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## THE EUROPEAN UNION CONVERGENCE IN THE ACHIEVED LEVELS OF HUMAN DEVELOPMENT

### Abstract

*The paper examines the existence of convergence in the achieved levels of human development among countries of the European Union in the period 1995-2018. The aim of the research is to test the hypothesis, There is convergence in the achieved levels of human development among the integrated countries of the European Union. The Human Development Index is used as a measure of human development. Using regression analysis and coefficient of variation, the existence of  $\beta$ - and  $\sigma$ -convergence is tested in this paper. In addition to the entire European Union, convergence is being tested for a group of developed countries of the European Union, as well as among so-called “New Member States”. The obtained results indicate the existence of convergence (both  $\beta$  and  $\sigma$ ) in the achieved levels of human development in the European Union, where it is more pronounced and stable in the group of “New Member States” compared to the group of developed countries of the European Union. The main contribution of this paper is to increase the number of papers in the field of convergence in terms of human development, given that so far, a small number of papers have explored this topic.*

**Key words:** *convergence, human development, Human Development Index, European Union.*

**JEL classification:** *C50, O47, O52*

## КОНВЕРГЕНЦИЈА У ДОСТИГНУТИМ НИВОИМА ХУМАНОГ РАЗВОЈА У ЕВРОПСКОЈ УНИЈИ

### Апстракт

*У раду се испитује постојање конвергенције у достигнутим нивоима хуманог развоја међу земљама Европске уније у периоду 1995-2018 године. Циљ истраживања је тестирање постављене хипотезе, која гласи Постоји конвергенција у достигнутим нивоима хуманог развоја међу интегрисаним земљама Европске уније. Као мера хуманог развоја користи се Индекс хуманог развоја. Коришћењем регресионе анализе и коефицијента варијације, у раду се тестира постојање  $\beta$ - и  $\sigma$ -конвергенције. Осим за целу Европску унију, конвергенција се тестира и за групу развијених земаља Европске уније као и такозване “Нове земље чланице”. Добијени резултати указују на постојање*

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*конвергенције ( $\beta$  и  $\sigma$ ) у достигнутим нивоима хуманог развоја у Европској унији, при чему је она израженија и стабилнија у групи “Нових земаља чланица” у односу на групу развијених земаља Европске уније. Главни допринос овог рада је у повећању радова из области конвергенције у достигнутим нивоима хуманог развоја, обзиром да је до сада мали број радова истраживао ову тематику.*

**Кључне речи:** *конвергенција, хумани развој, Индекс хуманог развоја, Европска унија.*

## Introduction

Convergence between countries represents one of the most significant discoveries in Solow's neoclassical growth model (Novaković & Cvetanović, 2013, p. 8). The main conclusion of Solow's growth model is the existence of income convergence, i.e. a situation when poor countries, with a lower initial level of capital and gross domestic product (GDP) per capita, tend to catch up with richer countries, i.e. converge. This indicates that the farther the country is from its steady state, the faster its income growth will be. Conversely, the closer the country is to steady state, the slower the income growth will be.

Initial theoretical understandings about income convergence in neoclassical, and later in endogenous growth theories, have been significantly improved due to the numerous studies that have followed. The theoretical and analytical framework has expanded, which has led to the emergence of different approaches, concepts and methods in analysis, and a large number of them are still used today in the study of income convergence.

Convergence is a concept that has become a research topic among economists, not only because of the importance of catching up with countries of different development levels, but also because this analysis can serve as a way to confirm the validity of different economic growth models. Income convergence is a process that can be analyzed from different aspects. Real income convergence describes income level convergence, nominal convergence reflects price level convergence, and institutional convergence implies harmonization of legislation. In addition, we can talk about the convergence of business cycles, consumer behavior and social stratification (Varblane & Vahter, 2005, p. 8).

When it comes to convergence, most of the research relates to income convergence. In that case, GDP per capita is mainly taken as a measure. However, as the economic development of the country is largely a consequence of technological progress, the idea of studying catching up with the level of technology among countries has emerged (Dollar, 1991, p. 263; Dollar & Wolff, 1994, p. 197). The total factor productivity is used as a measure of technology, hence the name convergence of total factor productivity (Gligorić, 2015, p. 15). Over time, the idea of studying convergence by measuring living standards with the help of the Human Development Index also emerged (Mazumdar, 2002, p. 87; Sutcliffe, 2004, p.15).

