country.

3.1.2. Destinations

It is not surprising that one of the main CEEC migration destinations in the EU have typically been, and still are, the United Kingdom and Ireland, as they chose not to exercise the country member's right to restrict free entrance of 2004 accession countries' nationals for up to seven years and let them into their labour market. Moreover, English, being one of the most common international languages, augmented the temptation to pick these countries as a destination of choice. Consequently, Britain was the most popular destination for Lithuanians and Latvians in 2004 and the second most popular for all other countries included in this study with the exception of Slovakia. The nationals of these countries chose Germany as their first preference, indicating that the requirement of a work permit was not seen as an obstacle to migrate. The list of popular destinations continues with Spain. Despite Spain's current financial hardship, the immigrant flows did not diminish even in 2008. Citizens of Baltic countries were also interested in moving to Scandinavian countries, particularly Sweden, Denmark, and Norway. Between Central European countries, Austria tends to be a frequent country of destination.

3.1.3. Changes of numbers of international students

Not all emigrants left their country for work: some of them moved abroad to acquire an education. The number of students studying in foreign countries was steadily increasing in all countries (except Slovenia) with the UK and Germany being the main destinations. In most countries, the numbers of students seeking education abroad more than doubled; and in Lithuania and the Slovak Republic increased more than 2,5 times between 2004-2009. There was a significant hike in numbers in all countries in 2008 (OECD, 2012). It is a common tendency that when an economic crisis strikes and unemployment goes up, people choose to continue studying instead of being unemployed. This trend is justified by recent student outflow from Greece which is facing large financial difficulties.

3.1.4. Migrants' level of education

A recent OECD study (2012) provides information on emigration distinguished between levels of education for 2000 and 2005/6. Even though OECD data does not cover the whole period of observation of this study, the discussion on the situation of educational level of emigrants is convenient for the general understanding.

All countries observed in this study show that citizens with a medium level of education hold the largest share of emigrants. Although there is a variation between countries whether the second largest group of emigrants has high or low education. In all countries apart from

the Slovak Republic, Slovenia, and in 2000 in Lithuania and Poland the part of highly educated emigrants (not distinguishing between sexes) was higher. Comparing sexes in the same education level it becomes apparent that the share of women in low educated emigration is always higher than that of men. However, the opposite is occurring with high education in which men are more represented. Contrary to global trends that hold that in highly educated part of society more women than men are migrating, in CEECs the picture is somewhat different (OECD, 2012). In most cases the rate of highly educated men leaving the country is higher than the rate one of women. The reason for this could perhaps be located in the prevailing patriarchal model of these societies and a sedentary character and lifestyle. The exceptions are: Estonia and Latvia, where this pattern is observed only in 2000, but in 2005 reverses; Slovenia, where in 2005 the percentage of highly educated emigrants of both sexes becomes equal.

In most cases more highly than low educated men were leaving, except the Slovak Republic, Slovenia and in 2000 Poland with Lithuania. In 2000 in all countries except Estonia and Latvia, more low than highly educated women were leaving. However five years later, in the Czech Republic, Estonia, Hungary and Latvia the situation reversed, whilst in Poland, the Slovak Republic, Slovenia and Lithuania the number of leaving low educated women remained higher (see Appendix 2 for numbers).

3.1.5. Brain drain and over-qualification

Brain drain seems to be an extensive issue in CEEC. First of all, the emigration rate of highly educated grew during the period of 2000-2005. Secondly, the rates are high, in all countries, apart from the Czech Republic, Slovenia and Estonia, fluctuating around 10% and in Poland reaching even 15.8% of the highly educated population during 2005. For reference, in OECD countries the number is 3.8% unweighted and 7.8% weighted average. Lastly, the emigration rates of highly educated significantly exceed the total emigration rates starting with 1.3 percentage points in Hungary up to the Czech Republic where the numbers are 3 times larger. It is worth mentioning that in Hungary, Poland, the Slovak Republic and Latvia the percentage is twice as high. It should be noted that Brain drain is not a major problem if highly educated individuals actually engage in activities requiring high qualification. However, in CEECs the numbers of people having jobs for which they are overqualified is significant: while the OECD average stands at 30%, CEEC average is 43% varying from 21.7% in Slovenia up to 68.5% in Lithuania (OECD data). Major demographic problems of OECD countries like ageing population, declining youth cohorts and retiring baby-boom

generations (OECD, 2012) lead to labour demand and supply gap which is usually filled with immigrant labour. CEEC emigrants are often the ones to fill that unskilled labour demand gap and as such create a huge loss for sending countries' human capital.

Despite these negative aspects of emigration, sizeable amount of Eastern and Central Europeans are still considering the opportunity of finding a new home abroad. Approximately 18% of Central and Eastern Europeans have a desire to permanently leave their home country if they find an opportunity to do so. This number is the smallest in the Czech Republic – 10% and the largest in Latvia – 27% (OECD, 2012).

To sum up, the typical CEEC emigrant can be characterised as a 20-29 year-old highly educated male, likely wasting his potential in a low skilled activity. This is a huge loss for countries budget, as the state was likely subsidising that man's education for years; for countries overall productivity, as males of that age are the most active, innovative and productive; and attractiveness, as productive labour force is often likely to draw foreign investor's capital.

3.2. FDI and Human Capital trends

In order to justify the claimed relationship between migration and FDI in CEECs it is beneficial to get acquainted with the main trends of investments in those countries. As this study is interested in the human capital as a channel of impact FDI has on migration, this particular relationship of university graduates and FDI will also be discussed in the section below; more precisely, the sectors that attracted most investments and whether they have a connection with the most popular study programmes in those countries. Data on FDI, with the distinction between sectors and of university graduates of OECD countries, has been obtained from the OECD database. Adequate FDI data of non-OECD countries, Latvia and Lithuania, was obtained from those countries' national statistics offices websites. Relevant data on those countries' graduates that would be consistent with the data of other countries is unfortunately not available.

During the observation period foreign direct investments in the reporting countries grew ranging from around 3 times in Latvia and Hungary to almost 17 times in the Slovak Republic (Fig. 3). Slovenia and Lithuania experienced growth of nearly 4 times whilst Poland, the Czech Republic and Estonia found themselves around 7 times more attractive to foreign investors in 2010 than in 1998. Most countries reported larger growth even before joining the EU, as liberalisation of capital movements was already advanced before the

accession. Only Lithuania and Latvia received more investments after becoming member states. However, Latvian changes were considerably larger. During the 1998-2003 period investments grew merely by 17%, whereas in 2004-2010 it skyrocketed to 146%.

Figure 3. FDI stocks to GDP ratio in given countries 1998-2010
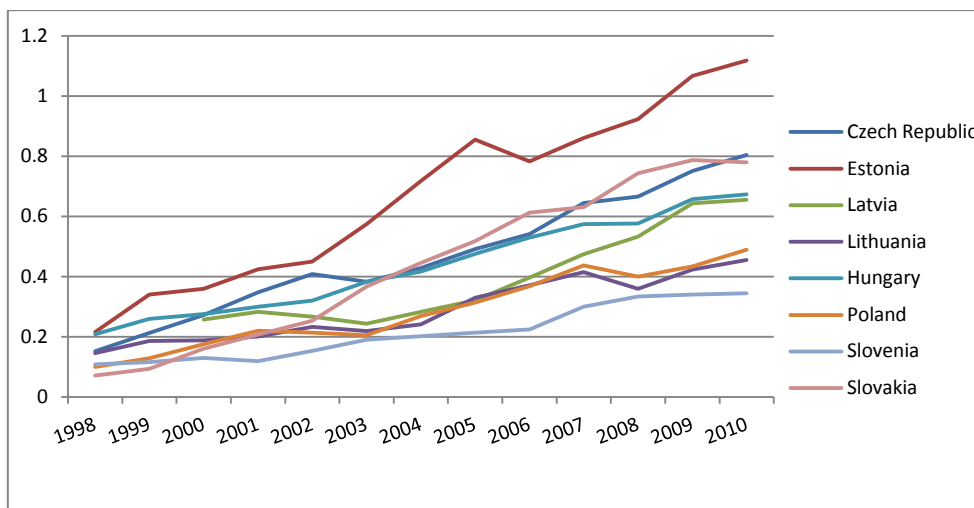
Source: Eurostat data on EU direct investment positions

Distinguishing between sectors between 2004 and 2010 Czech manufacturing grew 107%, whilst services grew 148%. Estonian manufacturing increased by 75% and services by 95%. Latvian numbers accordingly were 170% and 155%; Lithuanian – 85% and 161%; Hungarian – 8% and 109%; Polish – 107% and 161%; Slovenian – -3% and 100% and finally in the Slovak Republic manufacturing increased by 83% and services by 138% (Fig. 4).

