The EU Enlargement and Income Convergence: Central and Eastern European Countries vs. Western Balkan Countries

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A B S T R A C T
Objective: This article analyses the stochastic convergence of income per capita between the Western Balkan (WB) and the Central and Eastern European (CEE) countries compared to developed EU countries (EU15).
Research Design & Methods: Stochastic convergence implies that all shocks in country's income relative to the average income of the group are only temporary. In order to test stochastic convergence, the tests of the unit root were used. The Augmented Dickey-Fuller (ADF) test is supplemented with the Zivot-Andrews (ZA) unit root test, which allows for the structural breaks in time series of income per capita.
Findings: Results confirm the existence of stochastic convergence of income per capita toward the EU15 average in the cases of the Czech Republic, Slovakia, Poland, Slovenia, Estonia, Latvia and Romania. Income convergence is not found in the case of the Western Balkan countries.
Implications & Recommendations: While income convergence toward the EU15 average level was found in the case of 7 CEE countries, it was not found in the case of any WB country. This could be a proof of the importance of further support to reforms in the Western Balkan countries.
Contribution & Value Added: The scientific contribution of the article is reflected in the fact that the existing literature dealing with income convergence of the Western Balkan countries toward the income of the EU15 countries is still very limited in number, as is the number of studies that compare convergence of income per capita toward the EU15 between the Western Balkan and CEE countries.

INTRODUCTION

In the last few decades, one of the macroeconomic issues that has become increasingly important is whether convergence exists between countries – defined as the process of reducing differences in income per capita over time and whether poorer countries can catch up with richer countries in terms of the standards of living. The theoretical importance and the interest in this issue derive from the fact that testing for the existence of convergence presents the answer that confirms the validity of one out of two alternative theoretical approaches (Islam, 2003). While income convergence is an integral part of the neoclassical growth model (Solow, 1956), new theories of growth – theories of endogenous growth – imply that convergence does not occur automatically when the countries differ in income levels and that additional factors determine the existence of the convergence process (Romer, 1986; Lucas, 1988). In addition to different predictions regarding convergence, recommendations for conducting regional policies are also different (Hofer & Worgotter, 1997). New theories of economic growth advocate the idea that economic policies can influence not only the level of production, as discussed in the traditional neoclassical theory, but also the equilibrium rate of economic growth.

The rapid growth of poorer countries in comparison with their richer counterparts and a decrease in disparity in income per capita in the neoclassical growth model, is the result of the decreasing rate of return on capital, due to the fact that the marginal product of capital in poor countries, with smaller income per capita, is higher compared to richer regions with a higher volume of capital per capita (Cherodian & Thirwall, 2015). Income per capita converges towards various equilibrium stages (conditional convergence) or towards a mutual equilibrium stage (absolute convergence), independently from the initial level of income. The differences in equilibrium income between countries reflect differences in the rate of savings, the growth rate of population and the capital depreciation rate (Miller & Upadhuay, 2002). Supporters of the theories of endogenous growth reject the assumption of decreasing returns and faster growth of poor countries compared to the more affluent ones and stress that returns are either constant or growing. Due to growing income, production activity will be concentrated in a certain number of countries and inequalities in development will be intensified – divergence between countries will appear.

Europe consists of heterogeneous countries which have significant disparities in income per capita, so the question of convergence or the possibility of decreasing economic inequalities is a key economic and political challenge (Sutherland, 1986). During the last 25 years, significant transformations have taken place in ex-communist European countries, which have resulted in their integration into the global economy and an increase in living standards. However, for the first several years of transition towards the market economy framework, reforms of political and regulatory systems were followed by a drastic decrease in output, high inflation and an increase in the unemployment rate in these countries (Fisher, Sahay, & Vegh, 1998; Fisher & Sahay, 2000). An initial recession period was followed by divergence in income per capita between socialist countries and the rest of Europe, as well as within the countries themselves. In all countries, the transition towards a market economy was accompanied by numerous issues. However, countries in the Western Balkans (WB) had particular difficulties, where, due to war, political instability, sanctions, economic instability and isolation, the transition process began a decade later compared to the

other countries of Central and Eastern Europe (CEE). Despite economic progress in the last 15 years, which is reflected in an increase of gross domestic product (GDP), GDP per capita and convergence of income between the WB countries and developed EU countries, the speed at which reforms have been implemented is insufficient, hence, the entire region has still not completed the transition process (Stanišić, 2016).

