THE CRISIS IMPACT ON HUMAN CAPITAL FORMATION IN POLAND

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Abstract

Human capital, defined as a knowledge resource, know-how, skills and motivation cumulated in production age society, becomes a fundamental factor in competition of a country and determines the creation of an information society. The purpose of this article is to scrutinise the state of human capital in Poland comparing to the situation in other European Union's countries and to evaluate a possibility of human capital formation after the crisis reality. The problem is very complex, that is why the article describes how the crisis influences the migration decisions of the Polish people. Departures and arrivals from migration directly affect situation on the labour market and have impact on conditions of human resources. The methodology in the paper is based on desktop research and general statistics with multidimensional comparative analysis methods used as a taxonomic synthetic measure.

The main finding of the paper is that there is a strong divergence between human capital formations in Poland, countries recently engaged (UE11) and other Western European countries (UE15). It is difficult to notice one-way influence of the economic crisis on human capital formation. In Poland during the crisis period migration was inhibited on one hand, but on the other, the quantity of young people with tertiary education from agglomeration leaving Poland increased. The article represents distinctive scientific research, which could be used in formation of labour market and migration policies in Poland.

Keywords: crisis, human capital, migration, brain drain.

Introduction

One of the main features of contemporary economies is usage of human resource. The principal condition in creation of a knowledge-based economy is the relevant quantity and quality of human capital. The essence of human capital has to be analysed in two areas. The first involves human capital formation in the economic growth models. It is associated with endogenous model growth by P. Romer and R. J. Lucas. The second area consists of treating human capital as an element of intellectual capital, which forms a part of a firm's calculated value in the business market place. A company's success is dependent on constant creation of not only traditional potential, but also non-traditional, as well as on human capital. The most important resource of the company is its employees, who possess skills to create new products and technologies. Knowledge, experience and precise skills of the employees create the human capital and all expenses have to be viewed as an investment that will bring measurable advantages in the future (Biegańska, 2007). Human capital is a fundamental element of competitiveness on macroeconomic and microeconomic scales. During the economic crisis the above-mentioned matters get particular meaning, although the analysis does not show an equivocal state. From one point of view, during the recent recession period, the emphasis is placed on the 'stress to limit an investment', connected with human resources. Further than this, the situation on the labour market strongly depreciates resources cumulated in the human capital. On the other hand, the crisis cannot be a pretext to limit fundaments of long term development, especially in Poland where the problem of human capital development is linked with several paradoxes, which will have a significant influence in the development of the Polish economy in future.

In accordance with the view stated above, the present article is an attempt to evaluate the human capital condition in Poland between the years 2002-2009. The main results and conclusions are summarised in this article.

Research methodology

The research aim

The aim of the research is to evaluate the human capital condition in Poland between the years 2002-2009 against European Union's countries. The gathered information shows possibilities of its development in future. Especially, the article analyses how the economic crisis affects human capital formation. The crisis impact is shown by the migration process in Poland, which is very important for human capital formation. The paper's objective is to answer the question, if the economic crisis stopped human capital outflow from Poland or not.

Methodology

The evaluation of human capital is not an easy task. In the first step, it is required to specify determinants, which are treated in various manners in the literature. It mainly stems from the definition and capacity of the human capital. Most often, human capital is defined as a resource of knowledge, skills, health and vital energy cumulated in society. Human capital can be interpreted in a somewhat narrow or broader meaning. In the narrow meaning, investment in human capital is linked with investment on education, including investment on research and job development according to the learning-by-doing process. In the broader meaning, human capital is also contacted with other investments, which determine the characteristic quality of human resources, such as: investment in health, protection of the environment and culture (Becker, 1975). In this article, five areas were taken into account, which impact on the formation of human capital in Poland. These are: demography, education, research and development, health protection and job market. The human capital is defined as follows: "accumulated resource of knowledge, qualification, skills and readiness to increase the economic potential by the owners – readiness to start working" (Marciniak, 2010). To analyse the human capital, one of the comparative, multidimensional method was used: taxonomic synthetic measure Z. Hellwiga. This method provides a possibility to study particular effects in an aggregated way using a large quantity of diagnostic data simultaneously. The method orders objects (countries, group of countries) linearly based on the synthetic measurement instrument (taxonomic development measurement –TMR) (Hellwig, 1968). The first step of the research is elimination of a different range of variable variation and ranking change in a process of standardisation in accordance with the following formula:

$$z_{ij} = \frac{x_{ij} - \overline{x}}{S_i},$$

where:

x_{ij} – j characteristic; i – of the object

S_i – standard deviation

The next step is to create a standard of evolution taking variables according to the following rule:

In the next step it is necessary to determine a distance between the observed unit and the rule of development. It is possible to measure this distance (Euklides) according to the following formula:

$$d_{oi} = \sqrt{\sum_{j=1}^{m} (z_{ij} - z_{oj})^2}$$

The last element of this method is determination of taxonomic development measurement according to the following formula:

The analysis of human capital in Poland is compared with the EU countries divided into two groups: "old" countries – members of European Union before 2004 (UE15) and "new" countries – engaged in UE after 2004 without Poland (UE11). Period of the analysis is 2002-2009. In some cases, due to the lack of data, a selected time period of 2001-2008 was taken and analysed. While selecting variable, the most important criteria were: content, formal and technical. The variable selection is not definitive and represent a proposition of factors that determine development of human capital. Finally, the following data was taken into account:

X1 – Crude rate of net migration plus adjustment (per 1000 persons)

X2 – Old dependency ratio (population 65 and over to population 15 to 64 years - %)

X3 – Participation in education and training people from 25 to 64 years (%)
X4 – Student mobility (%) (2001 – 2008)
X5 – Persons with tertiary education attainment (%)
X6 – Students at ISCED level 5-6 - as % of all pupils and students (2001 – 2008)
X7 – R&D expenditure (GERD) (public % GDP)
X8 – R&D expenditure (GERD) (private % GDP)
X9 – Level of Internet access of households (%)
X10 – Mathematics, science and technology enrolments and graduates (%) (2001 – 2008)
X11 – Employment in technology and knowledge-intensive sectors (%) (2001 – 2008)
X12 – Unemployment rates of population with tertiary education - levels 5-6 (ISCED 1997)
X13 – Health care expenditure total (% GDP).

Research results

Research results are divided in two groups, which are entitled:

- Human capital formation in Poland against EU countries
- Human capital formation and migration process in Poland.

Human capital formation in Poland against EU countries

For the analysis of Figure 1, which shows the value of taxonomic synthetic measure of the human capital formation in Poland against European Union, a simplification should be indicated because of averaging values for UE15 and UE11. The analysis of situation in each country independently would certainly give more informative details; this is due to the fact that the human capital is strongly diversified in the European countries.