**Figure 4. FDI positions by industry normalized by GDP in 2004 and 2010**
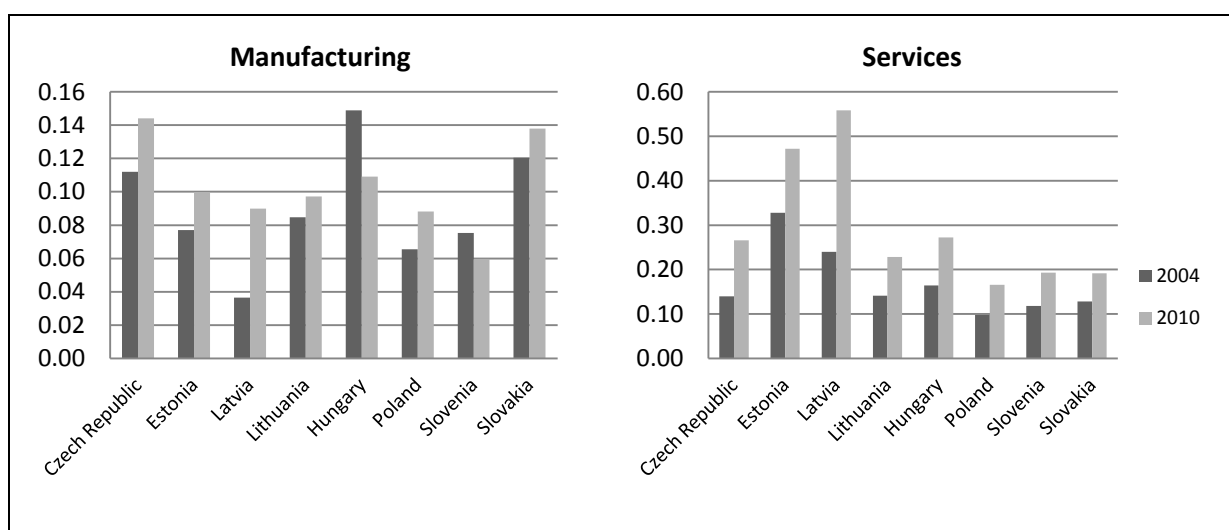
Source: OECD data on FDI positions by industry and GDP at current prices, USD; National Statistics Offices of Lithuania and Latvia

Further, the changes in the investments in particular sectors between two years are compared – 2004 – the first year after accession to the EU and 2010 – the last year of observation. Not the whole period of observation has been taken into account as some countries only started reporting data with a distinction between economic activities from 2004. To be consistent, the university graduates in sector-related study programmes are discussed comparing 2 periods: 1998-2003 and 2004-2010.

Comparing Czech services and manufacturing sectors, the largest share of investments in 2004 went to the services – 50% of total investments (further - %), with financial services in a leader position, followed by trade and repairs and lastly real estate, renting and other business activities (Fig. 5). Manufacturing received 40% of total investments, with the largest share in motor vehicles production. In 2010 the part reaped by services increased even more to 55%, with financial services again in the front; real estate renting and business activities at 15%. Manufacturing, meanwhile, earned only 29% where motor vehicles retained the same share of investments as in 2004.

Figure 5. Distribution of FDI in different industries/sectors (% of total FDI in the Czech Republic)
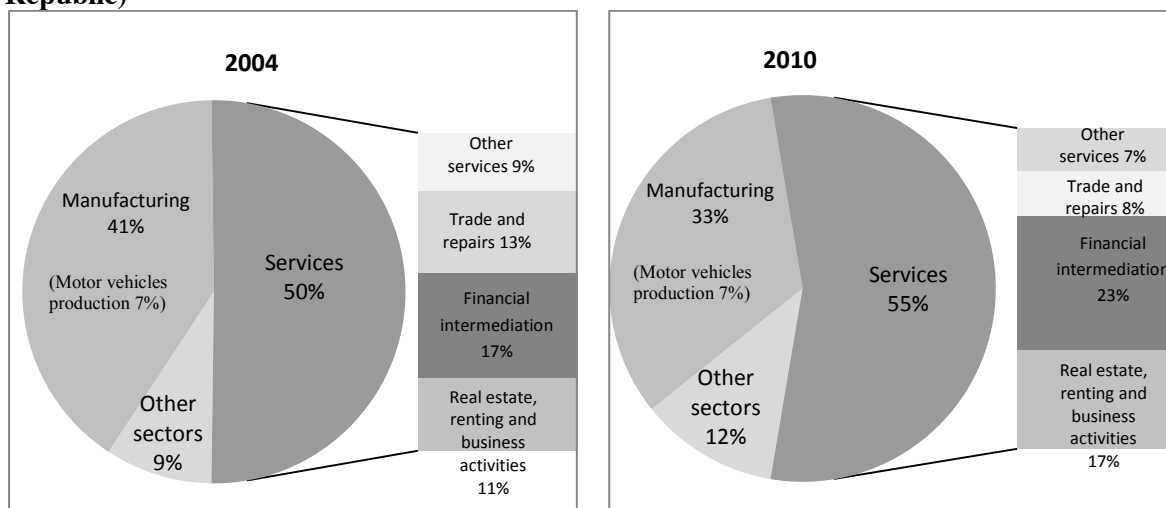
Source: OECD data on FDI positions by industry

Meanwhile, the largest share of graduates in the Czech Republic was engaged in studies related to social sciences business and law (Fig. 6). This area also demonstrated the largest growth in both periods - 1998-2004 and 2004-2010. The second largest group of students graduated from engineering and engineering trade programmes, however, with a diminishing growth rate. What concerns students in the manufacturing sector, the number of graduates in 1998 was 10 times and in 2010 almost 20 times lower than the one of social sciences, however, steadily growing with the increasing rate.
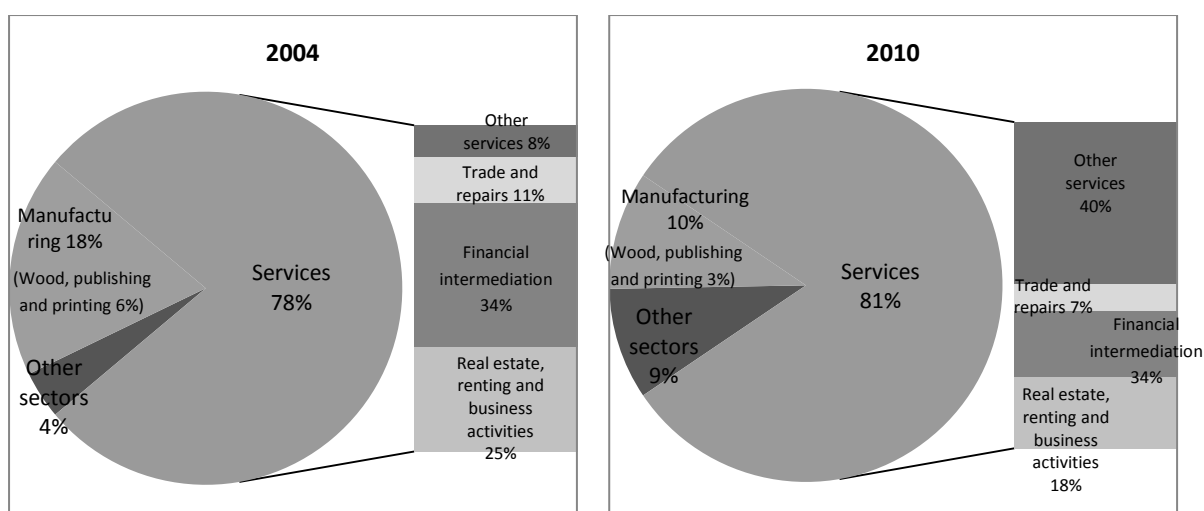
Figure 6. Distribution of students between three major fields of education in the Czech Republic
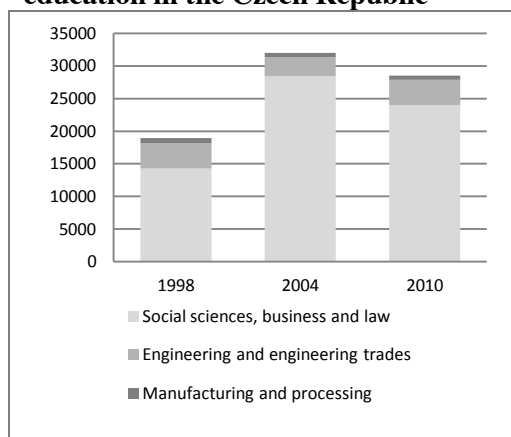
Source: OECD data on University graduates by the field of education

In Estonia both reference years witnessed investments mostly in the services sector – 71% in 2004 and 77% in 2010 (Fig. 7). In 2004, almost half of it was directed to the financial intermediation sector. Real estate renting and business activities did not lag behind much. The manufacturing sector in both years received only above 16% of investments with the largest share in wood, publishing and printing sector. In 2010 financial intermediation lost lead position to real estate, renting and business activities which increased to 29% of total investments.
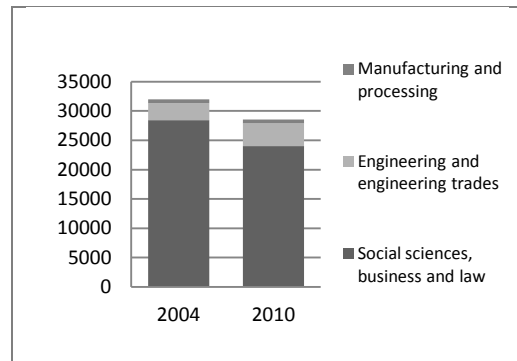
Figure 7. Distribution of FDI in different industries/sectors (% of total FDI in Estonia)

Source: OECD data on FDI positions by industry

Estonian students also largely chose education in the social sciences, business and law studies, with merely a small increase in 2010 compared to 2004 (Fig. 8). The number of students in manufacturing sector in both years was almost 20 times lower than that of social sciences, however, with a considerable 81% increase in 2010.

