THE EFFECTS OF ENTERING THE EUROZONE ON OTHER CENTRAL AND EASTERN EUROPEAN COUNTRIES IN RELATION TO POLAND

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Abstract

The aim of the article is to compare the major economic indicators relatively new EU members Estonia, Latvia, Lithuania, Slovakia, Slovenia who have joined the Eurozone with Polish macroeconomic indicators. The results also reflect economic changes that took place in these countries after joining the Eurozone in the context of economic convergence as well as competitiveness. The analysis is based on Eurostat data and encompasses the period of 2005-2017. In order to verify the process of economic convergence among these Central and Eastern European countries and the EU 12, both the hypotheses of absolute β-convergence and σ-convergence were verified. To this end, suitable econometric equations were formulated, and comparative analyses were carried out. The results obtained demonstrate that the position of countries after joining the Eurozone varies from nation to nation. Latvia and Lithuania joined the Euro only a few years ago (2014 and 2015, respectively), thus the long term effects are not yet clear. In the other countries researched, however, macroeconomic indicators of stabilization can be observed after their entrance into the Eurozone. In this context, Poland's economy also seems to be stable, although it remains out of the Eurozone. All the countries researched appear to have experienced growing β- and σ-convergence with the European Union core (EU 12).

1. INTRODUCTION

On May 1, 2004 Poland and nine other the Central and Eastern European countries became member states of the European Union. Their EU accession also means participation in the formation of the third stage of the European Economic and Monetary Union. After signing the Accession Treaty, Poland is obliged to create conditions necessary to adopt euro currency. In fact, by joining the European Union Poland entered the path leading to the replacement of its national currency with a common European currency. This means a commitment to adopting the euro, although the moment of this has not yet been determined. Polish government still has the ability to influence the scenario and pace of progress in this direction, with all the opportunities and threats associated with this.

In the subsequent period, other European countries joined the EU and it now consists of 28 countries. After almost 14 years of EU membership (in some cases shorter), some new members decided to join the Eurozone: Slovenia (1st of January 2007), Cyprus and Malta (1st of January 2008), Slovakia (1st of January 2009), Estonia (1st of January 2011), Latvia (1st of January 2014), and Lithuania (1st of January 2015). It is worth noting that some of the countries had decided to enter the Eurozone before the world economic crisis, and some immediately after that period.

At present, two groups new EU member states (entering in 2004 or later) can be designated: those that have joined the Eurozone, and those who have retained their national currencies despite participating in the European common market.

The present paper is organized as follows. Firstly, we review the empirical literature related to the effects of entering the Eurozone for the relatively new European Union member states. In the following chapter, the methodology and database is briefly introduced. The empirical part of the study is focused on macroeconomic indicators revealing potential differences among the countries that joined the Eurozone as compared to Poland, which is not a Eurozone member. To verify the process of economic convergence among researched Central and Eastern European countries and the EU 12, both the hypotheses of absolute β-convergence and σ-convergence were verified. The results obtained were included in the conclusions.

2. THEORETICAL BACKGROUND

Membership of Poland and other EU countries in the euro area requires the fulfilment of the so-called nominal convergence criteria, as outlined in Tomić & Demanuele (2017) and Boguszewski (2011):

- achieving a high degree of price stability, i.e. inflation levels do not exceed the reference value;

- a stable situation of public finances (public debt below 60% of GDP, budget deficit not exceeding 3% of GDP);

- respect for the usual fluctuation margins foreseen by the European Monetary System (ERM II) mechanism for at least two years without devaluation in relation to the euro;

- the stable nature of the convergence achieved by the member state, reflected in the level of the long-term interest rate (not higher than the reference value).

A natural complement to the criteria mentioned above is to increase the degree of similarity of the national economies, i.e. income per capita, consumption structure, investment, level of competitiveness, openness, etc. These are so-called real convergence criteria. Studies presented in the literature also indicate that real convergence has a positive effect on the possibility of meeting the nominal convergence criteria (Redo, 2015; Lein-Rupprecht et al., 2007). Moreover, a number of the members of the Executive Board of the ECB state that acceding countries are required to reach a high level of real and nominal convergence prior to adopting the euro (Feuerstein & Grimm, 2007).

All of the examined Central and Eastern European countries that joined the EU in May 2004 also became members of the European Monetary Union, but member states with a derogation.

This meant that they all did not adopt the euro at the same time. Until 2006, the five smallest of these states participated in the exchange rate mechanism ERM2, while Poland had not joined the ERM2 yet. This situation was a consequence of the individual current exchange rate regime of the analyzed countries. Estonia and Lithuania had currency boards, meaning that their exchange rate to the euro was absolutely stable. Slovenia and Latvia had a limited fluctuation band and Slovakia also managed its exchange rate to meet the ERM2 fluctuation band. In contrast to the above mentioned countries, Poland ran the exchange rate of the zloty to float freely (Feuerstein & Grimm, 2007).