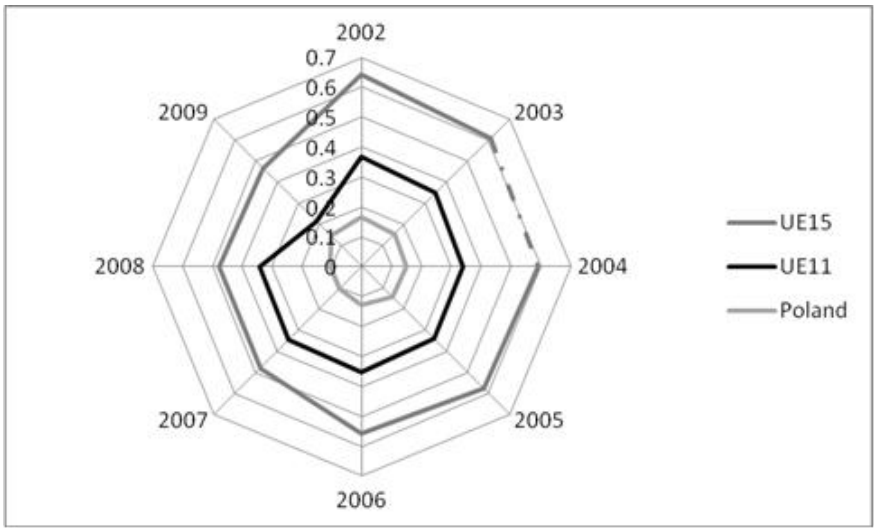

Figure 1. The value of taxonomic synthetic measure of the human capital in Poland against European Union
Source: adapted by the author based on Eurostat data

Some results can be derived from Figure 1. Firstly, there is a strong divergence between synthetic measurements of the human capital in Poland, countries recently engaged (UE11) and other Western European countries (UE15). In Poland's case, the measured values are twice as low as those comparing to UE11 and three times as low the other residual countries. Secondly, during the analysed period a relative reduction of synthetic measure value of the human capital both in Poland and in residual two groups was noted. It is important to add that the most significant value deduction took place for UE15 (0,64 – 0,46) and UE11 (0,36 – 0,21). In Poland the index was maintained in group 0,16 – 0,14. In addition in both analysed groups of the European Union a decrease of synthetic measure value occurred in the last two years. In Poland between 2007-2008 a decrease of synthetic measure value of human capital by 0,02 and in the last analysed year an important increase took place.

To answer the question about the divergence between Poland and the rest of UE countries, especially UE15, we have to point out, that it is not caused by every determinants of human capital which were taken into consideration, but only had a very deep impact on some of them. For example, it could be induced by migrations of Polish people, particularly after accession to European Union. The number of people staying abroad doubled between 2004 and 2006 and the dynamics of it was closer to the half of that number in 2008 (Kaczmarczyk, 2010). What is more, this significant divergence is connected with research and development area. The R&D index financed by the private sector for European Union is 1.25% GDP during the overall period, in EU11 countries – 0,31% GDP and in Poland 0,18% GDP. In addition lower percentage of mathematics, science and technology graduates and employment in technology and knowledge-intensive sectors about 1p.p. In relation with EU countries, there are about two times less adult participation in education and training in Poland. In 2009, in EU15 there was 10,8% of people between the age group of 24 – 64 years, and in Poland the value was about 50% lower. However, a completely different situation appears in the educational area. The data concerning education at tertiary ISCED level 5-6 shows a positive trend. From the beginning of ’90 we can observe a very dynamic development of tertiary education in Poland. As a result, in 2009 Poland was on the second position in European Union, after United Kingdom, taking under consideration the number of students. On average, every fourth person in the age range 19 – 24 is studying on master’s or PhD level. In EU15 this index reached about 20% lower value, and in the rest of the EU countries (UE11) is comparable to the Polish level. This data is from the last year’s analysis. It undoubtedly gives the evidence of quantitative success, but in confrontation with the labour market it shows some of the paradoxes of human capital formation in Poland.

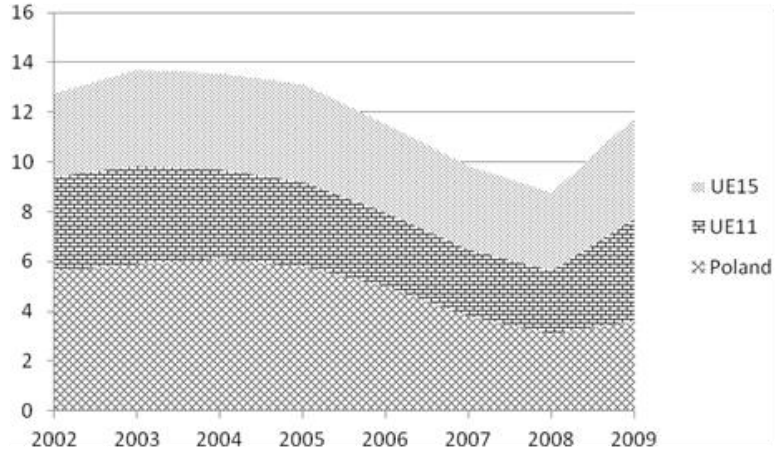

Figure 2. Unemployment rates of population with tertiary education
Source: Eurostat data