Hungary in 2004 was almost equally attractive to investors both in manufacturing and services sectors – respectively 39% and 43% of total foreign investments (Fig. 9). Manufacturing of motor vehicles and chemical products were the most successful in attracting investments. What concerns services, differently from previously discussed countries, real estate, renting and business activities received the largest share of investments, following by trade and repairs, transports, storage and communication, financial intermediation – all with approximately 8% of total investments. In 2010 the situation changed dramatically, when services took up 61% of total investments leaving only 25% for manufacturing. Most important in the services sector remained real estate, renting and business activities.

Figure 8. Distribution of students between three major fields of education in Estonia

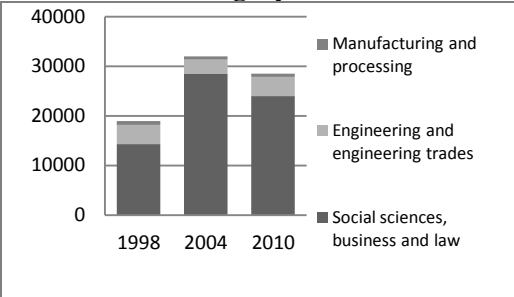Source: OECD data on University graduates by the field of education

Figure 9. Distribution of FDI in different industries/sectors (% of total FDI in Hungary)
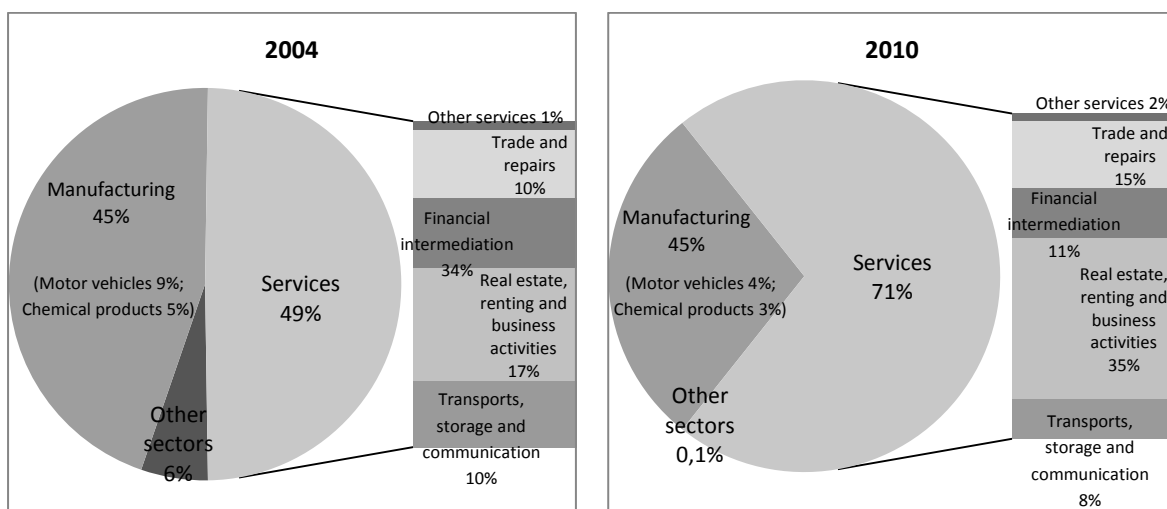
Source: OECD data on FDI positions by industry

In line with the other case studies, Hungarian students primarily showed interest in social sciences, business and law studies, with the number doubling in 2004 compared to 1998, but shrinking again in 2010 by 15% (Fig. 10). The number of engineering and engineering trade students was the second largest. In 2004, the amount decreased, but in 2010 returned to 1998 level. Manufacturing students' number was the smallest of the three and was falling throughout the years.

Figure 10. Distribution of students between three major fields of education in Hungary

Source: OECD data on University graduates by the field of education

Poland's manufacturing sector received 38% of total investments in 2004 with the most interest in the motor vehicles and food products (Fig. 11). Services on the other hand received 56% of investments where financial intermediation, trade and repair attracted 20% and 18% accordingly. In 2010 the picture was almost identical with only a small decrease of manufacturing and increase of services; financial intermediation forging ahead with 23% of total investments.

Figure 11. Distribution of FDI in different industries/sectors (% of total FDI in Poland)

Source: OECD data on FDI positions by industry

The number of Polish graduates in social sciences business and law programmes tripled in 2004 and kept growing, but on a slower pace, up until 2010 (Fig. 12). Engineering and engineering trade studies lost some interest in 2004, but regained in 2010. Unlike the other countries observed, the manufacturing sector in Poland witnessed a growing interest by the students.
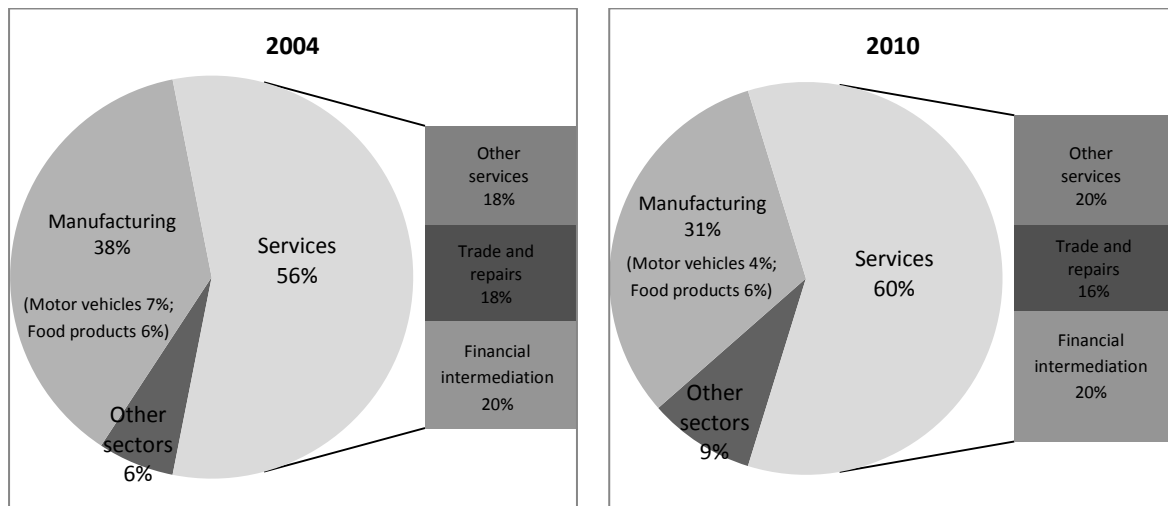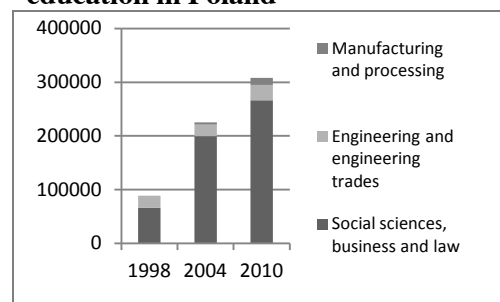
Figure 12. Distribution of students between three major fields of education in Poland

Source: OECD data on University graduates by the field of education

In the Slovak Republic in 2004 investments were divided almost equally between manufacturing and services, each receiving 43 and 46 per cent of total foreign investments accordingly (Fig. 13). In the manufacturing sector, metal products and refined petroleum sectors were most attractive, whereas in services again financial intermediation reaped the largest share of manufacturing investments in both years. The only considerable difference in 2010 was that the sector's investments were transferred to electricity, gas and water sector, leaving manufacturing with 34% of total investments.