When determining the existence of convergence or divergence between countries, two concepts are most often used in the literature:  $\beta$ -convergence (beta convergence) and  $\sigma$ -convergence (sigma convergence) (Marques & Soukiazis, 1998, p.3). The concept of

$\sigma$ -convergence implies that convergence exists if dispersion of income among countries within the observed group decreases over time (Stanišić, 2016, p. 4). Coefficient of variation is used to measure dispersion of income.

Two types of  $\beta$ -convergence can be distinguished - absolute and relative  $\beta$ -convergence. Whether it is absolute or relative  $\beta$ -convergence, it exists when poor countries grow faster than rich ones, that is, when countries converge to the same level of GDP per capita regardless of their initial conditions. Absolute  $\beta$ -convergence implies that all countries converge to identical steady state and differ only in the initial income level (Milutinović, 2015, p. 132). Absolute  $\beta$ -convergence occurs when countries have the same savings rates, population growth rates, and depreciation rates. Differences in GDP per capita can occur only due to unforeseen shocks in these determinants or as a consequence of moving towards steady state. After some time, the same GDP growth rates per capita will appear.

Unlike the concept of absolute  $\beta$ -convergence, relative  $\beta$ -convergence implies that countries have different steady state levels, due to different levels of technology, savings rates and population growth rates. As a result, countries are converging towards their own, different states of equilibrium (Milutinović, 2015, p. 133). Countries that are further from their steady state will grow faster than richer countries, that is, to those countries that are closer to their steady state. Therefore, it can be said that relative  $\beta$ -convergence is a situation when poorer countries have faster growth than richer countries, towards different steady states.

Comparing these two concepts of convergence ( $\beta$  and  $\sigma$ ), the interesting question is which of them is better. The concept of  $\sigma$ -convergence became popular in the 1990s with the work of Daniel Quah. Quah (1993) argued that  $\sigma$ -convergence is better because it shows whether income distribution among countries is becoming more or less equal. However, the concept of  $\beta$ -convergence is more commonly used in the literature because it shows whether poor countries are growing faster than richer ones, indicates the speed of the convergence process and whether convergence is absolute or relative (Milutinović, 2015, p.135). Finally, it is important to note that  $\beta$ -convergence is a necessary but not a sufficient condition for  $\sigma$ -convergence (Sala-i-Martin, 1995, p.5). Therefore, it can be said that these two concepts are complementary and irreplaceable with each other.

In addition to GDP per capita, convergence between countries of different development levels was also examined in the achieved levels of human development of the country. Namely, the connection between economic growth and the level of human development is evident. Economic growth expands the material basis for meeting human needs. Economic growth should promote human development in all its dimensions, i.e. generate full employment and security of life, promote human freedom and empowerment, distribute benefits equally, as well as promote social cohesion and cooperation and protect future human development (UNDP, 1996, p. 56). This is very important given that non-economic factors, such as ethnic, educational and religious characteristics, could also improve cooperation among nations and countries (Sržentić, 2020, p. 127).

Human development, on the other hand, requires, among other things, significant investments in education, health and nutrition. The result is a healthier and more educated population that is capable of being more economically productive. In addition, the importance of education lies not only in its effect on social and economic development,

but also as a tool for reducing unemployment (Bartosik & Wiścicka, 2021, p. 27). Indeed, many modern theories of growth explain economic growth primarily in terms of expanded human capital. Growth can also be linked to many other elements of human development, such as political freedom, cultural heritage and environmental protection. In the long run, economic growth and human development generally move together and tend to empower each other (UNDP, 1996, p. 66).

The subject of this paper is the analysis of the achieved standard of living and the level of human development of the European Union (EU) member states using the Human Development Index (HDI). The aim of this paper is to prove the existence of convergence in the achieved levels of human development among the countries of the EU. In other words, the aim of the paper is to test whether the EU member states are converging in living standards. Using the regression model and the coefficient of variation, following hypothesis will be tested in the paper: There is convergence in the achieved levels of human development among integrated countries of the EU. The main contribution of this paper is to increase the literature foundation on convergence in the achieved levels of human development, given that so far there are not a large number of papers examining this topic.

The rest of the paper is structured as follows. Concept of HDI as well as the comparative analysis of HDI among EU countries is presented in the part two. Literature review is given in part three, followed by data and model in part four. Results are presented in part five, while sixth part concludes.