In order to gain initial insight into the development of the WB countries thus far and the comparative disparity with EU member states, the dynamics of the change in the GDP per capita in these countries for the period 1993-2015 was analysed. Figure 1 depicts the trends of average GDP per capita measured by purchase power parity (PPP) in the EU15 (Germany, France, Italy, Netherlands, Belgium, Luxembourg, United Kingom, Denmark, Ireland, Greece, Spain, Portugal, Austria, Sweden and Finland), the CEE10 (Poland, Czech Republic, Slovakia, Slovenia, Hungary, Latvia, Lithuania, Estonia, Romania and Bulgaria) and the WB countries (Croatia, Bosnia and Herzegovina, the Republic of Serbia, Montenegro, FYR Macedonia and Albania).
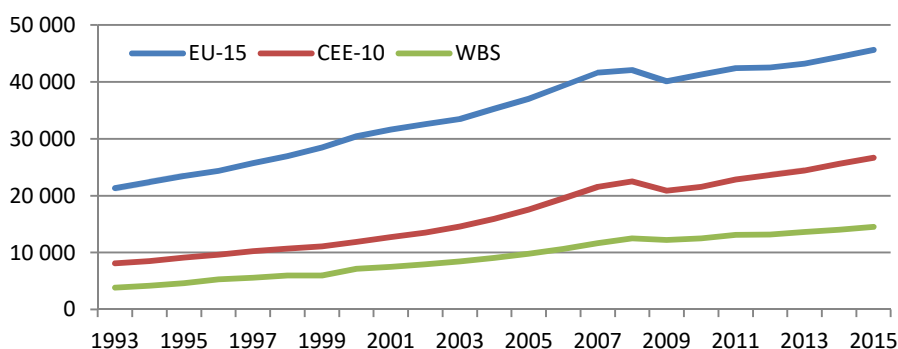

**Figure 1. Trends of average GDP per capita (PPP) in EU-15, CEE-10 and WB,
in the period 1993-2015, in current international dollars**
Source: World Economic Outlook (2016).

The level of living standards, measured by average GDP per capita, increased in all three groups of countries observed. The prosperity which characterised European transition countries at the beginning of the 21st century was suddenly halted due to the beginning of the global financial crisis, primarily in new EU countries. The crisis demonstrated that growth was not sustainable in many countries. In the long run, the manner in which economic growth is generated is important and not only via sudden increases in production. The lowest standards of living were found in the WB countries. In 2015, the standard of living was two times lower compared to that in the CEE10 countries and three times lower than in developed EU countries (EU15). The gap in GDP per capita between these groups of countries can be attributed to constantly lower productivity, higher unemployment and lower levels of human capital and competitiveness in the WB region (Holzner, 2016).

Based on these facts, the subject of the research is the convergence of income of the CEE and WB countries toward the average income per capita of developed EU countries. The aim of the research is to examine, through theoretical and empirical analysis, whether

the CEE and WB countries are converging towards developed countries in terms of income per capita. In line with this, the following research hypothesis is going to be tested:

The Western Balkan and Central and Eastern European countries are converging to the EU15 in terms of income per capita.

The article consists of five sections. Firstly, the results of relevant empirical research on the convergence of income are presented. There then follows an explanation of the data used and the applied methodology of the research, with the results of the research then presented. Lastly, the conclusions of the article are summarised and further direction for research in the area is outlined.

