THE IMPACT OF EMU INTEGRATION ON GDP AND PRODUCTIVITY IN THE BALTIC COUNTRIES

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ABSTRACT

We examined the effect of the accession to the Eurozone using the method of synthetic control groups. This method enabled us to compare the performance of the Estonian, Lithuanian, and Latvian economies with a combination of countries that have not accessed the Eurozone yet. We constructed a synthetic Estonia, Lithuania, and Latvia model as synthetic control units from a donor pool to evaluate the impact of the Economic and Monetary Union (EMU) on macroeconomic performance through synthetic control groups. The donor pool in our model consisted of European countries that do not use the euro. We used annual data from 1990 to 2019 for models with GDP and productivity. The results indicate that deciding to enter the Eurozone could increase productivity – measured as GDP over employment. Or in other words - if these Baltic countries did not join the euro, their GDP per employer would be lower than the actual. Accession to the Eurozone or ERM II has not increased or decreased GDP in Baltic countries as much as productivity.

Keywords: Eurozone; Estonia; Lithuania; Latvia; gross domestic product; productivity

INTRODUCTION

The enlargement of the Eurozone is still a topic of discussion since there are currently seven candidate countries for entering the Eurozone. Bulgaria, Czech Republic, Croatia, Hungary, Poland, Romania, and Sweden have been part of the European Union for many years. Interestingly, the newest member of the EU, Croatia, has made a tremendous effort to adopt the euro as soon as possible. According to the Convergence report from spring 2022, Croatia is fulfilling the Maastricht criteria (based on Article 140 of the Treaty on the Functioning of the European Union), and the preparation process for adopting the euro has already begun there. The Croatian parliament approved entry into the Eurozone on January 1^{st,} 2023, and the European institutions confirmed this date. After eight years, the Eurozone will enlarge again and welcome its 20th member state. However, an essential research question remains whether the countries that have already joined the monetary union fulfill better than the Maastricht criteria, but mainly what results in real convergence. With this topic of meeting criteria, ex-post deals with the endogeneity hypothesis. Frankel and Rose (1998) developed an endogeneity

hypothesis within the theory of optimum currency area (Mundell, 1961; McKinnon, 1963; Kennen, 1969) according to which country does not have to meet all the criteria of this theory before entering the monetary union. Monetary union membership affects deepening relations with the other member countries, and it achieves a high level of fulfillment of the criteria ex-post (Frankel, 1998), and was confirmed by (Fidrmuc, 2001; Broz, 2010; Afonso & Sequeira, 2010; Campos, Fidrmuc & Korhonen, 2019). So, did joining the Eurozone help to improve macroeconomic performance measured by GDP? To answer this question, we examine in this paper the effect of joining the Eurozone measured by GDP per capita and labour productivity in three Baltic countries by synthetic control method. This method should help us to understand better the benefits and costs of entering the monetary union. In this paper, we are trying to analyse and quantify the benefits and costs of the euro on the macroeconomic performance of the three newest euro members – Estonia, Lithuania, and Latvia.

LITERATURE REVIEW
Measuring the effect of the integration process through the method of synthetic control groups

Studies dealing with the impact of EMU integration on macroeconomic performance through the method of synthetic control groups are still few. One of the first studies dealing with the expansion of the Eurozone through this method was Sanso-Navarro (2011). He used an inverse approach to estimate the effect of the creation of EMU in 1999 on the UK. Based on data from 1986-2006, with the treatment year 1999, he estimated that the creation of EMU had a negative impact on the inflow of foreign direct investment from the US to the UK by almost 15%. He also estimated that if the UK had been part of the creation of EMU, its GDP per capita would have been slightly higher, according to the synthetic indicator. A similar hypothetical situation of the United Kingdom joining the EMU in 1999 for bilateral trade was investigated by Saia (2017). The results of his analysis suggest that if the UK had adopted the euro in 1999, its bilateral trade with Eurozone member countries would have been around 16% higher. Also, one of the conclusions was that after the creation of