As described in the literature, the theoretical basis of how principles of monetary union function is based on the theory of optimal currency area (OCA), formulated in the 1960s by Mundell (1961). The OCA theory indicates both the benefits of monetary union membership, and also the costs associated with it. One of the most serious disadvantages is the occurrence of the external asymmetric shocks. In the process of the evolution of the OCA theory, mechanisms allowing the absorption of the external shocks were proposed. Reducing the risk of asymmetric shocks was undertaken by the diversification of production, a similar level of inflation, convergence of business cycles and similarity of the structure of economies. In a situation in which asymmetric shocks are revealed, the factors conducive to shocks absorption are: production of mobility factors, flexibility of prices and wages, as well as fiscal and financial integration (Barczyk & Lubiński, 2009; Tchorek, 2011). As for inflation level, as Iacus & Porro (2014) state, there was a significant increase in inflation volatility between 2004 and 2008 in a number of the Eurozone countries.

From the macroeconomic point of view, the most serious cost associated with joining the monetary union is the loss of the autonomy of monetary policy at the national level. Common monetary policy conducted in the monetary union area makes it impossible to compensate for economic shocks through the adjustments of the exchange rate or rates adjustments of the domestic interest. Earlier, these instruments proved to be a useful means of amortizing sudden changes in the economic situation without the need to transfer adjustment processes solely to the real sphere of the economy (Kowalewski, 2001). This is the reasoning behind monitoring that process by regulatory bodies and policy makers (Ahmed at al., 2015).

Given the implications of the standard OCA theory, the results of the Kolasa (2009) studies suggest that a policy optimal for the euro area might not be optimal for Poland. In contrast, the detected extent of heterogeneity in terms of an imperfect cross country correlation of stochastic disturbances is not very different from that obtained in studies covering relatively closely integrated euro area member states (Kolasa, 2009).

At least two arguments that rely on the importance of synchronizing business cycles in the monetary union are controversial. First of all, diversification of the economic situation among individual member states may be a counter-cyclical factor. This happens when domestic demand and exports become substitutive components of aggregate demand. In the case of the deterioration of the domestic economy and its simultaneous improvement in the partner country, the fall in domestic demand could be exported. Thus, the decline in domestic production would be softened, as exports would act as a stabilizer of the economic situation. Conversely, the increase in domestic demand could be satisfied by the release of production capacity as a result of waning

exports. Thus, the risk of overheating the economy and the pressure to increase prices would be weakened (Lubiński, 2004). However, it seems doubtful that the substitution of exports and domestic demand could replace the counter-cyclical function of monetary policy. There is no doubt that in case of the similarity of the trade partner business cycle, fluctuations in aggregate demand are in fact strengthened. In this case, the counter-cyclical function of common monetary policy seems to be crucial (Stefański, 2008).

The second argument that undermines the importance of business cycle synchronization of the candidates of the monetary union is the endogenous theory. According to this model, the mere fact of creating the single-currency area accelerates the optimization mechanisms and processes occurring in the given area. Moreover, trade in a single-currency area could be made easier, which may cause that business cycles in the common trade area become more correlated. Inclusion within the monetary union leads to profound structural changes, trade intensification, and extends labour and capital flows. The single currency area is a significant factor that dynamizes economic links between the member countries. Even if the countries did not represent an optimal currency area when joining the monetary union, business cycles synchronization begins progressing (Antonakakis et al., 2016; Beck & Grodzicki, 2014). According to the endogenous theory, the administrative merger of countries into a single-currency area triggers a process, as a result of which the optimal currency area is automatically created in the economic sense (Frankel & Rose, 1997; Frankel & Rose, 1998).

Without diminishing the advantages that emerged from common currency adoption, many authors have suggested various reasons for overestimation of trade effects associated with adoption of the common currency such as a sample selection bias or the endogeneity of the monetary union. For example, Barr et al. (2003) who studied the potential effects of the EMU for the EU countries tried to solve the endogeneity problem by using instrumental variables. A similar study was done by Micco et al. (2003) who concentrated on the OECD countries. In his opinion, the predicted trade effects of joining the monetary union were much lower, especially in the latter achieving only a 6 per cent increase. Another interesting study was done by Flam & Nordstrom (2002) who examined the trade effects of a monetary union separately for various product groups. It turned out that the strongest effects of the monetary union were reported for trade in processed manufactured products, and in machinery and transport equipment.

More recently, Berger & Nitsch (2008) argue that the euro's impact on the trade disappears if the positive trend in the institutional integration is being controlled. The comprehensive survey of the early literature on the consequences for trade of joining the monetary union were compiled by Baldwin (2006) who suggested the need of controlling individual effects for a given country (as well as multilateral resistance terms).