LITERATURE REVIEW

As a topic of scientific research, the income per capita convergence between different countries has increased in importance since the appearance of the so-called "controversy on convergence", which arose as a result of theoretical and scientific debate after the appearance of the theory of endogenous growth (Azzoni, 2001). In literature, the question of convergence has been analysed in various manners. Papers that analyse convergence can be divided into two groups (Bernard & Durlauf, 1996). The first group of authors use cross-sectional data analysis, in order to examine dependence between the income growth rate from its initial level and proved hypotheses on convergence, whereas the other group uses the approach of time series. The time series approach uses unit root tests in order to prove hypotheses related to convergence. The use of various methods and the analysis of different time frames have resulted in mixed conclusions. For this reason, the question of convergence in real income per capita between European countries is still a highly controversial topic.

Cross-sectional studies mainly confirm the existence of the convergence of income. Matkowski and Prochniak (2004) examined the convergence of income between CEE countries (CEE8) and 'old' EU members, as well as in CEE8 countries themselves. The authors confirmed the existence of convergence for eight new member states, as well as a decrease in the gap in development compared to the EU15 members. A later study, conducted by the same authors using the same sample three years later but over a longer timeframe, confirms the existence of income convergence between 'old' and 'new' EU members (Matkowski & Prochniak, 2007). A decrease in the gap in development between 'old' and 'new' EU members was confirmed in the papers of Kaitila (2004); Vojinovic & Oplotnik (2008); Vojinovic, Acharya, & Prochniak (2009); Rapacki & Prochniak (2009); Vojinovic, Oplotnik, & Prochniak (2010); Głodowska (2015).

The different results of these papers are demonstrated in the speed of the convergence. The existence of convergence between new members and the EU15, as well as huge differences in the speed of convergence was asserted in the papers of Vamvakidis (2008) and Cavenaile and Dubois (2011). Szeles and Marinescu (2010) confirm the existence of absolute and conditional convergence in CEE countries. A decrease in the gap in development between the CEE10 and the EU15 countries was confirmed by Stanišić (2012), with the negative impact of the global financial crisis affecting the speed of convergence.

The approach of using time series in order to prove the existence of convergence started in the last decade of the 20th century. Some of these studies which based their

analysis on this approach include Kutan and Yigit (2005), who analysed stochastic convergence and proved the existence of significant progress of new members in convergence towards the EU. Brüggemann and Trenkler (2007) compared the convergence in income per capita between the Czech Republic, Hungary, Poland and the EU15 economies. The results demonstrated that stochastic convergence existed only between the Czech Republic and the EU15 countries. Cunado and Perez de Grazia (2006) proved a decrease in the gap in the standard of living of Poland, the Czech Republic and Hungary compared to the German economy in the period between 1990 and 2003. Kocenda, Kutan and Yigit, (2006) and Ingianni and Zdarek (2009) proved a decrease in income divergence among new members was present, as well as between new and old members, accentuating that differences exist among countries in the speed of catching up living standards, compared to developed EU members. Reza and Zahra (2008) confirmed the existence of absolute convergence, but not conditional convergence of income per capita between new and developed EU members. The process of the catching up between new and old members was confirmed in the papers of Gligoric (2014) and Strielkowski and Hoschle (2016), who analysed convergences in income in the EU during the last few decades of expansion and they found proof of the existence of convergence within the EU.

Although studies on income convergence of new EU members are numerous, there are few studies concerning the convergence between the Western Balkan countries and the EU15. El Ouardighi and Somun-Kapetanovic (2007) analysed the process of income per capita convergence between the WB countries and the EU24 during the period 1989-2005. They confirmed that after an increase in the gap in development between the two groups of countries during the period 1991-1993, the gap decreased but remained very significant, and the process of convergence with the EU remained very slow. Tsanana, Katralikidis and Pantelidis (2012) analysed income convergence between Balkan countries and the EU15 and concluded that it could be confirmed only in the cases of Slovenia and Greece, but not in the case of other Balkan states. Two years later, Tsanana and Katralikidis (2014) used unit root tests to prove the existence of income convergence among countries in the Balkans, as well as between these countries and the EU, remarking that although all WB states recovered after the year 2000, most of the countries were hit by the global economic crisis and therefore the convergence of their income toward average income of the EU countries remains under question.