Figure 13. Distribution of FDI in different industries/sectors (% of total FDI in Slovakia)
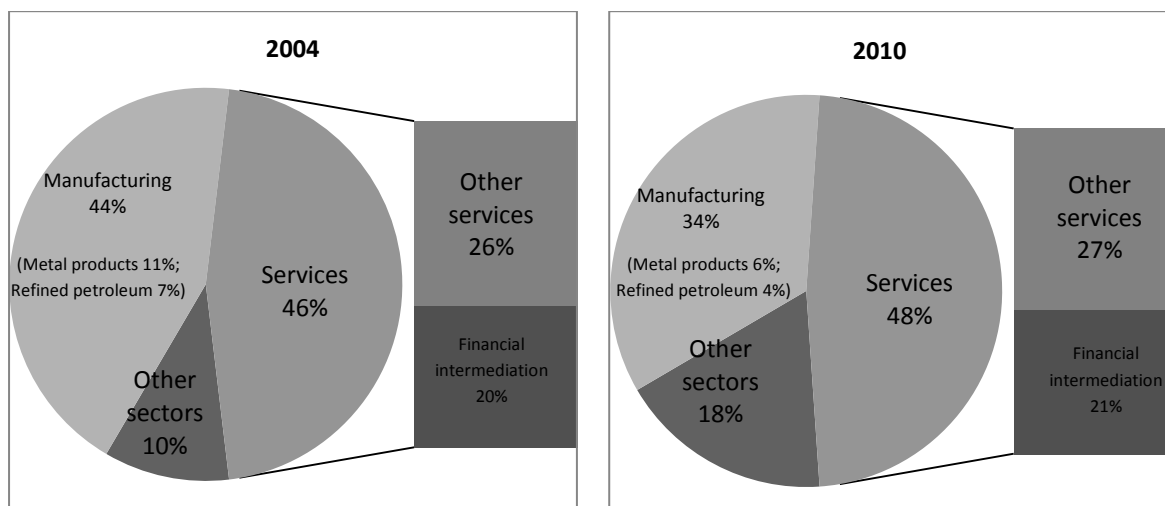
Source: OECD data on FDI positions by industry

In the Slovak Republic, both social sciences and engineering sectors were facing doubling numbers of graduates comparing 1998, 2004 and 2010 years (Fig. 14). The manufacturing sector, however, did not encounter any changes during 1998 and 2004, but in 2010 there was a significant increase of students.

Slovenia in 2004 received 37% of investments in the manufacturing sector with the largest share in pharmaceuticals, medicinal, chemical and botanical products (Fig. 15). Services gathered 58.5%, with

Figure 14. Distribution of students between three major fields of education in the Slovak Republic

Source: OECD data on University graduates by the field of education

financial intermediation in the front, closely followed by real estate, renting and business activities. In 2010 Slovenia became truly a services country with 72% of investments in that sector, where financial intermediation absorbed 44% of all foreign investments.
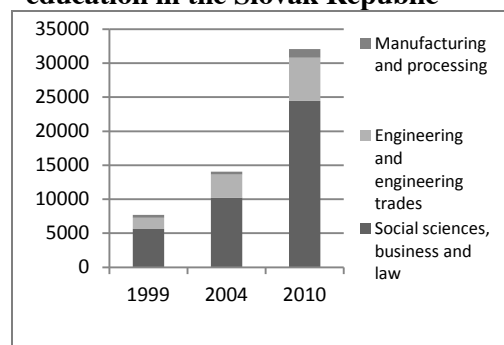
Figure 15. Distribution of FDI in different industries/sectors (% of total FDI in Slovenia)
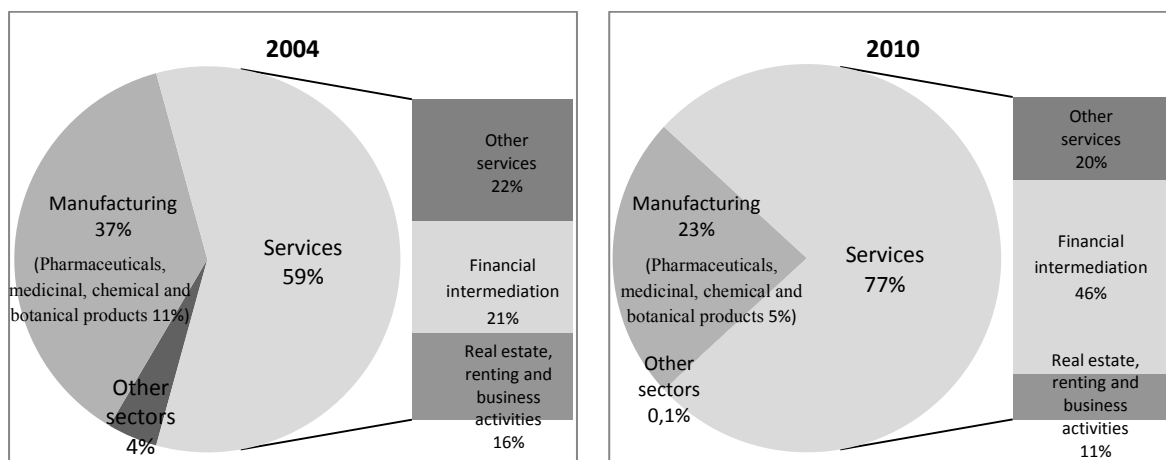
Source: OECD data on FDI positions by industry

In Slovenia, the interest of students comparing 2004 and 2010 was growing in the same rate in all study programmes (Fig.16).

Latvia during both years was more attractive to investors in service sector (77%) (Fig. 17). The manufacturing sector in 2004 received only 11.8%

Figure 16. Distribution of students between three major fields of education in Slovenia

Source: OECD data on University graduates by the field of education

19
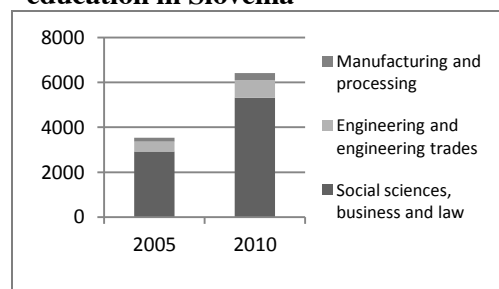
with a minor increase in 2010. Financial intermediation again absorbed most of the FDI followed by trade and repairs, lagging only by 4 percentage points. In 2010 financial services reaped 9% more investments than in 2004, leaving other sectors with considerably lower shares.

Figure 17. Distribution of FDI in different industries/sectors (% of total FDI in Latvia)
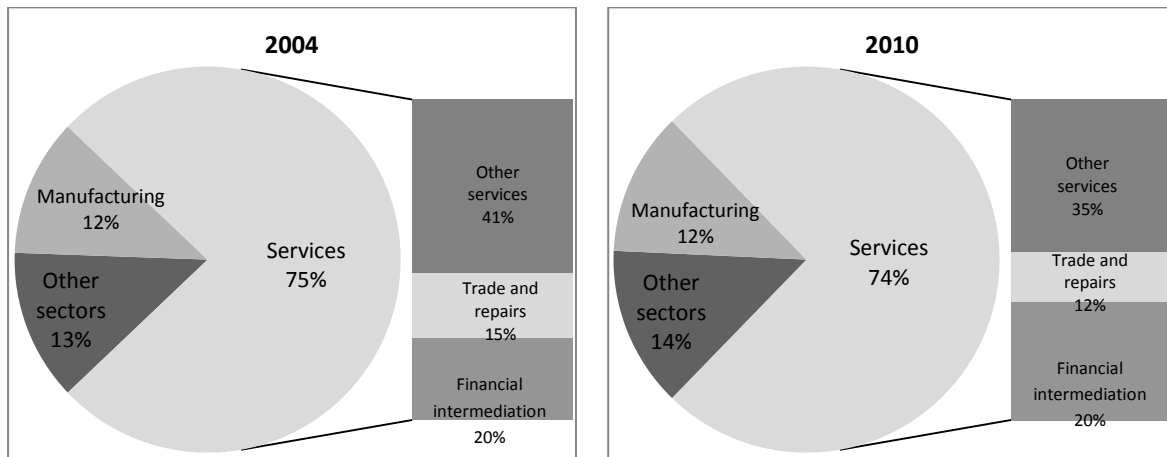
Source: Latvian Statistics Office data on FDI positions by industry

Lithuania's manufacturing sector in 2004 received 33% of total investments, half of which was secured by the manufacture of food products, beverages and tobacco and the sector of refined petroleum and chemical products (Fig. 18). In services, receiving 55% in 2004 and 62% in 2010, the main beneficiary was once more financial intermediation. In 2010, manufacturing investments went down by 6%, whilst the investments in services sector expanded.