More recent approach to studying the trade effects of the euro is based on the new strand theory of trade in the literature that stresses the role of firm heterogeneity. For example, Ottaviano et al. (2009) take a firm perspective in assessing the impact of a single currency on the trade volumes. According to him, lower trade costs force less productive firms out of business by the tougher competitive conditions of international markets. They argue that the impact on trade flows is at best only as a first approximation of the possible gains arising from the euro. The reason is that creation of trade does not bring a welfare in itself, but rather a channel through

which different types of microeconomic gains can materialize (Pentecôte et al., 2015). Thus, the economic integration fosters lower prices and a higher average productivity. To assess the quantitative relevance of these effects, they calibrate a general equilibrium model, using country, sector and firm-level empirical observations. They demonstrate that the euro has increased the overall competitiveness of the Eurozone firms. The effects differ among the countries. They tend to be stronger for countries which are smaller or with better access to foreign markets, and for firms which specialize in sectors where international competition is fiercer and barriers to entry the market lower. Therefore, the costs of non-participation in the Eurozone can be significantly higher for countries with smaller internal markets and smaller firms (Cieślik et al., 2012).

The trading potential of the Central European countries has been studied by many authors, including Fidrmuc et al. (2001). Very few attempts were made to estimate ex-ante trade effects due adoption of the euro by these countries. The first such an attempt was made by Maliszewska (2004) who studied bilateral trade flows between the EU and the Central and Eastern European countries during the period 1992-2002. She estimated a simple gravity model by OLS to find that the parameter estimate on the EMU dummy variable was positive and statistically significant. In particular, she found that as a result of adoption of the common, currency trade would increase on average by 23 per cent. Then she used this estimate to make a forecast for the CEE countries assuming that these countries will reach the same level of trade openness as the EMU members. According to her forecast as the result of the euro adoption, the less open countries such as Poland, Latvia and Lithuania will experience a significant increase.

In a more recent analysis by Cieślik et al. (2009), they studied the ex-ante trade effects of Poland joining the Eurozone using a generalized gravity model. Their forecast consisted of two elements. First, the authors estimated the effect of the exchange rate stabilization against the euro, making use of the data for the group of Central and Eastern European countries which pegged their currency to the euro. The second component of the forecast was based on the analysis of the impact of joining the Eurozone. It involved the elimination of the exchange rate fluctuations effect and the impact of the trade policy changes related to joining the Eurozone. Their results suggested that just after joining the Eurozone, Polish exports will increase by ca. 12 per cent, but the positive effect will gradually disappear over time. Aristovnik & Meze (2015) came to similar conclusions , analysing the Slovenia case, before and after entering the Eurozone.

One of the last research concerning the Euro area monetary policy effect on trade was done by Potjagailo (2017). He analyzed the spillover effects of a Euro area monetary policy shock to non-euro economies. He concludes that the size of spillover effects varies with country characteristics. Spillovers on production are larger in non-euro area economies with higher trade openness, whereas financial variables react to a higher extent in countries with a higher financial integration. As for the exchange rate regime, countries with fixed exchange rates show stronger spillovers both in terms of production and interest rates. Finally, prices increase in Western European economies outside the Euro area, but decline or do not respond in Central and Eastern Europe (Potjagailo, 2017).

On this theoretical background, a question about economic convergence change in the Central and Eastern Europe countries that joined the Euro area can be made. This is vital because sometimes membership in the common currency area is indicated as the reason for a deterioration of

the main economic indicators, and thus as argument against the common currency adoption. In the light of opinions cited in literature, this was also the case of the countries surveyed, which joined single currency area as the first ones (Barczyk & Lubiński, 2009).

To sum up the research review, it can be stated that there is no both β and σ-convergence among "The Old EU" members. The overall evidence supports the existence of two discrete clubs, the first by the 'cohesion countries' (Portugal, Ireland, Greece and Spain) and the second by the remaining members. In particular, there is a clear evidence of convergence within each club, whereas between clubs, there is a lack of catching-up effects (Chapsa & Katrakilidis, 2014).

3. RESEARCH OBJECTIVE, METHODOLOGY AND DATA

The aim of the article is to compare major economic indicators of these EU new members that join the Eurozone with corresponding Polish indicators. The expected results are also to point out economic changes that occurred in these countries after joining the Eurozone. In order to verify the process of economic convergence among the Central and Eastern European countries and EU 12, both the hypotheses of β-convergence and σ-convergence were verified. The analysis is based merely on Eurostat data and refers to the period between 2005 and 2017.

To see the differences among the analysed countries both before and after entering the Eurozone, as well as distinctions in the aspect of the changes of main macroeconomic indicators, comparative analysis was done. The studied indicators were: GDP growth rate, dynamic of GDP per capita, inflation rate (HICP), unemployment rate, export, import dynamics and foreign trade balance as a percentage of GDP.