## **Human Development Index in The European Union**

Every year, beginning in 1990, the United Nations Development Program publishes a Human Development Report with the aim of pointing out not only the economic, but also other dimensions of human existence. Thus, the HDI measures three dimensions of human existence, i.e. the achieved standard of living, life expectancy and achieved education of the population. The indicator for the first dimension is life expectancy at birth, for the second expected and mean years of schooling, and for the third gross national income (GNI) expressed in purchasing power parities. HDI simplifies and encompasses only a part of what human development implies. Its disadvantage is that it does not reflect inequalities within its three dimensions, so it is considered an index of potential human development. Also, the HDI does not include all relevant areas of human development such as social inclusion, sustainability, environmental protection, human rights, cultural and political participation.

The 2016 Human Development Report focuses on how human development can be ensured for everyone, now and in the future. The progress of human development over the past 25 years has been impressive on many fronts, but the gains have not been universal for all countries. Namely, there are imbalances in countries, socio-economic, ethnic and racial groups, urban and rural areas, due to which millions of people are not able to realize their full potential in life (UNDP, 2016, p. 1). The 2019 Human Development Report explores inequalities in human development by going beyond income, beyond averages, and beyond today (UNDP, 2019). Beside inequality of income, there are inequalities in key elements of human development such as health, education,

dignity and respect for human rights. Even though HDI shows, on average, impressive improvement (even convergence) in the capabilities included in the HDI. Yet, along with convergence in the basic capabilities that were the focus of Human Development Reports in the early 1990s, divergences are opening in other indicators, both within and across countries. Namely, life expectancy at older ages is becoming more unequal, as is access to tertiary education (UNDP, 2019, p. 24).

Depending on the value of the HDI, all countries are classified into four categories, i.e. very high level of human development (HDI has a ratio of 1 to 0.800), high level of human development (0.799-0.700), medium level of human development (0.699-0.550), low level of human development (0.549-0).

Table 1 gives the HDI and world rankings for EU member states for 2018. Top ranked country is Ireland with an HDI value of 0.942, which puts it in a very high category of human development, positioning it in third place out of 188 countries and territories of the world. From 1990 to 2018, value of Ireland's HDI increased from 0.764 to 0.942, which is an increase of 23.4 percent. Between 1990 and 2018, Ireland's life expectancy at birth increased by 7.3 years, mean years of schooling increased by 2.8 years and expected years of schooling increased by 6.7 years. In this period, Ireland's GNI per capita increased by about 179.2 percent (UNDP, Retrieved September 18, 2020, from [http://hdr.undp.org/sites/all/themes/hdr\\_theme/country-notes/IRL.pdf](http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/IRL.pdf)).

*Table 1: Human Development Index for European Union member states for 2018*

<b>COUNTRY</b>	<b>INDEX</b>	<b>WORLD RANKING</b>
<b>Ireland</b>	0,942	3
<b>Germany</b>	0,939	4
<b>Sweden</b>	0,937	8
<b>Netherlands</b>	0,933	10
<b>Denmark</b>	0,930	11
<b>Finland</b>	0,925	12
<b>United Kingdom</b>	0,920	15
<b>Belgium</b>	0,919	17
<b>Austria</b>	0,914	20
<b>Luxembourg</b>	0,909	21
<b>Slovenia</b>	0,902	24
<b>Spain</b>	0,893	25
<b>France</b>	0,891	26
<b>Czech Republic</b>	0,891	26
<b>Malta</b>	0,885	28
<b>Italy</b>	0,883	29
<b>Estonia</b>	0,882	30
<b>Cyprus</b>	0,873	31
<b>Greece</b>	0,872	32
<b>Poland</b>	0,872	32
<b>Lithuania</b>	0,869	34
<b>Slovakia</b>	0,857	36
<b>Latvia</b>	0,854	39

<b>Portugal</b>	0,850	40
<b>Hungary</b>	0,845	43
<b>Croatia</b>	0,837	46
<b>Romania</b>	0,816	52
<b>Bulgaria</b>	0,816	52

*Source: UNDP, Retrieved September 18, 2020, from <http://hdr.undp.org/en/countries>*

The worst ranked countries of the European Union are Bulgaria and Romania, which share 56th place, with an HDI value of 0.816. This value puts them in the category of countries with very high human development. Between 1990 and 2018, Bulgaria's HDI value increased from 0.694 to 0.816, an increase of 17.5 percent. In this period, Bulgaria's life expectancy at birth increased by 3.7 years, mean years of schooling increased by 3.0 years and expected years of schooling increased by 2.7 years. From 1990 to 2018 Bulgaria's GNI per capita increased by about 130.6 percent (UNDP, Retrieved September 18, 2020, from [http://hdr.undp.org/sites/all/themes/hdr\\_theme/country-notes/BGR.pdf](http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/BGR.pdf)). In the case of Romania, between 1990 and 2018, HDI value increased from 0.701 to 0.816, an increase of 16.3 percent. In this period, Romania's life expectancy at birth increased by 6.4 years, mean years of schooling increased by 1.9 years and expected years of schooling increased by 2.4 years. Romania's GNI per capita increased by about 109.1 percent between 1990 and 2018 (UNDP, Retrieved September 18, 2020, from [http://hdr.undp.org/sites/all/themes/hdr\\_theme/country-notes/ROU.pdf](http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/ROU.pdf)).