EMU, bilateral trade between the UK and non-member countries increased. Campos, Coricelli, and Moretti (2014) analyzed how GDP per capita and labor productivity would develop if EU member countries never joined this union. Their model included countries that joined in 1973, 1981, 1986, 1995, and 2004. They point to a positive effect of integration, living standards, and labor productivity, but the effect size varied considerably between countries. The effect on Greece was negative. In other words, if Greece had not joined the EU, its GDP per capita and labor productivity would have been higher. However, in general, the authors estimated in the models that if there were no such deep economic and political integration, per capita income in these acceded countries would be 12% lower on average. Aytung (2014) analyzed the effect of the introduction of the euro on the rate of economic growth through synthetic control groups. He used data from 1990-2011 and concluded that economic growth is not only affected by integration but that the financial crisis played a major role. With the euro adoption, GDP grew faster than theoretical developments in Cyprus, Malta, and Slovakia. But joining the EMU slowed economic growth in Greece, Italy, and Spain due to Slovenia's financial crisis. The study concludes that the effect of introducing the euro largely depends on the phase of the business cycle (Aytung, 2014). Janota (2015) analyzed the effect of the introduction of the common currency on GDP per capita and economic growth in the countries that later joined the EMU. The results show an overall tie effect for Malta, a neutral effect for Estonia, a positive effect for Slovakia, and a negative effect for Slovenia and Cyprus. In other words, if Slovenia and Cyprus had not adopted the euro, their standard of living and economic growth could be higher. The author adds that the cost of introducing the euro in Cyprus was approximately one-third of the GDP per capita. The author also adds that the financial crisis mainly influenced the direction of the effect. Janota (2015) points out that a small number of observations may distort the results. The results from Fernandes (2015) show that joining the Eurozone did not bring countries a permanent increase in GDP per capita. At the beginning of the first decade of this century, the common currency had a slightly positive effect on this indicator. However, in the second half of the examined period, the synthetic regression predicted higher levels of GDP per capita than

were achieved. Based on the results, they divided the Eurozone into three groups. The first group of countries (Germany, Austria, and the Netherlands) lost rather than gained by joining the Eurozone in terms of GDP per capita. The second group (Spain, Ireland, and Greece) benefited from the benefits of joining the monetary union. In the third group (Italy, Belgium, and Portugal), the relative benefits from the adoption of the common currency were only temporary and translated into losses in the long term (Fernandes, 2015). Hope (2016) examined the effect of the creation of EMU in 1999 on the current account balance of the 11 original countries. He included 15 OECD countries in the control group that never adopted the euro. He also included the openness of the economy, investments as a % of GDP, GDP per capita, economic growth and domestic consumption as variables. The results indicate that the introduction of the common currency caused a significant deterioration in the current account position in France, Greece, Italy and Spain. On the contrary, the positive effect was materialized in only one of the eleven countries - Austria. Using the method of synthetic control groups, Žúdel and Melioris (2016) focused on the effect of Slovakia's entry into the Eurozone in 2009 in the context of living standards. They constructed a synthetic Slovakia from a control group that consisted of European countries that kept their national currencies until 2016. The results showed that by adopting the euro, Slovakia improved its GDP per capita by approximately 10% until 2011. The difference between real and hypothetical development started to materialize already two years before joining EMU. Lin, Chen (2017) investigated the effect of the creation of the EMU on GDP per capita in 12 founding countries through the method of synthetic control groups. They took into account the period 1991-2013 and divided the countries into core economies and peripheral countries. An interesting finding was that in the case of the core countries, the actual development of their standard of living was lower than in the case of the synthetic indicator. On the contrary, in peripheral countries GDP per capita was higher after the adoption of the euro than their alternative development shows. They also included in the analysis three countries that did not adopt the euro - Denmark, Sweden and the United Kingdom. In the case of Denmark, the model showed that by adopting the euro in 1999,