In order to verify the process of economic convergence among the Central and Eastern European countries and EU 12, both the hypotheses of absolute β-convergence and σ-convergence were verified. The concept of real convergence is defined as the tendency to level off income among countries. This was verified empirically among the five new members of the Eurozone (Estonia, Latvia, Lithuania, Slovakia, Slovenia) and additionally Poland, as non-Eurozone member state, with the 12 member states of the European Union that set up the Eurozone (Austria, Belgium, Finland, France, Greece, Spain, the Netherlands, Ireland, Luxembourg, Germany, Portugal, Italy). The EU 12 was treated as a group.

To empirically verify the hypothesis of the absolute β-convergence, the following equation should be estimated:

$$\frac{1}{T}(lnPKB_T - lnPKB_0) = \alpha_0 + \alpha_1 lnPKB_0 + \varepsilon_t \qquad (1)$$

where:

$lnPKB_T$ – logarithm value of GDP per capita at the end of the analysed period

$lnPKB_0$ - logarithm value of GDP per capita at the beginning of the analysed period

T – periods number

a_0, a_1 - equations parameters

ε_t – random walk

The explained variable is the average rate of GDP growth per capita in the examined period (from 0 to T), the explanatory variable is the logarithm of the initial level of GDP per capita, while εt is a random component. A negative and statistically significant value of the α1 parameter means the occurrence of the β-convergence. In this case, the value of β-coefficient measuring the rate of convergence can be calculated from the formula (see e.g. Barro, Sala-i-Martin, 2003, p. 467):

$$\beta = -\frac{1}{T}ln(1 + \alpha_1 T) \qquad\qquad (2)$$

In addition, the hypothesis concerning the occurrence of σ-convergence was verified, according to which the decreasing dispersion of GDP per capita follows among the studied countries. The estimated σ-convergence quotation was as follows:

$$\sigma(lnPKB_t) = \alpha_0 + \alpha_1 t + \varepsilon_t \qquad\qquad (3)$$

The logarithms of GDP per capita standard deviation in individual countries was the variable explained, and time series (t = 1, ..., 18 for the period 2000-2017) was the explanatory variable. The εt - as before - is a random walk component. A negative and statistically significant value α1 parameter means the existence of σ-convergence. The calculations were based on GDP per capita time series obtained from Eurostat database.

4. RESULTS AND DISCUSSION

The very first indicator analysed among the Central and Eastern European countries is the annual GDP dynamic rate. As the countries selected entered the Eurozone at different time, the researched period covers the years 2005-2017 to present economy results, both the results before and after joining the Eurozone. The GDP dynamic reflecting the short-term development is presented in Table 1.

Tab. 1 – The annual GDP growth rate in selected Central and Eastern European countries in the years 2005-2017. Source: own calculations based on Eurostat database

year / country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Estonia	9.4	10.3	7.7	-5.4	-14.7	2.3	7.6*	4.3	1.9	2.9	1.7	2.1	4.9
Lithuania	7.7	7.4	11.1	2.6	-14.8	1.6	6.0	3.8	3.5	3.5	2.0*	23	3.8
Latvia	10.7	11.9	10.0	-3.5	-14.4	-3.9	6.4	4.0	2.4	1.9*	3.0	2.2	4.5
Slovakia	6.8	8.5	10.8	5.6	-5.4*	5.0	2.8	1.7	1.5	2.8	3.9	3.3	3.5
Slovenia	4.0	5.7	6.9*	3.3	-7.8	1.2	0.6	-2.7	-1.1	3.0	2.3	3.1	5.0
Poland	3.5	6.2	7.0	4.2	2.8	3.6	5.0	1.6	1.4	3.3	3.8	2.9	4.6

Note: * year of Eurozone membership

All analysed countries, except the Poland, encountered a negative GDP growth rate in 2009. Polish economy also noted a decline, but it was still a positive GDP dynamic. This was caused by particular negative intensity effects of the world financial crisis. It is also worth noting that among the examined countries that recorded a decline in GDP, all new Eurozone members (Slovenia, Slovakia) were. Joining the zone thus automatically did not save against a decline in economic activity. However, it should be emphasized that significantly greater declines (up to 15%) were recorded in countries that did not join the Euro at that time, i.e. Estonia, Latvia and Lithuania.