Figure 18. Distribution of FDI in different industries/sectors (% of total FDI in Lithuania)
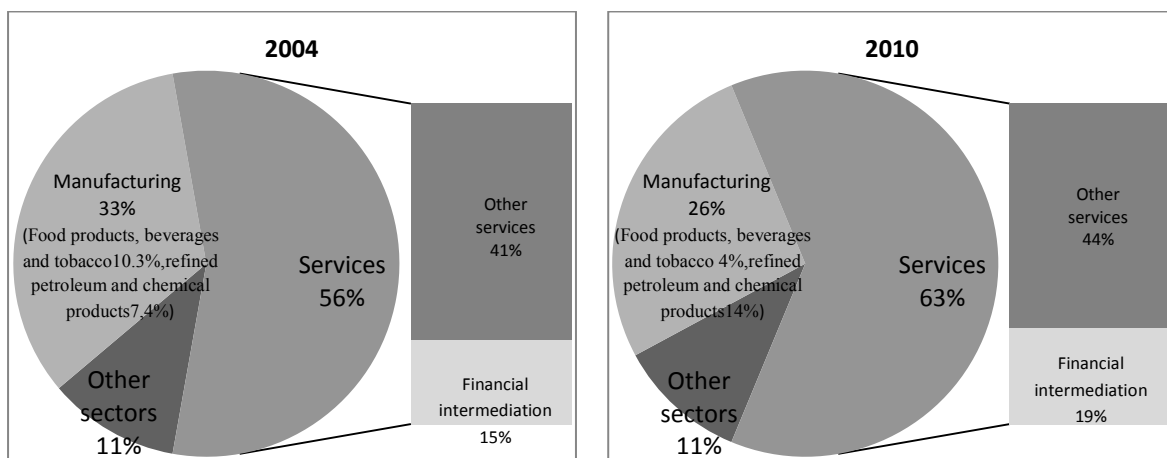
Source: Lithuanian Statistics Office data on FDI positions by industry

To conclude, in all countries services reaped a significantly larger share of investments than the manufacturing sector. In all countries, except for Hungary, financial intermediation was dominating, followed by real estate, renting and business activities and trade and repair sectors. In manufacturing, sub-sectors attractive to investors varied between countries. Concerning students, consistently with investments, the dominant share of the graduates was in social sciences (many of which fall into employment in the services sector), with manufacturing in most countries attracting only one tenth of the graduates or even less. However, different from the persistent trend of investments, where the share of manufacturing decreased in all countries, the share of university graduates that chose a programme in this field increased in all countries apart from the Czech Republic and Poland (the actual number of graduates in manufacturing studies graduates increased in both of these countries, decreasing only in Hungary).

It is no surprise that those countries that had a widely recognised, strong manufacturing sector, even though with a diminishing interest, were still receiving decent share of investments, as it is no secret that foreign investors tend to cherry pick the most profitable and most productive firms in the country. This explains why the Czech Republic, Slovakia, Poland, and Hungary still retained the importance of manufacturing, dominated by the automotive sector, even after the collapse of the Soviet Union. It is difficult to say if it is particularly foreign firms' activities in the sector that has resulted in the maintained interest in manufacturing and engineering studies in those countries.

From the data analysed above, it becomes evident that both investors and students are to the largest extent interested in social services and business sectors, where mostly highly educated labour force is located. It is difficult to speculate the existence of the relationship and the causality direction between students choice of education programmes and investors decision to invest in the country. Arguments can be made for both ways: investors make decision based on the potential of the labour force and qualifications in the country; students might choose to study in those fields that guarantee employment in foreign capital companies.

Clearly, CEE countries could not compete with Asian countries for investors in the manufacturing sector due to significantly higher labour costs. Therefore, it should be a viable strategy for CEECs to position themselves as services countries: not to mention the fact that it is beneficial for investors to bring their capital to CEEC's services sector, as they will likely find relatively highly educated, hardworking and English speaking labour force for relatively low labour costs.

4. Data and Specification

In this section, data description and specifications are presented. The most usual approach for this kind of analysis of factor relationships is utilising a gravity model that links bilateral flows (in this case FDI and migrants) between pairs of countries to their combined economic size and to the geographic distance. However, for the countries of interest and for the relevant time span, which includes the period after the accession to the EU, bilateral flows' data is not available. Therefore, using simple one-fold data, the panel of 8 CEE countries for the period of 1998-2010 is constructed. Due to the drawbacks of the dataset, not the accurate numerical results are of interest, but more general responsiveness of emigration to the changes of certain macroeconomic factors: whether they influence emigration negatively or positively.

Thus the estimated interaction model is:

$$lnEmig_{it} = \beta_0 + \beta_1 lnFDI_{it-1} + \beta_2 lnHUM_{it-1} + \beta_3 HCPI_{it-1} + \beta_4 lnWAGEratio_{it-1} + \beta_5 lnGDP_{it-1} + \beta_6 lnFDIxlnHUM_{it-1} + \beta_7 UNEMPdiff_{it-1} + f_i + \varepsilon_{it}$$

Where i is the migrant sending country and t is year 1998-2012, ε – the residual, f_i – country specific fixed effects.

$lnEmig_t$ stands for the logarithm of outflows of emigrants, who left the country in a particular year, normalised by the total population of each country. The data on migration flows in Eurostat database is available with a distinction between sexes; therefore, the constructed model is applied for males (*lnEmigmale*) and females (*lnEmigfem*) datasets to observe the differences between migration drivers of both men and women. One has to keep in mind that not all emigration is declared, therefore, the numbers in reality are higher. This is especially visible in the case of Lithuania in 2010, when data shows that the number of citizens leaving the country increased almost 10 times. This surge is not due to some extreme policy measures or economic shocks that made people leave, but it is related to changes introduced in the public health care scheme, requiring all registered residents of Lithuania to pay monthly insurance contributions. Therefore, people, who had been living abroad without informing relevant Lithuanian institutions, declared their new place of residence avoiding the payments. In order to eliminate shocks in the dataset, the value of 2010 was replaced by the value obtained extrapolating the trend of previous years.

lnFDI $_{t-1}$ is the lagged value of the log of the FDI stocks divided by GDP in millions of Euros (from 1.1.1999) and millions of ECU (up to 31.12.1998). In the Eurostat database data is available for the period 1998-2009. In order to enlarge the dataset including the year 2010 missing values were obtained from the statistical office website of the respective countries. The sign of the FDI stocks coefficient will answer the question whether migrants and investments are complements or substitutes. A positive sign shows a complementary relationship, while negative – substitution. The lag is necessary to avoid the simultaneity with the dependent variable and the reverse causality issues, since the causality between migration and FDI in the literature is recognised as going both directions. The causality going from migration to FDI was discussed in the literature review presenting findings of Docquier and Lodigiani, (2008); De Simone and Manchin, (2012); Javorcik et al. (2011). The first effect FDI can have on migration is a direct effect on skilled and unskilled labour demand in the country of the workers' origin. According to Heckscher-Ohlin theory, capital flows in labour abundant country increase the wages of unskilled workers. Moreover, the complementarity of physical and human capital means that foreign investments also increase the demand and returns of skilled labour. This effect on domestic wages should reduce the incentive to migrate (D'Agosto et. al, 2006). Furthermore, it can increase the overall level of income, which should discourage emigration flows, unless it is the case that higher income levels enable the potential emigrants to leave which they were not able to do before due to the financial limitations (Ivlevs and de Melo, 2010). Lastly, FDI reduces the informational constraints as it provides the knowledge about employment, wages, organisational and technical peculiarities in foreign enterprises that can serve as a stimulus to migration (D'Agosto et.al, 2006). In addition to providing knowledge about foreign job market, foreign companies can also grant education and training, which has the potential to be more marketable abroad than education provided by local institutions, which is often tailored to local market needs. This assumption is specifically relevant if the returns to that training abroad are higher than in the local market. Lastly, the experience obtained in the international company ought to be more recognised and valued abroad than the experience in the local firm. Therefore, if the individual is considering a migration opportunity, this argument might encourage him or her to do so.

lnHUM$_{t-1}$ – a lagged value of log of human capital variable. It is the ratio of tertiary education graduates, normalised by the population size. Emigration reduces the population size, therefore, regressing the previous year's human capital variable helps to avoid the reverse causality problem. Moreover, the reason is not only quantitative, but also qualitative.

Emigration, especially the skilled one, leads to the deprivation of a country's intellectual potential combined with a loss of investments in the preparation of the qualified labour force. For this reason it was impossible to include government expenditures on education in a fashion of D'Agosto et. al (2006), as it is highly correlated with the human capital variable. The sign of the coefficient tells whether the improvement of educational attainment rates in the country has influence on the migration decisions. If it works as a push factor – it could be due to the competition pressure. When the level of education of a population increases, the ones who cannot afford or do not have enough potential to join the educational institutions and compete for skilled jobs might choose to leave the country. Also, due to the skill-capital complementarity, increased number of skilled labour requires more capital and more investment (Griliches, 1969; Fallon and Layard, 1975; Batista, 2007). If this is not the case, the demand for educated labour force is likely too low, the returns on education are not satisfying which pushes educated individuals to search for opportunities abroad where the returns are higher. However, if the increasing amounts of tertiary education graduates stop people from leaving it could be due to the increase of the average wages, which is a consequence of the increase of the level of equilibrium in the economy fostered by the increase of human capital endowment (D'Agosto et al., 2006).

$HCPI_{t-1}$ – lagged value of Harmonised Index of Consumer Prices - an indicator of inflation and price stability for the European Central Bank: a proxy for macroeconomic stability.