## Literature review

Human development is a broad concept that must not be equated with economic growth. The experience of countries with high GDP growth rates shows that economic growth is not a guarantee of the socio-economic well-being of the whole society. On the other hand, many countries with low GDP growth rates have reached a relatively high level of human development thanks to channeling funds into building and expanding the quality of human capacity (Leković & Pantić, 2015, p. 61). Thus, human development is much more than economic growth expressed by GDP growth. Therefore, research has emerged that, in addition to testing the existence of convergence in income levels, tests the existence of convergence in the achieved levels of human development.

Mazumdar (2002), Sutcliffe (2004) and Noorbakhsh (2006) were among first authors that have investigated the convergence in the terms of human development. Mazumdar (2002) tested the existence of convergence in terms of human development for a sample of 91 countries, for the period 1960-1995, and also for three groups of countries according to their level of human development. The results showed divergence in terms of human development for all four cases over the period 1960-1995.

Sutcliffe (2004) examined this type of convergence for a sample of 99 countries, during 1975, 1980, 1985, 1990, 1995 and 2001. Author's results indicated convergence in terms of human development. However, the author rejects the idea of a convergence process in terms of human development for two reasons. First reason was that author argued that developed countries are close to one another in terms of human development

because in these countries life expectancy has been close to its biological limit, adult literacy and (primary) educational enrolment have been practically hundred percent, and the impact of the only variable without natural upper limit, i.e. per capita income, on measuring the difference between the rich and the poor is strongly restricted by taking the logarithm of per capita income (Konya & Guisan, 2008, p. 10). Secondly, author claimed that convergence in the terms of human development has been seized on by the International Monetary Fund, for example, to mitigate the acknowledged downside of the long-run economic history of the world economy.

Noorbakhsh (2006) tested the existence of convergence in terms of human development of countries and regions over the period 1975-2002, using data slightly updated compared to previous studies. Author found evidence of weak  $\beta$  and  $\sigma$ -convergence for the observed countries.

Bucur & Stangaciu (2015) tested the convergence within EU in the terms of GDP as well as social convergence using HDI. Authors proved the existing of convergence both in income and human development level. Results also indicate that the less developed countries from economic and social viewpoints managed to increase their level of GDP per capita and of HDI at a faster rate than the more developed states. Konya & Guisan (2008) investigated the possibility of human development convergence in the world between 1975 and 2004. Results indicate that the world had been converging in the sense that relatively backward countries managed to increase their HDI faster on average than more developed countries, though this convergence process was rather slow. Same authors performed similar analyses within EU and particularly NMS. In both cases authors have found  $\beta$ - and  $\sigma$ -convergence and convergence was much faster within these groups of countries than convergence in the world.

## Data and Model

The following hypothesis will be tested in the paper: There is convergence in the achieved levels of human development among integrated countries of the European Union. Both  $\beta$  and  $\sigma$  convergence will be used to test the set hypothesis. The analysis was performed for the period 1995-2018.

The following regression model will be used to test  $\beta$ -convergence:

$$\ln(y_{i,T}/y_{i,0}) = \alpha_0 + \alpha_1 \ln y_{i,0} + e_i,$$

where  $y_{i,T}$  is HDI in the last year of the observation period,  $y_{i,0}$  is HDI in the first year of the observation period,  $\alpha_0$  is constant,  $e_i$  is standard error. Negative value of the coefficient  $\alpha_1$  indicates the existence of  $\beta$ -convergence in the achieved levels of human development.