The countries with relatively small economies were exposed to a stronger impact of the crisis. In comparison to this, the Polish GDP dynamic differentiated throughout the period considered. During the whole examined period, the greatest GDP increase was in Poland and Slovakia, which in 2009 joined the Eurozone. In those two countries, the growth rate in the years 2005-2017 oscillated around 50%. The other examined countries, belonging to the Eurozone, revealed twice less GDP growth rate except for Lithuania, which noted a 35% growth. The dynamic of GDP growth divided into subperiods is presented in Table 2. In the first separated period, just before the world financial crisis, only Estonia and Latvia presented a negative GDP growth rate in the last year of that period. It may result from a smaller economic potential and less diversified economic structure. In general, all examined countries excluding Poland, represent small economies, which increases their sensitivity to external shocks. It is noticeable when analysing the second subperiod (2009-2013). The recovery period exposed crisis sensitivity in small economies with national currencies. Low level reserves of the national central banks of the Baltic States make limits to help of financial institutions to manage balance, in the face of essential capital outflows. In comparison to this economies with the Euro currency (Slovakia, Slovenia), they also experienced decrease, however, less severe than the Baltic countries. Poland as the biggest economy in this comparison managed to avoid the GDP shrink. This leads us to draw a conclusion that the Eurozone membership for these countries did not give absolute protection against the crisis shocks, however, it limited the volatility of GDP dynamics both negatively and positively.

The last separated subperiod covered the years 2014-2017. All examined countries revealed GDP growth, but the smallest one was the share of Slovakia. It could be explained by crisis within the eurozone, which also affected the new members of the Euro area. Some other situation takes place in Slovenia, where from 2010, the GDP cumulative growth achieved about 10% - the lowest result among the countries studied. Slovenia strives against the world financial crisis results, and has a problem with public debt growth. Moreover, economic crisis was accompanied by political disturbances. The GDP dynamics of the examined countries in separated subperiods is presented in Table 2.

Tab. 2 – The economic growth level in the Central and Eastern European countries belonging to the EU in selected periods in the years 2005-2017. Source: authors' own calculations based on Eurostat database

Period / country	2005-2008 (2005=100)	2009-2013 (2009=100)	2014-2017 (2014=100)	2010-2017 (2010=100)	2005-2017 (2005=100)
Estonia	112.4	129.7	113.6	128.1	125.5
Lithuania	122.5	123.9	110.8	127.9	135.6
Latvia	118.7	107.6	112.4	127.1	124.0
Slovakia	126.9	113.9	106.9	117.0	147.5
Slovenia	116.7	102.0	113.7	110.5	120.4
Poland	118.5	125.0	113.6	124.8	157.5

As it is commonly known, countries of Central and Eastern Europe are characterized by significantly lower level of prosperity when compared with the core Eurozone. In the years 2005-2016, the highest growth of GDP per capita in relation to the EU 12 average was recorded in Lithuania. In Poland, Estonia, Latvia and Slovakia, GDP increased by around 17-18%. Slovenia recorded a small decrease of 0.7 ppt. The changes of GDP per capita of the countries examined compared to the average Euro area score is presented in Table 3.

Tab. 3 – The GDP per capita changes in the Central and Eastern Europe as compared to the Euro area (12) in PPS (Euro area = 100). Source: authors' own calculations based on Eurostat database

year / country	2005	2010	2016	2005-2016 (in ppt.)
Estonia	53.4	58.9	69.7	+ 16.3
Lithuania	46.9	55.0	70.1	+ 23.,2
Latvia	45.0	47.9	59.9	+ 14.9
Slovakia	53.8	67.9	71.3	+ 17.5
Slovenia	77.5	75.7	76.8	- 0.7
Poland	45.0	56.8	63.3	+ 18.3

Apart from GDP growth, the economic situation is characterized by a general rate of prices growth. Table 4 presents the annual inflation index determined on the basis of a harmonized consumer price index (HICP).

One of the arguments most often formulated by the Euro opponents is a higher inflation level, especially just before the accession to the Eurozone. The fears emerged after replacing the lira by the Euro in Italy, and it was called the "cappuccino effect". Analysing the inflation rate, presented in Table 4., it can be noted that such hypothesis is doubtful. With reference to Lithuania, Latvia and Slovakia, the inflation level was relatively low, in comparison to earlier scores. In Estonia, prices went up in the Euro accession year, but next periods revealed systematic lowering of the price index. Poland, Slovenia and Slovakia noted low and comparable inflations from 2013.

Tab. 4 – The annual inflation rate (HICP) in selected Central and Eastern European countries. Source: authors' own calculations based on Eurostat database

year / country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Estonia	4.1	4.4	6.7	10.6	0.2	2.7	5.1*	4.2	3.2	0.5	0.1	0.8	3.7
Lithuania	2.7	3.8	5.8	11.1	4.2	1.2	4.1	3.2	1.2	0.2	-0.7*	0.7	3.7
Latvia	6.9	6.6	10.1	15.3	3.3	-1.2	4.2	2.3	0.0	0.7*	0.2	0.1	2.9
Slovakia	2.8	4.3	1.9	3.9	0.9*	0.7	4.1	3.7	1.5	-0.1	-0.3	-0.5	1.4
Slovenia	2.4	2.5	3.8*	5.5	0.8	2.1	2.1	2.8	1.9	0.4	-0.8	-0.2	1.6
Poland	2.2	1.3	2.6	4.2	4.0	2.6	3.9	3.7	0.8	0.1	-0.7	-0.2	1.6

Note: * year of Eurozone membership

In general, all examined countries that entered the Eurozone noted a lower price variability after adopting the common currency. However, a higher price variability in small examined countries (the Baltic States) can be observed when compared to Poland, both before adopting the Euro and after that moment.