$lnWAGEratio_{t-1}$ – a one year lagged value of the gross earnings of the single parent without children in a country i divided by the main destination countries' average of the gross earnings. The average is constructed of United Kingdom, Germany, Netherlands, Ireland average wages. In Euros (from 1.1.1999), ECU (up to 31.12.1998).

$lnGDP_{t-1}$ – the lagged value of GDP per capita in Euros (from 1.1.1999), ECU (up to 31.12.1998), meant to control for the level of development in the country.

$UNEMPdiff_{t-1}$ – the lagged value of the difference of unemployment rates between the sending countries and the main destination countries (Germany, The Netherlands, and United Kingdom). Unemployment variable is taken lagged with the reasoning that emigration is artificially reducing unemployment, so if variables are regressed for the same time span, reverse causality issue might distort the results. For the regressions of men and women emigration, unemployment data is also used with the distinction between sexes.

$lnFDIxlnHUM_{t-1}$ - an interaction term of lagged logarithmic value of FDI stock to GDP ratio and a log of human capital proxy. Previous empirical studies inform us that individuals

with tertiary education are more likely to be employed by affiliates of multinationals and take advantage of the higher wages and better job opportunities. Better income prospect provides an incentive for an individual with tertiary education to stay in the home country, thus deter the out-migration (Wang and Wong, 2011). However, as there is no data on different levels of migrants' education, the interaction term between tertiary education attainment rates and inward FDI is tend to show how this relationship between the ratio of educated society and FDI affects emigration. If the interaction term was significant and positive – FDI interaction with human capital forces those, who cannot meet the foreign firms' requirements or cannot cope with competition, to leave. Differently, FDI creates informational channels for educated labour that ease the way to migrate to foreign countries where the skills can be marketed for higher wages. Therefore, it would mean that mostly less educated people are leaving. If it is negative, foreign companies operating in CEECs are more interested in employing the educated people. Thus, the significant result would mean that the flow of capital, advanced technology, innovation, and employment brought by FDI can increase or reduce the flow of emigrants by interacting with country's absorptive capability (Shahrivar and Jajri, 2012). Taking the human capital perspective, graduates facing the inflow of capital that brings attractive workplaces have an incentive to stay due to the capital-skill complementarity. If this interaction term appears to be insignificant – FDI and human capital have independent effects on emigration and the interaction between FDI and human capital is not a precondition to influence emigration decisions. Another reason could be that most of the investing firms employ low skilled labour; therefore, there is no relationship in general with the educated part of the society.

Despite the high significance of exports in CEEC economies the export variable could not be included in the model due to the high correlation with the FDI variable. The inclusion would cause collinearity problem that could lead to biased estimation. However, the experimental inclusion of export variable instead of FDI showed that the increase of exports works as a push factor for potential migrants. The same issue of collinearity discouraged from including government spending on social security variable which correlates with unemployment variable. Though the inclusion of the social security would be reasonable as migrants seeking welfare benefits is recognised in the literature (De Giorgi and Pellizzari, 2006).

Table 1. Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.
lnEmig	-6.575	-6.322	-4.683	-9.111	1.105
lnEmigfem	-6.773	-6.663	-5.106	-8.902	1.05
lnEmigmale	-6.474	-6.326	-4.215	-9.402	1.22
$lnFDI_{t-1}$	-1.13	-1.087	0.065	-2.638	0.575
$lnHUM_{t-1}$	3.366	3.396	4.106	2.117	0.417
$HCPI_{t-1}$	4.883	4	1.53	-1.1	3.368
$lnWAGEratio_{t-1}$	-1.154	-1.134	-0.592	-1.708	0.282
$lnGDP_{t-1}$	9.144	8.883	2.109	8.096	1.782
$lnFDIxlnHUM_{t-1}$	0.089	0.067	0.484	-0.131	0.117
$UNEMPdiff_{t-1}$	4.167	2.733	1.436	-1.566	4.481

The descriptive statistics are presented in the Table 1. Correlation matrix of the variables of the model can be found in the Appendix 3. All the data is obtained from Eurostat database.

4.1. Specification of the Interaction term

Regarding the specification of the interaction term a more elaborate discussion is needed. Interaction terms are used to check the conditional influence of one explanatory variable on the dependant variable. In that case a conditional hypothesis is constructed. *"A conditional hypothesis is simply one in which a relationship between two or more variables depends on the value of one or more other variables"* (Brambor et. al, 2006). One of the hypotheses of this paper is that the relationship between FDI and human capital has a joint effect on emigration flows. From a FDI perspective, in a conditional hypothesis style, this claim can be transformed this way:

H_{1FDI}: the relationship between FDI stocks and emigration flows is enhanced, when the rate of educational attainment is increasing.

The analogous hypothesis could be constructed for the human capital variable instead of FDI, whereas FDI would be a conditional variable. The symmetry between the interacting variables always holds in interaction models.

H_{1HC}: the relationship between human capital and emigration flows is enhanced, when FDI stocks are increasing.

The interaction model usually takes a form of:

$$Y= \beta_0 + \beta_1 X + \beta_2 Z + \beta_3 XZ + N,$$

where X and Z are two interacting explanatory variables and N is the vector of the other control variables. When observing the marginal effect of X on Y, which is conditional on Z, one equally can calculate the effect of Z on Y, conditional on X (Berry et al., 2012). However, the main explanatory variable of this paper is FDI stocks, therefore, the attention will be concentrated only on this hypothesis.

It is emphasised in the literature that both main terms have to be included in the model. However, many scholars fail to do that in order to avoid multicollinearity problems or by reasoning that the main term in itself has no effect on the dependant variable. However, if the assumption is not correct, the model is under threat of the omitted variable bias (Brambor et. al, 2006, Balli and Sorensen, 2006). Therefore, statistical packages will show significance of the interaction terms only due to this error (Balli and Sorensen, 2006). It is only if X (or Z) has a natural zero that the analyst can be justified in having a theoretical prediction that the coefficient on XZ is zero when X (or Z) is zero. As neither it can be strictly assumed that either FDI inward stocks or human capital variable on their own do not correlate with the emigration variable, nor they can obtain a value of zero, both constitutive terms must be included in the model, even with the threat of multicollineraity (Balli and Sorensen, 2006). In addition, same authors state that collinearity is not an issue for the regressions with the interaction effects. Brambor et.al (2006) supports this opinion arguing that when the model includes interaction term it is normal to observe the change of coefficients of the main terms: this outcome is normally considered as a sign of collinearity. However, this is only the case in linear-additive models, but not in the models with interaction terms. One can explain this with the following reasoning: the coefficients in the interaction models do not show the average effect of an independent variable on the dependent one, but the marginal effect (of X/Z on Y). Therefore, the change of coefficients after the inclusion of interaction term is common and normal.

The marginal effect of X is calculated as a partial derivative of Y with respect to X (the same with Z).

$$\partial Y/\partial X = \beta_1 + \beta_3 Z$$

Therefore, the value of X is conditional on the value of Z, unless Z =0.

5. Results

Table 1: Estimation results

	lnEmig	lnEmigfem	lnEmigmale
C	-6.670***	-8.021***	-8.917***
	(0.731)	(1.213)	(1.559)
$\ln FDI_{t-1}$	1.223***	0.759***	1.213***
	(0.090)	(0.171)	(0.166)
$\ln HUM_{t-1}$	0.273*	0.686**	0.684**
	(0.138)	(0.286)	(0.335)
$HCPI_{t-1}$	0.024*	0.033***	0.031**
	(0.126)	(0.011)	(0.013)
$\ln WAGEratio_{t-1}$	-0.495*	0.217	-0.795***
	(0.284)	(0.310)	(0.217)
$\ln GDP_{t-1}$	-0.016	-0.013	0.007
	(0.014)	(0.013)	(0.023)
$\ln FDIxlnHUM_{t-1}$	-0.462*	-1.082**	-1.238**
	(0.264)	(0.438)	(0.494)
$UNEMPdiff_{t-1}$	0.024***	0.036***	0.254**
	(0.008)	(0.010)	(0.114)
R^2	0.924	0.922	0.927
F-statistic	61.02	56.667	60.96
	(0.000)	(0.000)	(0.000)
Number of obs.	85	82	82

Standard errors in parentheses
*** p-value <0.01, **p-value<0,05, *p-value<0.1

The data described in the previous section was used as an input for OLS regression estimation after testing and rejecting the hypothesis of unit root in all variables. Results reported in the Table 1 show that the main variable of interest – FDI stock to GDP ratio is the largest stimulus for emigration. It has a significant and positive sign of the coefficient; therefore, the hypothesis of complementary relationship is supported. The result is the similar for both men and women datasets. However, for men the complementarity relationship is stronger.

The human capital proxy – tertiary education graduates to population ratio – also has a significant and positive sign of the coefficient, meaning that it works as a push factor for emigration of total population and for men and women separately.