A large percentage of educated people have difficulties in finding a job in Poland. The average unemployment rate amounted to 4.86% between 2002 and 2009. This situation indicates considerable development of quantitative resources, educated people, and at the same time misaligned structure and quality with the labour market needs. From 2004 to 2008, we can observe a downward trend, but it is difficult to assess, if it was influenced by migration of qualified people connected with opening of the European labour market. It would mean that after accession, migration also has specific consequences, including the so-called “brain drain” scenario. This difference between the numbers of educated people and labour market, shows structural problems connected with human capital formation. First of all, it is attributed to the fast quantitative progress without thinking about quality of this capital and adjustment to the demands of knowledge based economy. Finally it caused depreciation of human capital and the new area of social disparities (Woźniak, 2005).

Another very important issue is to point out factors, which could affect reduction of synthetic measure value in 2002 – 2009 including the one that could appear as a result of the crisis. Taking under consideration the overall period of scrutiny, it shows a deep influence on the demographic situation expressed in the decreasing percentage of people in a productive age and an increasing percentage of people in after-productive age. It fundamentally expands the old dependency ratio. At the beginning of the analysed period, the index is about 10 p.p. less in Poland, but at the end of this period this difference is 7 p.p. This implies that in Poland we can observe a similar trend. More diagnostic variables, including a component of

taxonomical development measure (stimulants) kept the same position in EU15, which caused a relative reduction of aggregated measure in relation with other countries. The increased dynamics kept only variables connected with research and development: R&D expenditure and usage the Internet. The most interesting periods for analysis are the last two years. In this period we can observe a reduction of synthetic measure value of human capital for the group of countries EU11 and EU15 and an increase of this value for Poland. To determine the reasons, which caused the situation we have to point out and analyse the demographic issues. The problem of aging society in Europe in the last two years did not especially escalate, but during the overall period the trend was developing more intensively. Migration could have had a much deeper impact, if not for the somewhat forced re-migration decision as the crisis result. The macroeconomic situation in Western Europe, where most of the countries are typical migrants' destination, caused the migration index to reduce in the last year of analysis about 50% in relation to the first year. It also had a reflection on the Polish migrant's situation. For Poland, when looking at the overall analysed period there is a negative crude net migration index, considerable intense after 2004. From 2008 the difference between outflow and inflow of people in Poland is very evidently decreased, and that is why the migration index in 2009 amounts to zero. Next issue relate to public expenditure. In the last three years of research the value of expenditure decreased both on health care, and research and development, for EU11 and EU15. In Poland we can remark on quite an opposite situation. In addition, the years under the crisis were impacted by labour market's problems as well. For EU11 and EU15 the unemployment rate of people with tertiary education increased, especially in 2009 achieving 4.08% for EU15 and 4.13% for EU11. In Poland during the years 2007 – 2008 the index reached the lowest value comparing to the overall period. It was 3.1% but in the last year the unemployment rate started to rise. The same situation took place in technology and knowledge-intensive sectors. In the years 2001 – 2007 employment in this sector had increased with 0.3 p.p. It was also quite dynamic, but in 2008 it decreased to a level of 3%. Particular consideration has to be put on education in Poland. The percentage of highly educated people is increasing at a fast rate. The dynamics of this trend found in the analysed period was two times as high as compared to the rest of the countries. The number of tertiary graduated people doubled in 2009 in relation to 2002 and the numbers of students had growth by about 7 p.p. This signifies a dramatic progress comparing to the EU15 countries, where this index had shown a growth of about 1 p.p.