The last four years showed the deflation phenomenon among EU members. In the examined group of countries, Slovakia, Slovenia and Poland noted deflation. In Lithuania, the demand drop in the year of adoption of the Euro caused one year fall in prices. Compared to other studied economies, inflation in Poland appear low and stable during the period researched.

It can be stated that in the countries surveyed, stabilization of the prices was related to adoption of the Euro, but on the other hand, Polish example shows that it was not a necessary condition of price stability. In case of a large country, like Poland, there seem to be other important factors that also have a stabilizing effect on inflation, despite remaining outside the Euro area.

4.1 Labour market indicators analysis

Labour market situation is mainly inversely correlated both with GDP growth rate and inflation level. The economic growth in the Central and Eastern European countries belonging to the EU in the period 2005-2007 oscillated annually around 6%. Not only did it provide a significant growth of income, but it also contributed to the creation of new work places. This was essential in the face of double-digit unemployment rate at the beginning of the 21st century.

The high GDP dynamic in the 2005-2008 enabled countries to limit unemployment rate to a similar rate as among twelve core European Union members. In 2008, the unemployment rate in Estonia, Slovenia and Lithuania decreased to only 4-5%, in Poland and Latvia up to 6%, in Slovakia – 7.5-9%, whereas the average in the EU reached 7%. This means that in the selected countries, the unemployment rate was lower than the average in the entire EU (12). The unemployment rate increased dramatically in 2009-2012 due to the crisis, but still, at the end of 2014, all examined Central and Eastern European countries had a lower unemployment rate than the average of the EU (12). The unemployment rate in the countries surveyed is presented in Table 5 below.

Tab. 5 – The annual unemployment rate in selected Central and Eastern Europe countries.
Source: authors' own calculations based on Eurostat database

year / country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Estonia	8.0	5.9	4.6	5.5	13.5	16.7	12.3*	10.0	8.6	7.4	6.2	6.8	5.8
Lithuania	8.3	5.8	4.3	5.8	13.8	17.8	15.4	13.4	11.8	10.7	9.1*	7.9	7.1
Latvia	10.0	7.0	6.1	7.7	17.5	19.5	16.2	15.0	11.9	10.8*	9.9	9.6	8.7
Slovakia	16.4	13.5	11.2	9.6	12.1*	14.5	13.7	14.0	14.2	13.2	11.5	9.7	8.1
Slovenia	6.5	6.0	4.9*	4.4	5.9	7.3	8.2	8.9	10.1	9.7	9.0	8.0	6.8
Poland	17.9	13.9	9.6	7.1	8.1	9.7	9.7	10.1	10.3	9.0	7.5	6.2	4.9

Note: * year of Eurozone membership

Taking into account the unemployment rate in the long-term perspective, it can be concluded that this indicator resulted mainly from the global business cycle phase. If the moment of implementing the euro coincided with an unfavourable economic situation i.e. global crisis (Slovakia example), the unemployment went up. In the Baltic States, the adoption of the euro took place after the first (Estonia) or second crisis wave (Lithuania and Latvia), which contributed to a decreasing redundancy scale. The situation of labour market in Poland in this perspective was favourable. In the whole analysed period, the rate of unemployment did not amounted 11% in critical 2011-2012 years. At present, it is the lowest among the countries examined. Slovenia, as mentioned above, noted a bit higher level of unemployment on average, due to difficulties in public sector debt level and political instability.

4.2 Foreign trade indicators

One of the most important effects of adoption of the single currency is the intensification of foreign trade. The intra Eurozone growth in trade may occur as a result of reducing costs of transaction and the risk of liquidation of fluctuations in the nominal exchange rate, as well as the increase in overall macroeconomic stability. In the long term, a positive effect should also be revealed by increased competition and greater transparency of prices (De Grauwe, Mongelli 2005).

The elimination of the exchange rate risk is more crucial for exporters and importers, the more the economy of a given country depends on foreign trade. The exchange rate stability eliminates uncertainty of business entities associated with the volatility of revenues caused directly by fluctuations in the exchange rate. In macroeconomic dimension, it increases price stability through the influence of the price of goods imported. Therefore, countries with a high degree of openness are more predisposed to rigid the exchange rate in contrast to closed economies. The changes in the foreign trade volume and balance in the examined countries are presented in Table 6.

