THE ANALYSIS OF THE INTRA–UNION MIGRATION IN CONNECTION WITH THE HDI AND ITS THREE DIMENSIONS

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Abstract

The main aim of this paper is the analysis of the intra-Union migration in connection with the Human development index - HDI. In our previous research was proved, that there is statistically significant correlation between gross migration rate (GMI) and HDI. As the information content of the GMI is smaller, we have analysed linear and also non-linear correlation between crude rate of net migration (CRN) and HDI, our results were positive, and we can state that there is statistically significant linear and non-linear correlation between these two variables. The next step was to analyse the dependence between these two variables with the use of regression analysis. At first, we used linear regression analysis, but as there were some extreme countries which could influence our results, we have decided to use nonparametric linear regression analysis as we would like to obtain the substantial presentation of the reality. Results from this analysis are the object of this paper and will be an important part of our final thesis – The international migration within the European area.

Key words: CRN, HDI, nonparametric linear regression analysis

JEL Code: F22, R23

Introduction

To analyze the intra-Union migration is very important for each country which would like to influence its future economic, cultural or other kind of development. Bilgic (2013), e.g. stated that European Union has to solve the problem with irregular migration by adopting common policies, but the problem is, that regularization in this case is preferred more at the national level than at the EU-level. Author in his article argued, that more suitable way to prevent irregular migration is to set up some flexible measures, videlicet some guide which helps member states in creation the regulation mechanism. So the common policy would be less effective up to this author.

The relations between emigration and development have been analyzed by Careja (2013). She states that the development potential of emigrants depends on the context of the sending countries. If we can consider the resources from emigrations for the seeds of the development, then the government has to involve in this process. Author demonstrate this necessity at the example of Romania, one of the largest labour sending countries in Eastern Europe, which laissez-faire approach does not support this idea and therefore Romania has to bear the consequences of this approach.

The next authors demonstrate that it is necessary to formulate policies and to implement measures that can enable to keep the workers from foreign countries in temporary status which could help to prevent the permanent settlement of these workers and on the other hand host country can gain benefits from additional labour power. (Tseng & Wang, 2013)

The other way how to control the inflow of unwanted immigrants is to create some control signals, which can also help countries to solve their dilemma whether they have prefer tighter immigration controls or more liberal work visa control. This research agenda has been established in Australia, and its task is to examine the success rate of this idea and on the other hand the aim is to implement this idea also into other realms of public policy where states face control dilemmas. (Wright, 2013)

The migration – development nexus is the key point also in the paper of Levitt and Rajaram (2013). They work with two very important categories – migration and return, and their question is how can career status which emigrant gain in the abroad influence organizational change when they return. And they focus also on the way how the role of senders and receivers of social remittances shifts over time.

The main aim of this paper is the analysis of the intra-Union migration in connection with the Human development index – HDI. In our previous research was proved, that there is statistically significant linear correlation between crude rate of net migration (GRN) and HDI. The dependence between these two variables was tested with the linear regression analysis. As there were some extreme countries which influenced our results, we have decided to use nonparametric linear regression analysis and its results are the object of this paper and will be an important part of our final thesis – The international migration within the European area.

1. Materials and methods

We have started our examination with monitoring of different research studies from journals and books available mainly in web of science and also other research databases. The statistical data are from Eurostat and from Human development report prepared by United Nations Development Programme.

The main aim of this paper is the analysis of the intra-Union migration in connection with the Human development index – HDI. We use the nonparametric linear regression to analyse the dependence between CRN and HDI as we would like to gain the true reflection of the reality. Calculations were made in MS Excel.