GDP per capita would be higher. On the other hand, the fact that Sweden and the United Kingdom did not adopt the euro at the time of the EMU may appear to be a better solution in the context of GDP per capita over time since the synthetic indicator in the case of the introduction of the common currency turned out to be lower. Gunnella (2021), in a report from the ECB, quantified the effect of the introduction of a common currency on bilateral exports between eurozone countries compared to countries that did not adopt the euro using the SCM. Their analysis included the original 12 eurozone countries and four that joined later – Slovenia, Slovakia, Cyprus, and Malta. In conclusion, they summarize that the euro's effect on bilateral exports was very significant. The export of intermediate products and final goods from the EA 12 countries to the four later acceded countries increased by approximately 30% by 2015. Entry into the EMU in EA 12 countries increased trade with intermediate products by 5.3%. On the other hand, a significant increase in the export of final goods (up to almost 32%) to the EA12 countries occurred after adopting the euro in later acceded countries. According to the authors, this increased trade is a prerequisite for increasing the degree of synchronization of economic cycles.

Many studies have attempted to estimate the change in the economic performance of countries that have entered the monetary union. Conti (2014) used a *difference in difference* estimation framework to analyse the effects of adopting the euro by measuring the GDP per capita. The contrast in difference is a statistical technique that evaluates a treatment's differential impact on the affected group versus the control group. Conti put in his model seventeen European countries, which included 15 eurozone member countries and Norway and Iceland. He covered the period from 1990-2010. This study showed that adopting the euro may have raised the GDP per capita and labour productivity by about 4 %. Integration into EMU also increased trade. Bun (2002) estimated a total cumulative increase in intra-eurozone exports of 3.9% in 1999, 6.9% in 2000, to 9.6% in 2001. He confirms that the euro has a sizeable positive impact on trade.

Moreover, the monetary union exhibits no significant impact on FDI, according to Dinga (2011). The effect becomes substantial on the

subset of countries of the European Union, increasing FDI flows from 14.3% to 42.5% in the period from 1997-2008. Interestingly, according to this study, the EU membership fosters FDI flows much more than the euro, increasing FDI flows from 55% to 166%. Also, the positive effect on FDI was caused by determinants such as GDP, the low distance between countries, and low unit labour costs in the target country. Results of a study written by Frankel (2002) support the hypothesis that the beneficial effects of common-currency regimes on economic performance come through the promotion of trade rather than through the adoption of non-inflationary monetary policy and other macroeconomic policies. Frankel used economic and geographic data from more than 200 countries to quantify the implications of monetary unions for trade and income. The results suggest that being a member state of the monetary union more than triples trade with the other members of the common currency union. Frankel estimates that 1% increase in trade (trade relative to GDP) raises income per capita by at least 0.33% over twenty years.

According to Matysek-Jędrych (2014), The Baltic States have experienced one of the biggest Gross Domestic Product (GDP) contractions during the Global Crisis so far. Moreover, according to Boltho (2020) the economic performance of Baltic countries over the last decade was significantly better than that of its Southern member countries. The economic performance in this paper was measured by GDP per capita. The other Central and Eastern EU members who have not adopted the euro have shown less progress in various governance areas. It was caused probably because of two reasons – better governance prompted membership by some countries but not others and membership itself imposed improvements. Another reason for the differences in performance between Baltic countries and other non-euro countries could be fulfilling the convergence criteria. Countries that aim to qualify for monetary union will have to perform well on the Maastricht criteria to be allowed entry. Hence the three Baltic States in particular, which only joined in 2011, 2014 and 2015, had strong self-imposed limits on their public finance and inflation behaviour. Shadowing the Eurozone to achieve the conditions for entry is possibly more constraining than membership itself. Also, after the fall of communism, Central and Eastern European countries have experienced a transition process in which a remarkable increase is observed not only in increased GDP but also in foreign direct investment flows into the region (Avci, Akin, 2020). The transition from a centrally planned communist economic system to a capitalist-based free-market economy allowed individuals and private businesses to buy and sell goods for profit. The price of and access to goods was no longer being controlled artificially by the central governments but by market forces of supply and demand (McKenzie, 2015)