Tab. 6 – Foreign trade volume changes in selected Central and Eastern European countries.
Source: authors' own calculations based on the Eurostat database

year / country		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Estonia	export	130.1	124.5	104.1	105.4	76.6	134.8	137.3*	104.3	98.1	98.3	95.7	102.8
	import	122.8	130.2	106.8	95.3	66.7	127.5	135.3*	112.2	98.8	99.1	95.1	103.0
	balance	-19.1	-24.1	-23.4	-15.8	-5.6	-3.6	-3.4*	-8.9	-8.8	-8.7	-7.6	-7.7
Lithuania	export	126.9	118.7	111.1	128.5	73.4	132.7	128.8	114.4	106.5	99.3	94.0*	98.7
	import	125.5	123.5	115.4	118.7	62.1	134.5	129.3	109.0	105.3	98.8	98.1*	97.2
	balance	-15.3	-18.1	-19.8	-17.0	-4.8	-7.3	-9.0	-5.6	-4.8	-4.2	-6.7*	-5.5
Latvia	export	128.7	118.2	123.7	113.8	80.1	130.2	131.2	116.4	99.2	100.6*	99.8	100.4
	import	122.6	131.5	121.6	98.2	64.1	125.4	132.7	114.6	100.3	98.8*	98.3	98.6
	balance	-22.0	-27.9	-27.0	-18.6	-7.3	-9.0	-12.0	-11.5	-11.3	-10.0*	-8.7	-7.6
Slovakia	export	114.9	130.1	128.1	113.3	83.1*	121.3	117.6	109.4	102.9	100.8	104.2	103.3
	import	116.0	128.6	123.4	113.6	79.4*	122.9	116.9	105.0	102.2	100.2	107.3	103.1
	balance	-6.0	-5.8	-3.0	-3.2	0.5*	-0.4	0.0	3.5	4.1	4.5	2.1	2.3
Slovenia	export	117.6	119.6	118.8*	105.6	80.6	117.8	113.1	100.5	102.3	105.7	106.3	103.3
	import	114.5	117.6	119.8*	109.3	75.7	119.2	112.4	97.7	100.8	101.7	105.2	102.6
	balance	-3.0	-2.3	-3.1*	-5.4	-1.0	-1.9	-1.7	0.3	1.4	4.1	5.0	5.4
Poland	export	119.2	122.7	115.9	113.3	84.4	123.1	112.5	106.4	107.0	107.4	108.3	101.9
	import	113.3	123.8	119.6	117.4	75.5	125.3	112.6	102.4	100.9	107.7	105.2	100.6
	balance	-4.6	-4.9	-6.3	-8.0	-2.5	-4.2	-4.1	-2.8	-0.5	-0.7	0.6	1.1

Note: * year of Eurozone membership, export (import) index calculated to the previous year considered as 100, balance: deficit (-) or surplus (+) as percentage of respective country GDP.

The analysis of foreign trade indicators shows both a higher dynamic export and import volume before 2009 in all the researched counties. In that period, the Baltic States, along with Slovakia, were leaders in this matter. The main effect of the crisis, i.e. the sharp demand, revealed that small economies oriented to external trade are more volatile in such a case, because of their less diverse and more concentrated production. In the Baltic States, export and import drop oscillated around 20-25%. The fall in the other examined countries did not exceed 20%. The 2010-2011 years' dramatic growth in trade dynamics was the result of the low preceding year volume and led to rebuilding the size of the market. During the recovery period (2012-2015), the dynamics of foreign trade was noticeably lower in some countries. In Estonia and Lithuania, both export and import volume shrank; in Latvia it oscillated around the volume gained in 2013. Based on this, Slovakia revealed a small but stable increase. In Slovenia and Poland, the rise was higher than in the other economies studied.

One of the aims of joining the Eurozone by the Central and Eastern European countries was to improve the foreign trade balance, which has succeeded in all the examined countries. Nevertheless, each country had started from a different level. In the period before the low point of the crisis, the Baltic States noted an extremely large foreign trade deficit in relation to GDP volume. Despite still having a negative trade balance, all the Baltic States managed to decrease this parameter from 15-22% of GDP volume in 2005 to 5-8% of GDP in 2016 (see Table 6). In the case

of Latvia and Lithuania, it is hard to estimate precisely how the adoption of the Euro affected the improvement of the foreign trade balance. In Estonia, after a short (2012-2013) period of balance deficit growth, an upswing is taking place.

The other three examined countries revealed a significantly lower foreign trade deficit in the first analysed period (3-6% of GDP volume). Despite the fact of two increases in trade deficit during the crisis (except for Slovakia), Slovakia and Slovenia (since 2012) and Poland (since 2015) have noted a small but growing surplus in that matter.