We work with two important variables. The first is crude rate of net migration plus statistical adjustment and it represents ratio of net migration plus statistical adjustment (CRN) during the year to the average population in the same year, expressed per 1 000 inhabitants. As the net migration is difference between the total gross rate of total change and the gross rate of natural change of the population we can state that this kind of migration is that part of the populations´ movement, which was not caused by death or birth. (Eurostat, 2013)

The second variable is human development index (HDI). It represents a composite measure of health, education and income. It was created as an alternative index to the gross national product (GDP) with the aim to measure the development of the particular country more precise. Its three dimensions are: health (LEI), education (EI) and living standards (II). (UNDP, 2012)

The formula poses the geometric average of normalized indices and is as follows:

$$HDI = (H_{Health} \ H_{Education} \ H_{Living\ standard})^{1/3} \quad (1)$$

As it has been mentioned, we have used nonparametric linear regression in our analysis and the necessary formulas are as follows. (Stehlíková & Žofajová, 1987)

Model of the regression line is:

$$y_i = a + bx_i - e_i,\ i = 1, 2, \ldots n \quad (2)$$

where: xi (i = 1, 2, …, n) are assigned values

a, b are unknown values

ei (i= 1, 2, … n) are mutually independent continuous random variables

Formulas for the estimation of the coefficient b are:

$$N = \tag{3}$$

then: $S_{ij} = \frac{\quad}{\quad}$, i j (4)

and the nonparametric estimation of the regression coefficient b is:

$$= \text{median} \tag{5}$$

Formulas for estimation of the absolute coefficient a are:

$$q_{ij} = [y_i + y_j - (x_i + x_j)] / 2, \; i \quad j \tag{6}$$

And the absolute coefficient a can be estimated up to this formula:

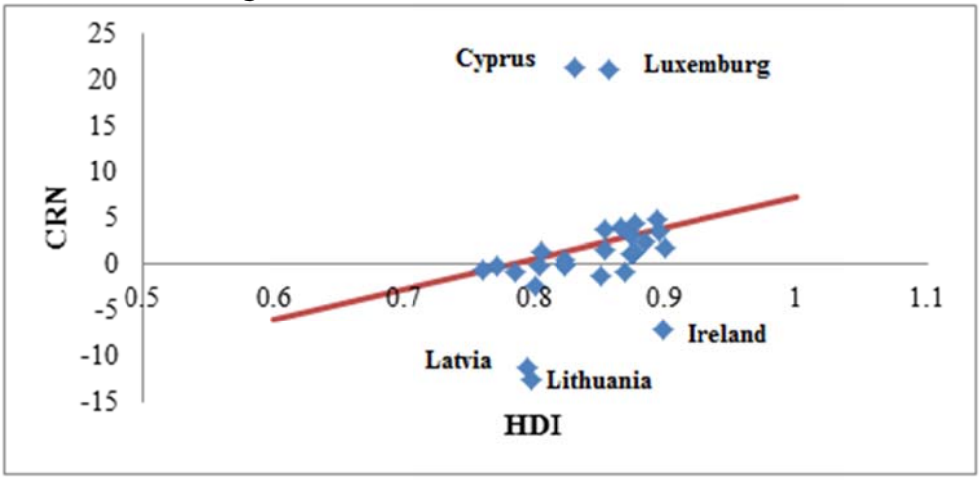
$$= \text{median} \tag{7}$$

Using formulas (1) – (7) we have obtained results which are introduced in the next chapter.

2. Results and discussion

Our results are illustrated in graphs 1 – 4. We have decided for the nonparametric linear regression analysis as we would like to know it the influence of the extreme countries as Cyprus, Luxemburg, Latvia, Lithuania, Ireland etc. can influence the trend of the regression line. The formula of the regression line from graph 1 has the form: y = -26.089 + 33.362x. From the graph 1 is obvious that there is increasing trend of the regression line, despite the impact of some extreme countries as Cyprus, Luxemburg, Latvia, Lithuania and Ireland.