A study of the International Monetary Fund (Murgasova, Ilahi, Miniane, Scott, & Vladkova-Hollar, 2015) examined the speed at which new member states of the EU (NMS) and the WB countries catch up the average GDP per capita of developed EU members (EU15). It was concluded that a very slow convergence between WB and the EU15 countries was achieved in the period 2000-2007, explained by the fact that the growth of less developed countries such as Bosnia and Herzegovina and Albania was slower compared to developed countries like Croatia. In the same period, significant convergence of income between NMS and the EU15 was achieved. After the beginning of the economic crisis, authors proved the existence of convergence for the WB countries, although slower than achieved by NMS countries. Stanišić (2016) tested the speed and existence of convergence of income in the Western Balkans countries and developed EU countries, compared to NMS. The results suggested that although convergence was achieved in the pre-crisis years, the global financial crisis halted the decrease in the gap in the economic

development between the EU15 and the WB countries, while at the same time the income gap between the WB countries and NMS increased.

A study of the European Investment Bank (Berthomieu, Cingolani, & Ri, 2016) demonstrated that although the gap in the standards of living between countries in the Western Balkans and the EU15 is decreasing, it is still very high. A period of at least twenty years will need to pass for the region to achieve the income per capita of the EU15, unless the growth rate of the Western Balkan countries were to increase to 6% per year, while being at a level of 1% in the EU15. If the growth rate of the WB countries were smaller, i.e. 4% per year, 14 years or more would be needed to achieve equal standards of living.

The scientific contribution of this article is reflected in the fact that there are few studies on income convergence between the Western Balkan countries and the EU15, as is the number of studies that compare convergence of income per capita toward the EU15 between WB and the CEE10 countries.

MATERIAL AND METHODS

There are two main methodological approaches to test the existence of income convergence. One is based on cross-sectional analysis of panel data, while the other one is based on time-series analysis. Since Friedman (1992) criticised the cross-sectional approach of testing the impact of initial level of income on the rate of economic growth, there is an increasing number of researchers who explores the existence of income convergence based on time-series analysis. This approach examines the existence of so called 'stochastic convergence', as first time described in Carlino and Mills (1993). Stochastic convergence implies that all shocks in country's income relative to the average income of the group which a country belongs to are only temporary. In accordance with that, econometric tests of stochastic convergence are based on unit root test applied to time series of natural logarithm of a country's income relative to the average countries group income. The rejection of null hypothesis of unit root in time-series is considered as a proof of income convergence, and vice versa.

This article examines the existence of stochastic income convergence among the Western Balkan states (WBS) and New EU member states (Central and East European countries, CEE10) on the one hand, and the most developed members of the EU (EU15), on the other hand.

Econometric approach of testing the income convergence is based on differentiation between two types of non-stationarity of time-series with a trending mean, which are:

1. Trend stationary: The mean trend is deterministic. Once the trend is estimated and removed from the data, the residual series is a stationary stochastic process,
2. Difference stationary: The mean trend is stochastic. Differencing the series D times yields a stationary stochastic process.

The distinction between a deterministic and stochastic trend has important implications for the long-term behaviour of a process:

1. Time series with a deterministic trend always revert to the trend in the long run (the effects of shocks are eventually eliminated),
2. Time series with a stochastic trend never recover from shocks to the system (the effects of shocks are permanent), which is why there is no convergence.

In order to examine the existence of stochastic income convergence, two different unit root tests are used in this article: Augmented Dickey-Fuller (ADF) test and Zivot-Andrews (ZA) test of unit root.

The augmented Dickey-Fuller tests if a variable follows a unit-root process. The null hypothesis is that the variable contains a unit root, and the alternative is that the variable was generated by a stationary process. Giving the fact that time-series of income of the WBS and the CEE10 relative to the EU15 average income over time have trend, ADF test that includes the trend is used.

The main drawback of ADF unit root test is that it ignores the existence of structural breaks in time-series, which could be of high importance in income time-series analysis. Therefore, Zivot and Andrews (1992) suggest the utilisation of unit root test which allows a single break in intercept and/or trend. As the existence of structural changes and shocks is common for the process of economic transition in the WBS and the CEE10 countries, ADF test is supplemented with the ZA unit root test in this article. If potential structural changes are not allowed for in the specification, but are, in fact, present, the results may be spurious because they can be biased towards the non-rejection of the non-stationarity hypothesis (Perron & Zhu, 2005).