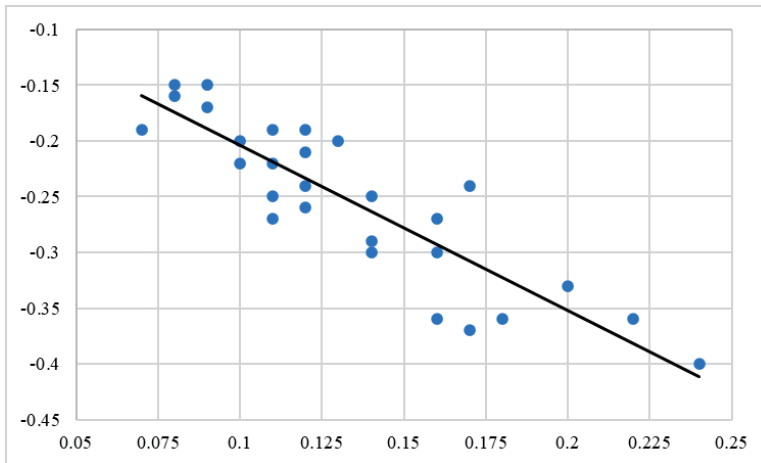
To test the existence of  $\sigma$ -convergence in the achieved levels of human development, the coefficient of variation of HDI is used as a measure of the dispersion of the development level between countries. The downward trend of the coefficient of variation shows the existence of this type of convergence.

Data for the analysis was obtained from United Nations Development Programme web site (<http://hdr.undp.org/en/data>).

## Research results and discussion

The results of convergence in the achieved levels of human development obtained by regression analysis are presented below. Dependent variable is the HDI value in the last and first year of the period (2018 and 1995), while the independent variable is HDI in the initial year (1995). The existence of  $\beta$ -convergence is first examined. Figure 1 shows the scatter plot of the dependent and independent variables.

Figure 1: Distribution diagram of average HDI growth rate (1995-2018) and initial HDI level (1995) for EU member states



Source: author

The coefficient  $\alpha_1$  with the initial HDI level is negative and significant (Table 2) and is -0.465. This result confirms the assumption that there is convergence in the achieved levels of human development among EU member states, when it comes to  $\beta$ -convergence. This means that countries with lower living standards converge to countries with higher living standards.  $\beta$ -convergence was also confirmed when observed separately developed EU countries (EU15) and so-called “New Member States” (NMS). Analysis showed that convergence is more pronounced in the NMS group (higher value of the coefficient with the independent variable).

Table 2: Results of regression analysis of  $\beta$ -convergence in the achieved levels of human development

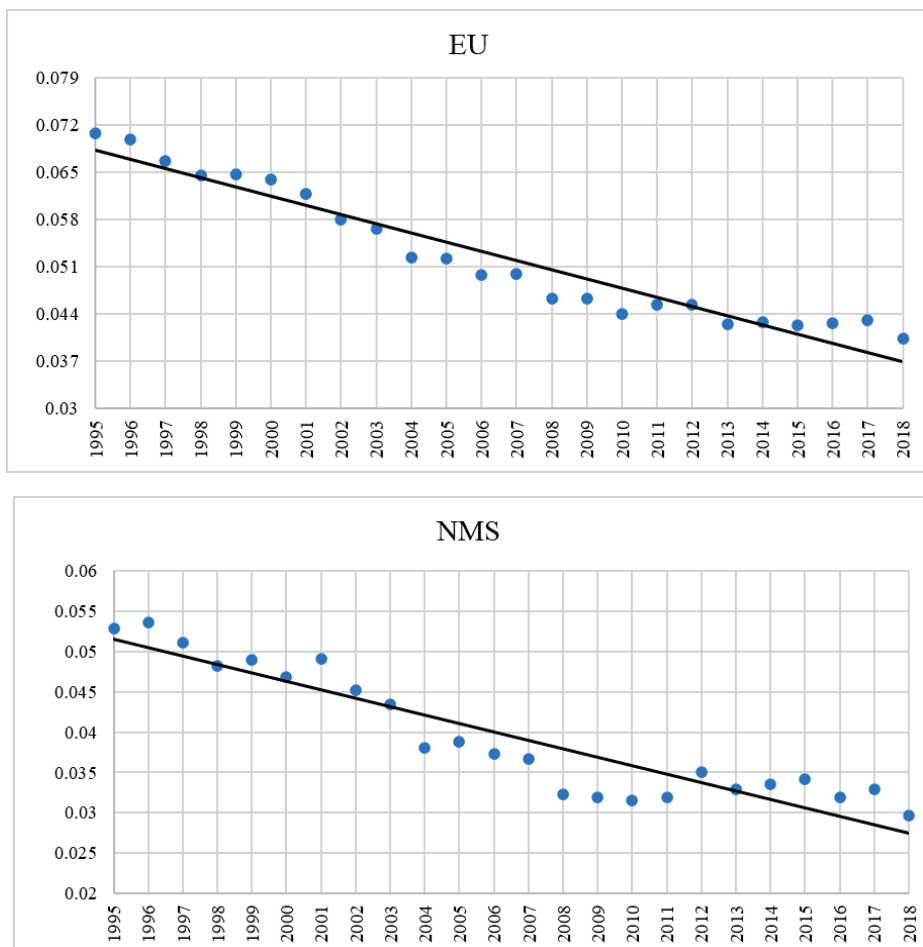
	EU		EU15		NMS	
	Coefficient	<i>p</i>	Coefficient	<i>p</i>	Coefficient	<i>p</i>
<b>Constant</b>	0,02	0,873	0,029	0,392	-0,004	0,892
<b>ln(HDI)<sub>i</sub></b>	-0,517	<0,0005	-0,386	0,031	-0,540	<0,0005
<b>R<sup>2</sup></b>	0,757		0,310		0,761	