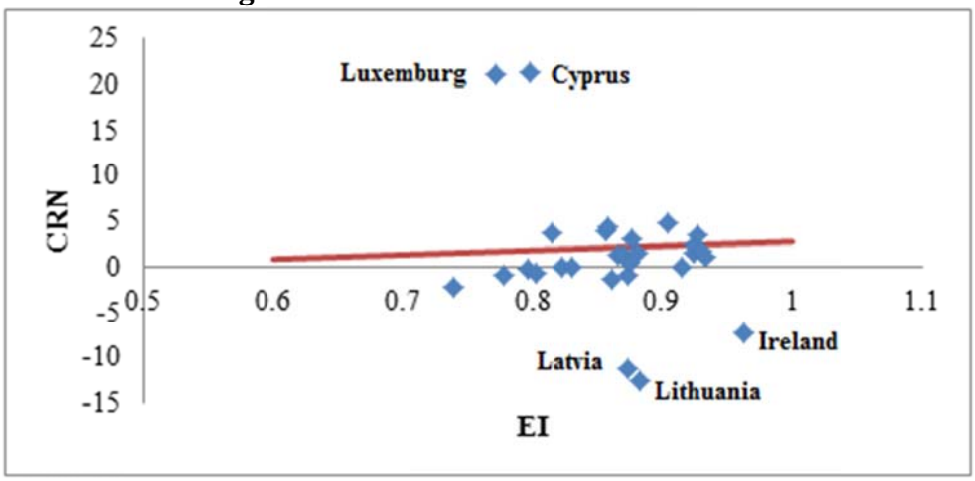
Gr. 1 Illustration of the regression line: CRN and HDI



Source: own processing of dates from Eurostat and HDR.

We have to mention that with the use of the classic linear regression, the formula for regression line was y = -35.292 +43.519x, in our previous research. When we compare these results we can state that the increasing trend is now sharper and the immigration increases in the countries with higher level of HDI. On the contrary, if we use just linear regression for whole analysed file except our extreme countries the trend would not be sharper, but moderate.

Gr. 2 Illustration of the regression line: CRN and EI



Source: own processing of dates from Eurostat and HDR.

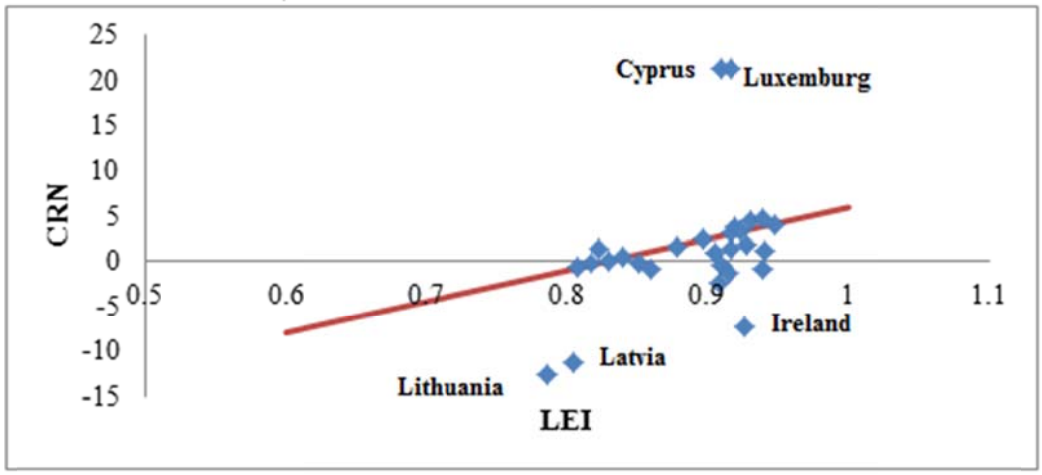
The formula of the regression line in the second case is: y = -2,050 + 4,820x. Trend of this regression line illustrates graph 2.

It is visible that the positive trend is maintained also in this case, but in the comparison with the previous case is flat. Here we would like to underline that when we compare our current results with that ones from our previous research, we can state that if we use just linear regression for our data, the trajectory of our regression line with formula: y = 34.361 - 38.197x, would be contradictory and we have to state that if the education in the particular country increase, the emigration from the country increase too, but when we take in to account our current results, we have to stated, that when the education level in the country increases, the immigration in this country increases too. The comparable results were reached also by the use of the classic linear regression analysis for data adjusted from our extreme countries. In this case we could not reject the hypothesis that extreme countries do not influence the trajectory of the regression line.

The third graph below, illustrates the regression line for variables CRN and health – LEI. The formula of the regression line in the third case is: y = -28,720 + 34,673x. The increasing trend of the regression line is notable, but if we compare results from classic linear regression analysis, the increasing trend would be sharper, however the elimination of the

extreme countries helped moderate this trend. So we can state that with the increase of the health level in the country, the value of CRN increase too, which means that the immigration in the particular country increases.