Kotlinski (2020) analysed the effect of entering the Eurozone on HICP inflation in three Baltic countries. The average expressed the HICP inflation before joining the monetary union over five years before the euro changeover. The average measured the HICP inflation after accession over five years after euro adoption. The result of this study shows that HICP inflation has dropped in all Baltic countries after joining the common currency area. In the case of Estonia, the HICP inflation fell from 4.9% before the Euro adoption to 2.6% in the first five years after the euro adoption. In Latvia, the average HICP inflation rate was last five years before the euro 1.7%, dropping in the post period to 1.3%. Lithuanian average inflation rate before the euro was 2.0% and fell to 1.6% after the euro adoption. However, not only entering the monetary union but also macroeconomic development contributed to this downturn. For some countries, euro adoption was not as challenging as Slovakia and Slovenia, which had fulfilled the criteria in the years before the euro adoption. Latvia and Lithuania could not fulfill the convergence criteria for more than ten years while there were in the ERM II also because they were affected by the effects of the global financial crisis (Deskar, 2020). Although the Baltic States had met the public debt criterion without significant problems, meeting the other criteria was tough, especially during a crisis.

METHODOLOGY

Following Abadie and Gardeazabal, 2003; Abadie et al., 2010 and Abadie et al., 2015 and using the synthetic control method, we researched Estonia, Lithuania, and Latvia. We assumed that the actual Baltic countries would have developed as artificial or synthetic Baltic countries if these countries did not access ERM II

and Eurozone. We could quantify the costs of this decision as the difference between the actual performance of these countries and the synthetic one. We constructed synthetic Estonia, Lithuania, and Latvia as synthetic control units from a donor pool. In the donor pool, we included actual member states of the European Union which have joined the European Union but not the Eurozone and also countries that are not part of the European Union - Croatia, Bosnia and Herzegovina, North Macedonia, Serbia, Montenegro, Albania, Bulgaria, Czechia, Hungary, Poland, Romania, and Sweden. Our procedure assumed that a possible treatment effect materialised after 2009 in the case of Estonia, in 2012 in the case of Lithuania, and in 2013 in the case of Latvia, which was two years before joining the Eurozone, when the country had to be included in ERM II. The sample was divided into two periods: a control period before accession to the ERM II and a treatment period after the entry into this mechanism. Synthetic Estonia, Lithuania, and Latvia were expressed as a weighted average of the countries in the donor pool. The weights were determined by minimizing the distance between the macroeconomic performance of actual Estonia, Lithuania, and Latvia and the macroeconomic performance of the synthetic Baltic countries prior to the treatment. Our gross domestic product and total employment data were taken from the Penn World Table database, version 10.0. GDP is expressed as Expenditure-side real GDP at chained PPPs in a million US dollars with base year 2017. Total employment was expressed as number of persons engaged in millions. Using these two datasets we calculated productivity as gross domestic product over total employment. Data were downloaded from World Penn Tables. It should be noted that this method does not explain where the benefits of the euro came from, through which it worked for our selected Baltic countries i.e. whether firms have invested more thanks to the euro or the consumption of the households has increased. One important caveat of the synthetic control methodology is that it does not allow us to assess the significance of the results obtained.

DISCUSSION

In our research, we have focused on the analysis of the impact of joining the ERM II because, according to several authors, the preparatory process of joining the Eurozone has a greater impact on the overall economy than the adoption of the common currency itself. This is mainly because the candidate countries must meet the Maastricht criteria and adjust their economic policies accordingly, especially the fiscal and monetary policies.