The wage ratio has a negative sign, meaning that the larger the wage in the home country the less incentive there is to leave. This is not surprising, as it is well known from the international factor flows theory that factors move to countries where the returns are the highest. However, it gets more confusing when the estimation is run separately for males and females. Results show that men tend to act according to the theory whereas the coefficient of wage ratio in females' regression is positive and insignificant. This suggests that women are

not so focused on purely economic reasons and are perhaps less driven by monetary issues than men.

Even though insignificant, but necessary control for the level of development of the country – GDP per capita – has an expected negative sign in regressions of total and female emigration and positive for male. However, as it is insignificant, no further comments are presented.

The inflation variable has a positive sign – the increase of consumer prices works as a push factor for emigrants. This is due to the fact that CEEC residents spend one of the highest shares of their expenditure on consumption goods in Europe. For example, in Lithuania the share of expenditure devoted to food and non-alcoholic beverages reached more than 26%, when the EU27 average was 13.1% in 2009 (Eurostat data). On the other hand, this variable can just be regarded as a reflection of macroeconomic stability. Thus the lack of stability in the country works as a push factor for the potential leavers both, when analysing total emigration numbers, and when distinguishing between sexes.

The positive and significant coefficient of the unemployment rate difference between the sending and the average receiving country shows that a worse employment situation in the home country, compared with the destination country, is an incentive to leave. This occurs due to the hope that job opportunities abroad will be more promising. Moreover, men are more sensitive to unemployment issues as CEE countries still have relatively more patriarchal societies than other countries in the EU. When the situation in the labour market for men is not satisfying, they might want to search for opportunities abroad in order to better contribute to the wellbeing of the family. Once again men prove to be more driven by economic stimulus of migration.

The interaction term between FDI and human capital variable is significant and has a negative sign (without substantial differences between men and women), meaning that when other variables are constant, FDI works as a push factor, however interacting with increasing human capital, it contributes to the decision to emigrate. The same can be said from the human capital perspective.

One might doubt the negative value of the intercept as emigration rates cannot be negative. However one has to keep in mind that the value of the dependent variable is logarithmic. Therefore to obtain the real value of the intercept , a simple transformation is needed:

$$If\ ln(x) = -6,\ x = e^{-6,}\ where\ x = 0.0025$$

which results in the positive value of the intercept.

6. Conclusions and Discussion

The main goal of this paper is to investigate the relationship between Central and Eastern European emigration flows and foreign direct investments in those countries with the help of empirical research. This link was addressed with the following questions: if there is a complementary or a substitution relationship between outgoing labour and incoming foreign direct investments in those countries; how does the human capital situation in the country change the effect FDI has on emigration and, in addition, what other factors apart from FDI affect emigration in CEECs. The data revealed that FDI and the level of educational attainment in the country on their own work as push factors of emigration, however when they interact, they discourage people from leaving.

The interpretation of this result can vary. What concerns the direct relationship of FDI and emigrants, firstly, international firms provide home labour with the relevant training and knowledge, which meets the international standards and can be chosen to market abroad if foreign countries offer higher wages. As most of the investments in the CEEC are in the services industry, the skills and knowledge of most branches in this sector can be easily transferred to a foreign country. Good specialists can be attracted by the foreign firms as a knowledge transfer tool (Covan et al., 2001) Secondly, investors by launching new enterprises or intervening home firms create networks between employees in the home enterprise and the same company's subsidiaries abroad, provide workers with the information about wages, employments possibilities and organisational specificities. Therefore, the home country worker having that information might decide to do the same or similar job in the foreign affiliate, especially if the wage difference is appealing. Lastly, people who work in the home country in an international company may assume that if they migrate the name of that company on their CV will be recognised in other countries, and as such increasing the chance of finding a job abroad. Having a well-known name on one's CV is often regarded as a matter of prestige and possibly a sign of trust.

Why does the increase of human capital push people away from their countries? A very straightforward answer would be that returns on education are higher abroad. However, this is not the only reason. As mentioned before, it could be due to the increased competition – the more educated people are in the job market, the fewer chances there are for the poorly

educated ones. Furthermore, some students upon completion of their studies and after, that would open potential to use the acquired education (capital-skill complementarity) simply leave with the struggling to obtain a job in their home country (due to unsatisfying possibilities, lack of investments in capital and technology hope of finding employment abroad (both for jobs which they are qualified or overqualified). Moreover, the education provided by local institutions is often not of the highest level. This statement is backed up by U21 Ranking of National Higher Education Systems, which evaluated 50 countries of the world based on four factors: resources, environment, connectivity and output. After combining all mentioned indicators, 5 CEEC countries (that were included in the evaluation) were situated between 26th and 35th position. They were overtaken by all countries of Western Europe (Universitas 21, 2012). This pushes CEEC nationals to seek for further education abroad due to several consecutive reasons. Firstly, in some countries, e.g. Lithuania, having a diploma is often necessary even for low skilled jobs due to the high overall education attainment ratio. A diploma becomes not as a signal of qualification and knowledge but merely a permission to enter the job market. Therefore, the acquisition of the diploma is relatively easy and the value of it diminished. Local employers are aware of the pitfalls of the local education systems and hence, foreign diploma allows graduates to excel beyond their competitors that only hold local diplomas. Secondly, the disappointment in the acquired education might push a university graduate to continue studying abroad in order to challenge themselves and to actually get essential knowledge for their future career. This would be useful despite the decision: to make a return to the home country or to pursue the career abroad where the returns on education would probably be higher, not to mention the fact that having a foreign diploma would open more doors for employment abroad. And indeed it is noted in the review of the migration trends above, that there is an increasing number of students interested in studies abroad, although there is no distinction in the data whether it is more popular to study abroad at under-graduate or post-graduate level. The availability of this kind of data would shed more light on the research findings regarding the role of human capital in CE Europeans' migration decision.

However, how one explains the result, that the interaction of FDI stocks and the level of educational attainment in the country stops people from emigrating? One way to speculate this is that the foreign companies operating in those countries are more interested in employing educated people. This is supported by the earlier presented statistical data, showing that most investments go to the services sector, which is more educated labour-consuming. Thus the advantages brought by FDI can reduce the flow of emigrants by

interacting with a country's human capital – the potential to absorb and adapt to foreign investors' requirements and sufficiently contribute to the goals of the investing company. At the same time, more people are seeing that with proper education the opportunities in one's own country can also be satisfying through the involvement in international companies' activities that bring more capital, technology, and are not so inclined to leave. The more investments, the more workplaces, the less competition, the more incentives to stay seems to be the rule. However, it must be noted that this kind of speculation would carry more weight if a micro-level research with personal information of emigrants was executed. Only then the real emigration push factors of an average person can be estimated.

With these results and interpretations this paper contributes to the literature of international factor mobility answering the question if production factor flows are complements or substitutes. This paper's outcomes are in line with the findings of numerous authors who investigated this relationship in developed countries, with the different causality-going from emigration to FDI – and found a complementary relationship (Kugler and Rapoport (2005), Docquier and Lodigiani (2010), De Simone and Manchin (2012), Javorcik et al. (2011) , Gheasi et.al (2011)). Also with authors like D'Agosto et al. (2006) who were also interested in the same relationship and the same causality going from FDI to migration. These authors also found that FDI has a direct complementary relationship and indirect substitution effect, when working through human capital channel.

Despite similar findings, this paper differs by the adoption of a dataset of 8 CEE countries, which did not draw much scholarly attention due to the lack of data. It also stands out by presenting results with the distinction between men and women. Despite dubious accuracy of results due to the lack of data, this study suggests an interesting approach to investigate the issue of emigration in those countries via the joint effect of FDI and human capital and help understand a little bit what causes excessive emigration flows. The lack of data and not availability of migration data with the distinction between the level of skills is a recognised limitation. Therefore the suggestion is made for future researchers, who will likely be less constrained by data availability, to see FDI effect on migration of skilled and unskilled people in CEECs. Availability of that kind of data in micro and in macro levels would shed more light on the investigation of migration push and pull factors.

7. Implications for Practice and Policy

If governments seek to stop excessive emigration, simultaneous programs should be implemented focussed on improving the quality of education and attracting foreign investors, as the results of this study showed that only the joint effect of human capital and FDI can reduce emigration flows. First of all, governments should support those study programmes that would prepare future labour force for the demand of international companies, to meet their standards and requirements. However, these domestic investments on education will be useless if there will be no international companies that bring technology and innovation, as according to a recent World Bank (2012) study, CEE countries lag behind the rest of the EU in the sense of innovation. Therefore, responsible bodies should address the areas that may be discouraging the incoming investments, notably enterprise taxation, bureaucracy related to the start of new businesses and corruption. This would benefit not only people by creating jobs (which is necessary as unemployment is a recognised migration push factor), but also stimulate local companies as it is found that they mostly innovate through osmosis (World Bank, 2012).