The following equation that allows one time change in both the level and the slope of the series is estimated to test for the unit root:

$$x_i = \alpha_0 + \alpha_1 DU_i + d(DTB)_i + \gamma(DT)_i + \beta t + \rho x_{t-1} + \sum(\phi_i \Delta x_{t-1}) + e_i$$

Where the intercept dummy DU_t represents a change in the level ($DU_t = 1$ if $t>TB$, and zero otherwise); the slope dummy DT_t represents a change in the slope of the trend function ($DT_t = t$ if $t > TB$, zero otherwise); DTB_t is the crash dummy ($DTB_t = 1$ if $t = TB +1$, and zero otherwise); and TB is the break date; t is the time trend variable, while Δ denotes the first difference. The model has a unit root with a break under the null hypothesis. The alternative hypothesis is a broken trend stationary process.

The data used for the theoretical and empirical analysis were taken from a data base of World Economic Outlook (2016) and cover the period 1993-2015. As a measure of income per capita, quarterly data on real GDP per capita in the countries of the Western Balkans, the Central and Eastern European countries (CEE10), and developed EU countries (EU15) were used, adjusted by purchasing power parity of the currency.

RESULTS AND DISCUSSION

Table 1 summaries the results of Augmented Dickey-Fuller test of unit root in time-series with trend and with one year time lag.

Based on the ADF unit root test results, the income convergence toward the average income of the EU15 countries is proved only in the following three cases: Slovenia and Latvia from the CEE10 group of countries, and Bosnia and Herzegovina from the WB group. In all other cases it was not possible to reject null hypothesis of the existence of unit root in income ratio time-series.

As the economic transition process in all countries of both the CEE10 and the WBS groups was marked with structural shocks, more reliable results are expected from ZA unit root test which allows for endogenous break in time-series. Table 2 summarises the results of ZA test, with breaks in trends and intercepts allowed.

Table 1. ADF test results

country	t-statistics	p value
CEE10		
Bulgaria	-2.997	0.13
Czech R.	-2.337	0.41
Estonia	-2.999	0.13
Hungary	-2.382	0.38
Latvia	-3.136*	0.09
Lithuania	-2.121	0.53
Poland	-1.676	0.76
Romania	-2.484	0.33
Slovak R.	-2.434	0.36
Slovenia	-3.739***	0.01
WBS		
Croatia	-1.950	0.62
Bosnia and Herzegovina	30.330***	0.00
Serbia	-1.969	0.61
Montenegro	-1.790	0.70
FYR of Macedonia	-2.062	0.56
Albania	-2.758	0.21

Note: Boundary value of t-statistics for 10% significance is -3.240, for 5% significance it is -3.600, and for 1% significance it is -4.380

Source: own study.

Table 2. Results of ZA unit root test

country	t-statistics	Break year
CEE10		
Bulgaria	-2.993	2011
Czech R.	-5.379**	1997
Estonia	-5.982***	1997
Hungary	-3.173	2002
Latvia	-5.792***	2005
Lithuania	-3.172	2003
Poland	-3.767*	2001
Romania	-5.093**	1997
Slovak R.	-4.334**	1999
Slovenia	-5.951***	2008
WBS		
Croatia	-3.170	2002
Bosnia and Herzegovina	-3.263	2008
Serbia	-2.447	2012
Montenegro	-3.950	2007
FYR of Macedonia	-3.204	2001
Albania	-3.028	1997

Note: Boundary value of t-statistics for 10% significance is -4.82, for 5% significance it is -5.08, and for 1% significance it is -5.57

Source: own study.

ZA unit root test results confirm the existence of stochastic income convergence in all CEE countries except Bulgaria, Hungary, and Lithuania. In all other cases the existence of unit root in time-series of relative income is confirmed. No convergence was proven within the WBS group.