Estonia

According to data about the Gross Domestic Product, which we have obtained from the Penn World Tables and which are also the basis for our model in this paper, we can conclude that the GDP of Estonia over the observed period 1990-2019 was almost constantly growing. During these 30 years, there were only two periods when GDP declined. The first period of GDP decline was during 1990-1995, when in Estonia and other countries of Central and Eastern Europe, the transformation process was underway after the fall of the Soviet Union. Estonia's second short period of GDP decline is evident during the financial crisis. The GDP dropped from 34,698.31 million $ in 2008 to 31,391.7 million $ in 2009. The period with the highest economic growth was from 2000 to 2007, with an average annual growth rate of more than 9%. European countries generally perceive this period as the period of growth that preceded the financial crisis.

Moreover, Estonia and nine other countries were preparing to join the European Union during these years. Estonia has experienced the steepest economic growth, especially in the first three years after joining the European Union on the 1st of May 2004. Estonia did not achieve such comparatively strong growth until 2011 when the economy was recovering from the financial crisis. The economic growth in that year was 11.8%.

The result of our analysis is a combination of countries in the donor pool whose economic development copies the development of the Estonian economy as much as possible. The synthetic GDP of Estonia was created by five countries with the most similar development. The results show that joining the monetary union impacts macroeconomic performance in the new member state. One of the advantages of the synthetic control methodology is that results can be displayed easily in one chart that needs minor clarification. The actual gross domestic product is higher than the synthetic indicator,

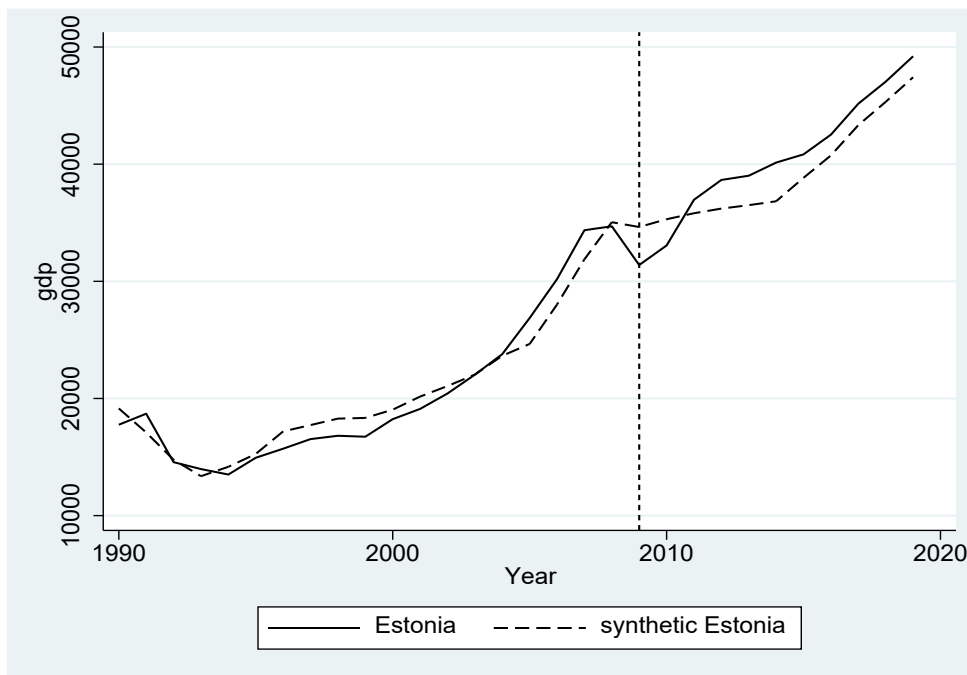but the difference is insignificant and does not even widen six years after entering the ERM II.