To evaluate the crisis impact on the human capital formation in Poland against European Union countries is very difficult and challenging. At the beginning the difficulty appears when we want to describe time – frame of the crisis. It is hard to say when it started and finished for the certain countries or point the time when the crisis penetrated into the economy. What is more, in spite of the fact that the crisis had a global dimension, it is difficult to assess how deep it influenced individual countries and whether we should use the term "crisis" in Poland's case or maybe only "slowdown in growth". We can assume also that macroeconomic situation influences each sphere of our life with delay and only in the next few years we will be able to unequivocally evaluate the crisis impact on the human capital formation in Poland.

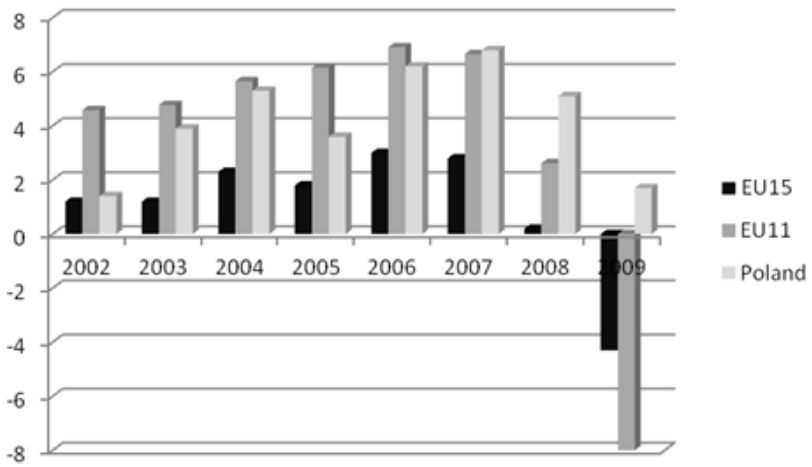

Figure 3. % GDP per capita growth
Source: Eurostat data

Despite any doubts, according to the concerned figure increase of the GDP per capita in 2002 – 2009, a particular evaluation was performed on the last two years analysed, 2008-2009. In case of the UE15

countries, it is difficult to notice a bad influence of the economic crisis on human capital formation in those countries. The synthetic measurement value decreased from 2002 and the crisis had neither multiplied, nor decreased the trend. It is possible to say that the direct cause of that decrease is not the economic situation, but other more complex problems linked with demography. In the UE11 countries in 2008-2009, a sharp decrease of synthetic measure of the human capital can be noticed, which is undoubtedly linked with the economic crisis. As a consequence, in the last years the continual education part decreased in production age, the public expenses into research and development were decreased again causing a reduction of employment in the high-tech sector and an increase of unemployment of people with higher education. Those countries wrestle with demographic problems. In relation to these two groups of countries specified, it is important to stress once again a huge generalisation cause by averaging of synthetic measurement values of the human capital. Consideration of each country separately would show an important diversification of the situation in the EU; however it is not the major purpose or intent of this article. In Poland, during the last two years of the analysed period an increase of the value of the synthetic measure is noticeable when comparing it to the previous years. It was mainly caused by termination of emigration from Poland, constant increase of the students and people with ahigher education, a relatively small increase of unemployment and unchanged value of residual variables.

Human capital formation and migration process in Poland

The economic situation in Poland during the last years becomes a secondary matter, when we want to analyse the scale of migration from Poland and the eventual re-emigration. When considering these factors, they show that the economic situation of European Union is the main reason for migration. The Poles are one of the most mobile nations in Europe. The mobility was linked with the transformations that took place in the environment. Consequently, it is justified to undertake a study of the influence of economic crisis on the migration of human resources being abroad and their return to Poland. It has an unquestionable influence on formation of human capital in Poland (Kaczmarczyk, 2010). A significant date from this point of view is the moment, when Poland joined the European Union, because for migration it meant elimination of the majority of tbarriers for the European Unions' job market. Even if only three countries completely opened their job markets (Ireland, Sweden, Great Britain) without any period of transition, the quantity of people abroad increased (in r 2004 – 1 million people, in 2007 – 2,270 million people). That migration was characterised not only by the scale of people leaving Poland but also by the migrants' profile.