Compared to ADF unit root test results, the number of the countries for which the income convergence can be confirmed in the case of ZA unit root test is higher: seven compared to three. Beside Slovenia, and Latvia, the stochastic income convergence can be confirmed also in the cases of Czech Republic, Slovakia, Poland, Estonia, and Romania as well.

Looking at the years of breaks in time-series, it is possible to conclude that these years are mostly from 1990s transition period, or from the recent financial and economic crisis.

Income convergence towards an average level of income of the EU15 in the identified CEE countries is due to a number of reasons. The main reasons why the Czech Republic, Slovakia, Poland, Slovenia, Estonia and Latvia are catching up with the living standards of developed European economies could be found in a relatively short and successful period of the transition process, as well as in the quality of institutional reform. The intensive inflow of direct foreign investment in these economies could be one of the reasons for their faster convergence. This factor is considered one of the most crucial for a decrease in the developmental gap in Romania, compared to developed EU countries. In contrast, convergence in Bosnia and Herzegovina (proven only by ADF test) is probably the result of significantly low income at the beginning of the observed period due to the civil war.

The results obtained in this article are generally in line with findings in the existing literature, especially for the CEE countries, although obtained with a different research method. Comparable results obtained with different methodological approaches serve as a kind of proof of robust income convergence between almost all CEE countries and the EU15. As far as the Western Balkan states are concerned, results are in line with Tsanana, Katralikidis and Pantelidis (2012), and Tsanana and Katralikidis (2014), where the income convergence between WB states and the EU15 were not found. Even studies that have shown convergence in income between WB states and the EU15 found it to be very slow, as in Murgasova *et al.* (2015).

CONCLUSIONS

The basic expectation for European transition economies after the initiation of the transition process and the EU accession was in reaching the standards of living enjoyed by developed European economies. In accordance with this, the subject of the analysis within this article is the examination of stochastic income convergence between the Western Balkan and the Central and Eastern European countries on one side, and developed EU countries (EU15) on the other side, in the period 1993-2015. The examination of income convergence between European countries is important from the aspect of analysing the achieved success and overlooking differences in the level of income per capita in Europe.

The scientific contribution of the article is reflected in the fact that the existing literature dealing with income convergence of the Western Balkan countries toward income of the EU15 countries is still very limited in number, as is the number of studies that compare convergence of income per capita toward the EU15 between the Western Balkan countries and new EU members (CEE10). Also, research on stochastic convergence between the Western Balkan countries and developed EU15 is barely in existence.

In order to examine the stochastic convergence of income, an approach based on time series was applied in the article. Two unit root tests were used: the Augmented Dickey-Fuller (ADF) test and the Zivot-Andrews (ZA) test. The results of the ADF test demonstrate the existence of income convergence towards the average level of income of developed EU countries only in the case of three countries: two from the CEE10 group – Slovenia and Latvia, and one from the WB group – Bosnia and Herzegovina. In all other cases, it was not possible to reject null hypothesis on the existence of a unit root test in a time series of income ratio of the country and average income of the EU15. Due to the fact that the transition process in the CEE10 and the Western Balkan countries was characterised by significant structural changes and shocks, an addition to the ADF test, the ZA test was also used, with endogenous breaks in the time series permitted. The results of this test demonstrate that income convergence exists in the case of seven countries, all from the CEE10 group; the Czech Republic; Slovakia, Poland, Estonia; Latvia, Romania and Slovenia. In all other cases, a null hypothesis of the unit root test was confirmed. The income convergence toward the EU15 was not confirmed for any Western Balkan country.

According to the results obtained, the hypothesis that a convergence of income toward the EU15 average level exists among the CEE10 and the WB countries can be only partially accepted. The absence of convergence in the case of any WB state could be a proof of the importance of further support to reforms in the Western Balkan countries, whose economies are still very vulnerable to economic shocks, both internal and external.

The main research limitation of the article is the relatively short period of the observed time, and even more importantly the fact that the Western Balkan countries were faced with many social and political issues, and even conflicts during the 1990s, which greatly influenced their income.

The research conducted suggests several options for further development. Above all, a broader insight is necessary to identify factors that determine the existence of convergence and explain why some countries experienced the reduction of development gap, while the other ones did not.

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