Figure 1: GDP in Estonia 1990-2019 - the treatment year 2009

Source: author´s calculations

Based on our dataset, we have calculated productivity as gross domestic product per employer. The productivity in Estonia has been growing from 1994 to 2019. The highest growth was in the period of economic growth from 2000 to 2007. However, during the financial crisis, the growth of productivity slowed down. Productivity has grown from $21,432.62 per employer in 1990 to $73,121.57 per employer in 2019.
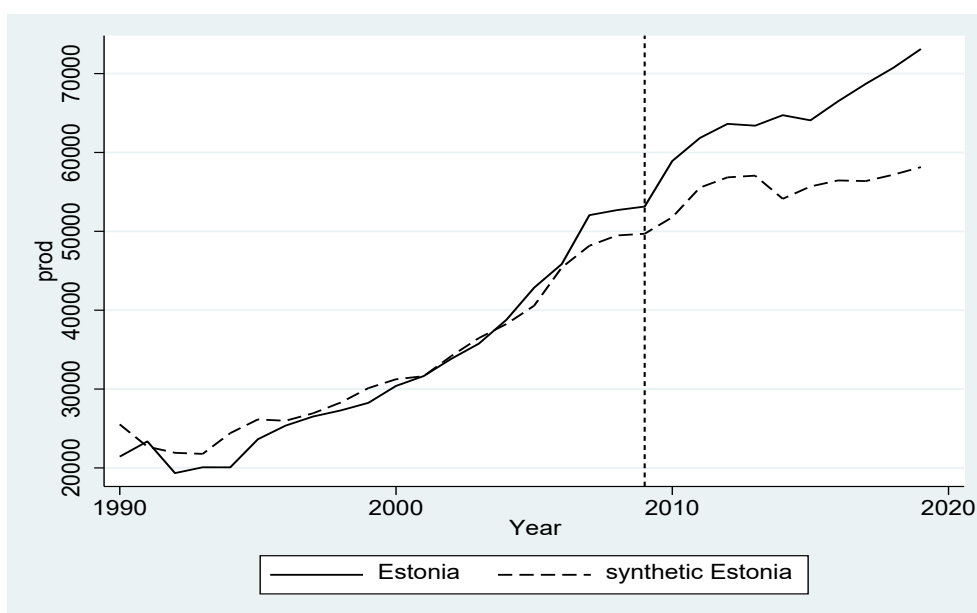
Figure 2: GDP per employer in Estonia 1990-2019 - treatment in 2009

Source: author´s calculations

We can quantify the costs of entering the ERM II and, afterward Eurozone by the gap between actual and synthetic gross domestic product per employer. The gap between real and synthetic GDP per employer is widening. The difference between these two indicators was in 2009 (two years before entering the Eurozone) - 3 448.065 US$. As we have mentioned, the gap is widening over time, and in 2019, the difference is - 14 977,667 US$. Respecting the assumptions and limitations of our model, we can interpret the results as if Estonia decided not to join the Eurozone, its GDP per employer would be 20 % lower.

Lithuania

In the first attempt to join the euro in 2006, the Lithuanian government sought to meet the convergence criteria. The most difficult criterion for the government to meet was the inflation criterion. In March 2006, Lithuania asked the European Commission and the European Central Bank to assess their request to join the euro. The assessment reports found that Lithuania met all but the inflation criteria. Consultations over Lithuania's euro membership began in Brussels in March 2013. The Lithuanian Parliament adopted the Law on the Euro Adoption in April 2014, while the new currency's plan was approved later in the summer (Dandashly, 2020).

The GDP of Lithuania over the observed period 1990-2019 was almost constantly growing. During these 30 years, there was only one period when GDP declined, during the financial crisis. The GDP decreased from 75,329.16 million $ in 2008 to 65,381.9 million $ in 2009. The period with the highest economic growth was from 1996 to 2008, with an average annual growth rate of more than 6.3%. European countries generally perceive this period as the transition that preceded the financial crisis.