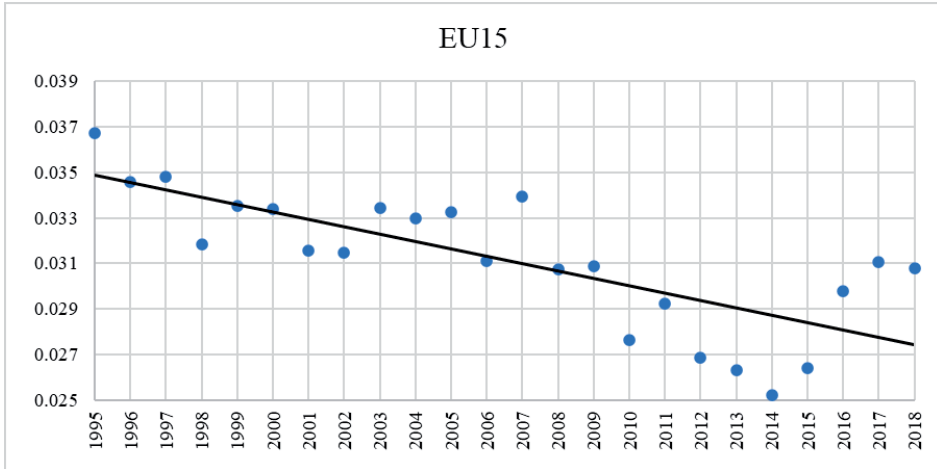
Source: author's calculation



The presence of  $\sigma$ -convergence in the achieved levels of human development is tested by calculating the coefficient of variation. If the coefficient of variation tends to decrease over time,  $\sigma$ -convergence exists. The coefficient of variation of HDI for all EU countries, as well as for EU15 and the NMS group is shown in Figure 2. The coefficient of variation shows a decreasing trend for all three groups of countries, which confirms the existence of  $\sigma$ -convergence in achieved levels of human development.

Figure 2: Coefficient of variation of the Human Development Index for EU, EU15 and NMS from 1995 to 2018





Source: author

When comparing groups of countries individually, it can be seen that the coefficient of variation has the smallest deviation in the EU. There is a slightly smaller deviation in the NMS group, while in the group of the most developed EU countries, the coefficient of variation shows the greatest instability. These results indicate a more consistent and pronounced convergence in the achieved levels of human development in the NMS group compared to the EU15.

The obtained results indicate that the hypothesis There is convergence in the achieved levels of human development among integrated countries of the EU can be confirmed. In other words, EU member states converged in the terms of human development.

## Conclusion

The concept of income convergence is a broadly researched topic. Catching up with countries of different development levels has been proven in numerous papers, when less developed countries are catching up with the level of GDP per capita of developed countries. However, a high level of GDP is not always a guarantee of the socio-economic well-being of the population. Therefore, convergence between countries is also examined in terms of levels of human development, using the Human Development Index. Human Development Index is calculated every year since 1990 by United Nations Development Programme, and covers three dimensions of human existence, i.e. the achieved standard of living, life expectancy and achieved education of the population.

The subject of this paper is convergence in human development levels within European Union. The aim is to test the hypothesis There is convergence in the achieved levels of human development among integrated countries of the European Union. In order to test the hypothesis regression model and coefficient of variation were used. As a measure of human development level, Human Development Index was used. Results indicate the existence of convergence in levels of human development, meaning that the set hypothesis

is confirmed. The main contribution of this paper is to increase the number of papers that examine the existence of convergence in the achieved levels of human development, given that so far there is a very small number of papers that address this topic.

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