Table 1

The economic profile of emigrants

Characteristic of emigrants	Migration between 2005 – 2007 (%)	Migration between 2005 – 2009 (%)
Education:		
- tertiary	16, 9	20,0
- secondary	37,7	37,3
- practiced profession	37,2	35,7
- elementary	8,2	7,0
Age:		
- below 24	19,9	28,7
- 25 – 34	36,8	32,9
- 35 - 44	21,9	21,5
- 45 – 59	20,6	15,9
- 60 – 64	0,7	0,8
Resident town:		
- cities 500 000 and more	5,4	12,9
- cities 200 000 – 500 000	11,3	11,0
- cities 100 000 – 200 000	5,4	6,5
- cities 20 000– 100 000	17,6	16,1
- cities less than 20 000	14,3	16,8
- villages	45,9	36,8

Source: Kotowska I.E (red.), Rynek pracy i wykluczenie społeczne w kontekście percepcji Polaków – diagnoza społeczna 2009, Centrum Rozwoju Zasobów Ludzkich, viewed: 30.03.2011. Available at: http://www.crzl.gov.pl/images/Diagnoza_raport_tematyczny/Rynek%20pracy%20i%20wykluczenie_Diagnoza%20spo%B3eczna%202009.pdf.

Comparing to the migration that took place before the EU access, people migrating after 2004 were much younger. More than 50% were below 40 years old. The majority of this group had not had any familial obligations, thus the period of staying abroad prolonged and caused a relatively small transfer of savings to Poland.

The second difference concerned education of emigrants. People leaving Poland after 2004, were better educated and had a better knowledge of foreign languages. Young people did not have any time limit of the stay period (Jończy, 2009). Starting from 2008, there was a small decrease of Polish emigrants, which was linked to the economic crisis. In 2009, the quantity of people going abroad continued to decrease and in parallel re-emigration increased (Informacja o rozmiarach, 2010).

It is estimated that in 2009 about 1 870 000 citizens of our country were abroad and it is 340 000 people less than in 2008. Although the migration decreased, the quantity of young people with tertiary education from agglomerations simultaneously increased. In total, to the end of 2009, almost 60% of all emigrants were people with secondary education. What is more, even if data from the last years shows a falling tendency, it is still more of a higher value than at the beginning of Poland's access to the European Union and exceeds the quantity of born children during this period in Poland. Consequently, the author points out to the thesis that the economic crisis inhibited the outflow of Polish workforce, but more importantly, thanks to this situation, it became clear that the migration strategies in Poland will have an important impact on human capital creation in Poland in future. That transparency of the migration in Poland will probably stop such a potentially huge migration, but it will still raise some concerns related to the majority of educated and young people in Poland and elsewhere in Europe. The following points can confirm the thesis:

- Labour market - even during the economic crisis the foreign labour markets were more attractive than domestic. Often departures from Great Britain or Ireland did not mean returns to Poland but only the choice of another foreign country. It was caused by the lack of support plan for people that come back to the country (incorporation in domestic labour market).
- Mentality - new emigration wave from Poland did not happen only because of the economic reasons; it was often linked with other motivators: culture knowledge, foreign language, acquisition of professional experience, education. The research by Deloitte and Human Resource Department of SGH found out that the willingness to leave Poland decelerates among almost 60% of students and only one per five decides to stay in Poland (Pierwsze kroki, 2011).
- Structural problem – because there are no other researches in the labour market connecting business and education environment, it is very difficult to adjust demand and supply in the labour market. We can observe striving for higher education level without analysing wider context. That is why there is a large percentage of people with tertiary education, but with no chances to find a job. It can be a risk that the people decide to leave Poland, because they will be demanded in the EU countries and we will lose qualified and educated human capital for the benefit of other countries. People with higher qualification have been found to be the most mobile ones.
- Push – pull factors – demographic problems of Europe indicate that these countries will need more and more employees from the Middle East Europe. Migration decisions in Poland can be supported not only by the negative factors connected with unemployment, but also be the attractive appeal of the destination countries. Referring to the classical migration theory, we can point out push and pull factors of migration process, and deep connections between them in contemporary Poland (Babiński, 2009).