No clear assessment is possible regarding the influence of the adoption of the Euro on foreign trade dynamics and balance in the examined countries. In Estonia, unfavourable changes occurred after joining the Eurozone, while in other countries a recovery was observed. However, the aim of present study was not to evaluate to what extent this was related to the adoption of the Euro, and to what extent to the business cycle was affected.

4.3 Convergence analysis

European Union membership and subsequently entering the Eurozone was predicted to contribute to the growth of the level of convergence among member states. To verify this hypothesis, regression equation parameters characterizing β-convergence processes were estimated, with the results presented in Table 7.

Tab. 7 – Results of the estimation of regression equation parameters in relation to β-convergence among the EU 12 and countries surveyed in 2000-2017. Source: own based on Eurostat data

Specification	Value
α_1	-0,0386953
t-students statistics	-8,99
Value p	0,0003
α_0	0,403484
t-students statistics	10,12
Value p	0,0002
N	18
R^2	0,9418
β convergence	yes
β ratio	6,3%

Taking into account the parameters included in Table 7, it can be stated that among the examined EU countries, β-convergence was confirmed, as the α1 parameter value is negative and statistically significantly dependent on the initial level of GDP per capita. Moreover, the obtained α1 parameter estimation is also negative, and the t-student statistic value (-8,99), p-value (0,0000) and coefficient of determination value (94%) also confirm the existing β-convergence. These results show that the six countries examined which joined the EU and subsequently the Eurozone (except for Poland) demonstrate on average a higher GDP per capita growth rate in the years 2000-2017 than the 12 Eurozone founders.

σ-convergence was measured by GDP per capita standard deviation logarithms. To achieve this, regression equation (3) parameters were estimated, with the procedure results presented in Table 8.

Tab. 8 – Results of the estimation of regression equation parameters in relation to σ-convergence among the EU 12 and countries surveyed in 2000-2017. Source: own based on Eurostat data

Specification	Value
α_1	-0,0172381
t-students statistics	-18,60
Value p	0,0000
α_0	0,426513
t-students statistics	44,90
Value p	0,0000
N	18
R^2	0,958424
σ-convergence	yes

Similarly to the results obtained by β-convergence, σ-convergence among the countries surveyed in the researched period was also confirmed. A negative and statistically significant α1 parameter value along with other factors shown in Table 8 demonstrate a very good fit of regression function to the empirical data. The existent σ-convergence shows that GDP per capita dispersion among the examined EU member states is shrinking in contrast to other members of the Eurozone.

5. CONCLUSIONS

The aim of this paper was to compare macroeconomic effects of entering the EU in Central and Eastern European counties who have joined the Eurozone to Poland, as the largest and relatively new member state which is still functioning with its own national currency the zloty. As Lithuania, Latvia became Eurozone members just a few years ago, it is difficult to precisely characterize how joining the Eurozone affected the main macroeconomic indicators. However, for the examined countries who have been in the Eurozone for at least six years (Estonia) or more (Slovakia, Slovenia), some results can be described.

By joining the EU and entering the Eurozone, the new members were expected to gain free and open access to the EU market and capital resources, as well as to strengthen macroeconomic stability. The Euro, the national currency of almost 300 million citizens, appears significantly more stable and sound in comparison to the currencies of the new EU members who have not adopted it.

Based on this framework it can be stated that by joining the Eurozone the examined countries have not obtained absolute protection from economy shocks, but with no doubt the common currency adoption has contributed to decreasing GDP fluctuations. This is especially perceivable in the cases of the smallest new Eurozone members, such as Latvia, Estonia and Slovenia.

Indeed, it is too early to judge the situation in Lithuania, but no reasons have been shown that would predict a different result for this country.

As for inflation indicators, similarly to GDP, it can be noted that the common currency adoption has contributed to price stabilization within the examined countries. With regard to unemployment, the key success factor seems to be the year of joining the Eurozone, with a longer time period needed to observe positive effects in the labour market. We must remember that some of the examined countries joined the Eurozone during the last world economic crisis, which must have had an additional influence on individual countries' economic indicators.

With reference to Poland, the economic results obtained by the new Eurozone member states are not spectacular. Despite accepting the common currency, the examined countries did not manage to avoid economic disturbances during the analysed period. This demonstrates that adopting the common currency cannot be considered a remedy for all national economic difficulties. Entering the common currency area can be regarded as one of a number of essential factors which may support economic growth, but for this development to take place a series of other economic conditions must be met. Indeed, the present analysis the confirmed progressing convergence processes associated with Eurozone membership. Nevertheless, in the case of Poland, the decision to join the Euro should be preceded by a systematic and comprehensive analysis, i.e. one which embraces both short-term indicators as well as long-term structural changes in order to make the Euro adoption a jump start to economic growth instead of a stalling point requiring many difficult years of structural adjustments.

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