Apart from implementing these measures, there should be serious initiatives balancing out the emigration by improving return rates or by attracting labour force from other countries. The former can be tackled by approaching the factors that pushed people away: the wage difference, unemployment and macroeconomic instability. This is an ongoing process involving many stages that hopefully one day will help to converge to the situation in countries where CEEC people are emigrating. The attraction of foreign labour force, on the other hand, can be addressed more directly by easing legal procedures related to work permits and the residence conditions. This will, however, not solve the issue of intolerance for immigrants that CEEC people are known for, but perceptions can also be changed through social initiatives. It is a long process, but steps have to be made.

References

Balli, H.O. & Sorensen, B.E. (2012). *Interaction Effects In Econometrics*. MPRA Paper 38608. University Library of Munich, Germany.

Batista, C. (2007). *Joining the EU: Capital Flows, Migration and Wages*. Economics Series Working Paper No. 342.University of Oxford, Department of Economics.

Berry, W & Golder, M. (2012). The Importance of Fully Testing Conditional Theories Positing Interaction. *Journal of Politics 74(3),* 653-671.

Brambor, T., Roberts Clark, W.& Golder, M. (2006). Understanding Interaction Models: Improving Empirical Analyses. *Political Analysis 14(1),* 63-82.

Cowan, R., Soete, L. & Tchervonnava,O. (2001). *Knowledge Transfer and the Services Sector in the Context of the New Economy*. Research Memoranda 020. Maastricht: Maastricht Economic Research Institute on Innovation and Technology.

Crespo Cuaresma, J., Oberhofer, H., Smits, K. & Vincelette, G. A. (2012). *Drivers of Convergence in Eleven Eastern European Countries*. World Bank Policy Research Working Paper 6185. Washington, D.C.: The World Bank.

D'Agosto, E., Solferino, N. & Tria, G. (2006). *The Migration and FDI Puzzle: Complements or Substitutes?* CEIS Research Paper 76. University of Rome "Tor Vergata", Centre for Economic and International Studies.

De Giorgi, G. & Pellizzari, M. (2006). *Welfare Migration in Europe and the Cost of a Harmonised Social Assistance*. IZA Discussion Paper No. 2094. Forschungsinstitut zur Zukunft der Arbeit.

De Simone, G. & Manchin, M. (2012). Outward Migration and Inward FDI: Factor Mobility between Eastern and Western Europe. Review of International Economics, Wiley Blackwell, 20(3), 600-615.

Docquier, F. & Lodigiani, E. (2010). Skilled Migration and Business Networks. *Open Economies Review, Springer, 21(4),* 565-588.

Fallon, P. R. & Layard, P. R. G. (1975). Capital-Skill Complementarity, Income Distribution, and Output. *Journal of Political Economy, 83(2),* 279-302.

Gheasi, M., Nijkamp, P.& Rietveld, P. (2011). *Migration and Foreign Direct Investment: Education Matters*. Tinbergen Institute Discussion Paper, TI 2011-136/3

Griliches, Z. (1969). Capital-Skill Complementarity. *The Review of Economics and Statistics, 51(4),* 465-468.

He, Q. (2011). *Does FDI Promote Human Capital Accumulation?The Role of Gradual Financial Liberalization*. CEMA Working Papers, No. 455. CEMA, Central University of Finance and Economics, Beijing.

Ivlevs, A. & De Melo, J. (2010). FDI, the Brain Drain and Trade: Channels and Evidence. *Annales d'Economie et de Statistique, ENSAE, 97-98*, 103-121.

Javorcik, B. S., Özden, Ç., Spatareanu, M. & Neagu, C. (2011). Migrant Networks and Foreign Direct Investment. *Journal of Development Economics, 94 (2)*, 231–241.

Kaczmarczyk, P. & Okólski, M. (2005). *International Migration in Central and Eastern Europe – Current and Future Trends*. United Nations Expert Group Meeting on International Migration and Development. New York: United Nations, Population Division.

Karimi, M. S. & Soltanpanah, H. (2011). Accumulation of Human Capital and FDI Inflows in ASEAN-3 Countries (Malaysia, Thailand, Indonesia). *Timisoara Journal of Economics*. *4(2)*, 123-130.

Kugler, M. & Rapoport, H. (2005). *Skilled Emigration, Business Networks and Foreign Direct Investment*. Discussion Paper Series in Economics and Econometrics 0503. Economics Division, School of Social Sciences, University of Southampton.

Mazhar Mughal, M. & Vechiu, N. (2010). *The Role of Foreign Direct Investment in Higher Education in The Developing Countries (Does FDI Promote Education?)*. Working Paper No. 2010-2011_10. Université de Pau et des Pays de l'Adour.

OECD. (2012). Connecting with Emigrants: A Global Profile of Diasporas. *OECD Publishing*.

Ross Williams, R., de Rassenfosse, G., Jensen, P. & Marginson, S. (2012). *U21 Ranking of National Higher Education Systems*. A project sponsored by Universitas 21. University of Melbourne, Institute of Applied Economic and Social Research.

Shahrivar, R. B. & Jajri, I. B. (2012). Investigating the Interaction between FDI and Human Capital on Productivity Growth. *Research Journal of International Studies, 23*.

Wang, M. & Wong, M. C. S. (2011). Inward FDI, Remittances and Out-Migration. *Applied Economics Letters, 18:15*, 1405-1409

William Maloney, W. & Aroca, P. (2004). *Migration, Trade and FDI in Mexico*. Latin American Meetings with number 329. Econometric Society.

Zhuang, H. (2008). Foreign Direct Investment and Human Capital Accumulation in China. *International Research Journal of Finance and Economics, 19*, 205-215.

Appendices

Appendix 1.

International students from the given countries in OECD countries 2004-2009

	2004	2005	2006	2007	2008	2009
Czech Republic	3108	3278	3702	3990	7917	8675
Estonia	696	898	1065	1129	1966	2249
Hungary	2425	2778	3094	3201	5013	5355
Poland	9393	10979	14075	16503	28459	28748
Slovak Republic	1614	1874	2301	2374	3725	6079
Slovenia	949	1120	1193	1101	1312	1410
Latvia	958	1250	1528	1839	2851	3100
Lithuania	1475	1838	2444	2864	4670	5424

Appendix 2.

Level of education of emigrants (given in percentage of the total number of emigrants in that group) with a distinction between sexes, 2000 and 2005/2006

		2000			2005/06		
		Men	Women	Total	Men	Women	Total
Czech Republic	Low-educated	15.4	29.4	23.9	14	23.8	19.7
	Highly educated	35.6	22.8	27.9	38.9	27.6	32.3
Estonia	Low-educated	28.7	27.6	28	29.8	21.1	24.6
	Highly educated	33.5	32.9	33.1	34.5	35.9	35.3
Hungary	Low-educated	22.4	27.8	25.2	16.6	22.7	19.7
	Highly educated	31.6	27.7	29.6	33.3	33	33.1
Poland	Low-educated	28.2	34.3	31.6	22.3	26.8	24.7
	Highly educated	23.2	20.7	21.8	26.8	26.7	26.8
Slovak Republic	Low-educated	29.4	47.6	39.3	22.9	35.2	29.6
	Highly educated	15.2	10.7	12.7	19.9	17.9	18.8
Slovenia	Low-educated	35.2	59.5	48.2	33.3	48.2	41.9
	Highly educated	12.8	10.8	11.7	15.1	15.2	15.2
Latvia	Low-educated	19.6	21.1	20.5	20.3	18.3	19.2
	Highly educated	43.5	40.8	42	40.2	41	40.6
Lithuania	Low-educated	31.7	37.7	35.2	27.4	31.2	29.6
	Highly educated	28	23.3	25.2	32.4	28.9	30.3

Appendix 3.

Correlation matrix

	lnEmig	lnEmigfem	lnEmigmale	lnFDI$_{t-1}$	lnHUM$_{t-1}$	HCPI$_{t-1}$	lnWAGEratio$_{t-1}$	lnGDP$_{t-1}$	lnFDIxlnHUM$_{t-1}$	UNEMPdiff$_{t-1}$
lnEmig	1									
lnEmigfem	0.979	1								
lnEmigmale	0.992	0.947	1							
lnFDI$_{t-1}$	0.353	0.377	0.341	1						
lnHUM$_{t-1}$	0.209	0.233	0.239	0.158	1					
HCPI$_{t-1}$	-0.324	-0.313	-0.326	-0.263	-0.055	1				
lnWAGEratio$_{t-1}$	0.196	0.096	0.276	0.043	0.155	0.033	1			
lnGDP$_{t-1}$	0.003	-0.032	0.033	0.262	-0.009	-0.100	0.238	1		
lnFDIxlnHUM$_{t-1}$	-0.072	-0.087	-0.064	-0.062	-0.357	0.050	0.184	0.207	1	
UNEMPdiff$_{t-1}$	-0.344	-0.284	-0.388	-0.242	-0.193	-0.145	-0.455	-0.111	-0.131	1