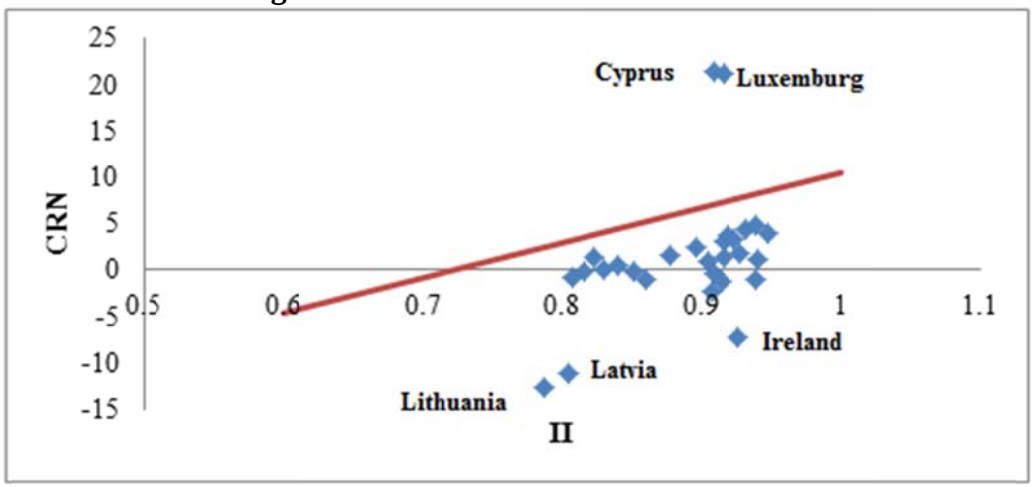
Gr. 3 Illustration of the regression line: CRN and LEI



Source: own processing of dates from Eurostat and HDR.

The formula of the regression line in the firth case is: y = -27,222 + 37,700x and it has also increasing trend as in the previous three situations. Up to this, we can state that with the increasing level of living standard in the country the immigration in the country increase too.

Gr. 4 Illustration of the regression line: CRN and II



Source: own processing of dates from Eurostat and HDR.

When we compare the current situation with the results from classic linear regression analysis, it is obvious that we cannot reject the hypothesis that the extreme countries do not influence the final trend of the regression line as the first results from classic linear regression analysis have shown that the increasing trend is sharper than in this occurrence.

Conclusion

As we stated in the begging of this paper to analyze the intra-Union migration is very important for each country which would like to influence its future economic, cultural or other kind of development. Our task was to examine how independent variables as health, education and living standards, which represent the three dimensions of HDI, can influence the development of the CRN. The increase of positive values of CRN means that the immigration grows in the particular country a vice versa.

Our previous research has shown us that except one case, when the HDI, or LEI and II increase, the immigration in the particular country increase too. The problem is that there are some extreme countries as Cyprus, Luxemburg, Latvia, Lithuania or Ireland and therefore we have to hypothesis that such countries could influence the trajectory or the trend of the regression line and therefore it is necessary to choose other type of analysis.

We have decided for nonparametric linear analysis and our results have proved our hypothesis that extreme countries are able to influence as the trajectory of the regression line, so its trend. So the nonparametric linear regression analysis will show us truer view of the reality in the connection with the dependence between CRN and HDI and its three dimensions – education, health and living standards. The results were as follows.

When we analyse the dependence between CRN and HDI, we can state that the immigration increases in the countries with higher level of HDI and the extreme countries can influence the trend of the regression line.

The influence of the extreme countries was more notable in the case of the CRN and EL, as if we use just classic linear regression analysis for whole dataset including the extreme countries, the trajectory of the regression line would be negative and our explanation of our results would be exactly opposite in comparison with our current results. Now we can state that when the education level in the country increases, the immigration in this country increases too.

The level of impact of the extreme countries was notable also in the third and firth case, but in each case our extreme countries influence just the trend of the regression line, which is more moderate with the use of nonparametric linear regression analysis and therefore we can sustain that with the increase of the level of health and living standards in particular country, the immigration in that country increase too.

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