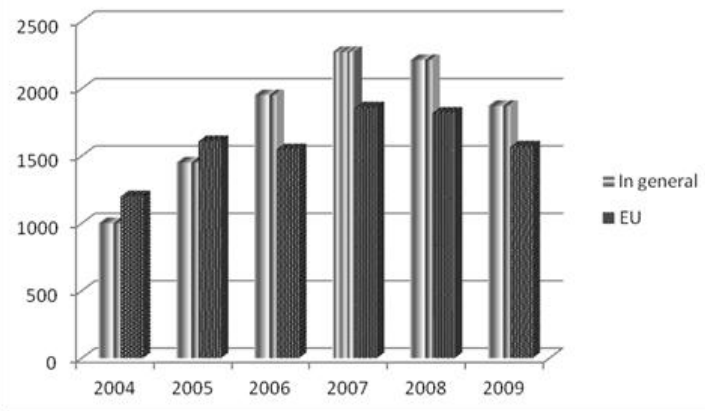

Figure 4. Emigration for temporary stay in 2004-2009 (in thousands).
Source: GUS data

Out of the factors mentioned above, the main danger is connected with maladjustment education structure of young people in Poland and the change in available job structures. The job preferences of young people are not adjusted to the level of economic development in Poland. We can call it "excess qualifications" in relation to possibility of using them. This situation can cause double implications for human capital formation. It is called "brain drain" and "brain waist". Firstly, when an educated person cannot get work in his/her profession and is pushed to undertake a job below his/her qualification level, it is easier for him/her to make a decision to migrate, because this kind of job is better paid for abroad then in Poland. The process of "brain waist" suggests that the achieved competences and skills will be forgotten and become invalid. Secondly, it is obvious that we are under pressure from the Western Europe, which tries to attract high-skilled employees from Poland. As an example we can point the labour market in Germany and Austria, which from is open for Polish employees from the 1st of May. Although we had to wait for the possibility to work there, people with tertiary education could pass through the shortened procedure of work permission since 2009. It is currently evaluated in order to save the dynamics of economic development in Germany, where the labour market will demand about 300-400 thousands of immigrants. First of all employees with tertiary education, such as engineers and IT specialists, are demanded (Kafarska, 2011). Looking at the demographic forecast, we can deduce that this problem will influence even more of the European countries.

Conclusions

The scrutiny of the human capital in Poland against European Union countries showed that there is deep divergence between Poland and other member countries of the EU. Despite the fact that in the EU15 the consecutive regression in synthetic measure of human capital, which was used in the analysis, was found, up to the end of 2009 the divergence was still marked. The most essential things, which have to be improved in the human capital formation in Poland, are: re-emigration of young people, research and development area and adult participation in education and training. The evaluation of the global crisis impact on human capital formation in Poland was reduced to the migration process analysis. Although migration during the crisis period decreased, the quantity of young people with tertiary education from agglomerations simultaneously increased. What is more, even if data from the last years shows a downward tendency, it is still more of a higher value than at the beginning of Polish access to the European Union and exceeds the quantity of born children during this period in Poland. The increasing number of educated people, maladjustment of the education structure of young people, change in the available job structures and pressure from the Western countries can all be the causes of the process, which is referred to "brain drain" in the literature. It will have a significant impact on the human capital formation in Poland primarily for employers and then for the Polish economy and competitiveness.

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