Moreover, during these years, Lithuania, together with nine other countries, was preparing to join the European Union. Lithuania has experienced the steepest economic growth, especially in the first three years after joining the European Union on the 1st of May 2004. In 2005 the GDP growth rate was 7.92 %; in 2006, it was the same rate of growth, 7.92%, and in 2007, 12.36 %. When recovering after the financial crisis, the annual growth rate in 2011 was 10.22%. Among the Baltic countries, Lithuania has the highest number of employed persons.
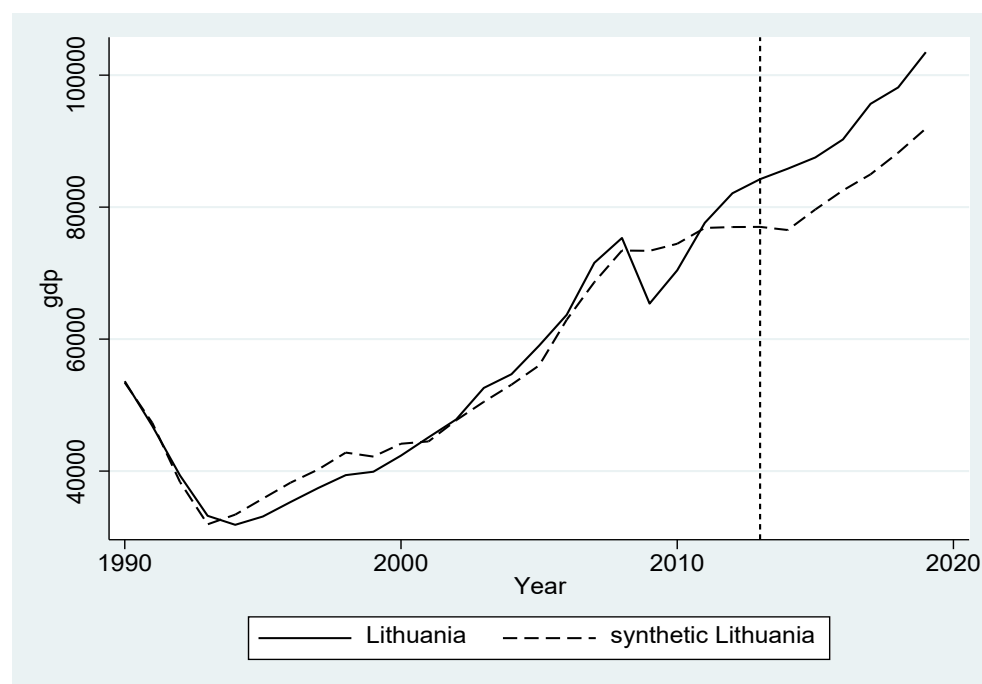

Figure 3: GDP in Lithuania 1990-2019 - treatment in 2013

Source: author´s own calculations

As seen in Figure 3, the actual GDP in Lithuania was higher than the synthetic indicator. Also, the gap between the actual and synthetic GDP has widened since joining the Eurozone in 2015 or the ERM II in 2013. The beginning of widening gap has been visible since the year 2011. This could be because Lithuania was trying to join the Eurozone sooner, so this country was trying to meet the convergence criteria just after entering the European Union. The biggest attempt of Lithuania to join the monetary union was in 2007, but this candidate country was rejected because its inflation rate was too high and it was not sufficient for fulfilling the convergence criteria. They met four of the five criteria, but Lithuania exceeded the inflation limit of 2.6 %.

Also, Lithuania is the only country initially to have been denied approval to adopt the euro after requesting a convergence check. (Maila, 2015)

Based on our dataset, we have calculated productivity as gross domestic product per employer. The productivity in Lithuania was growing beginning of 1994 to 2019. The highest growth was in the period of economic growth from 2000-2007. However, during the financial crisis, the growth of productivity slowed down. Productivity has grown from 31 439.67 $ per employer in 1990 to 75 011.264 $ per employer in 2019.
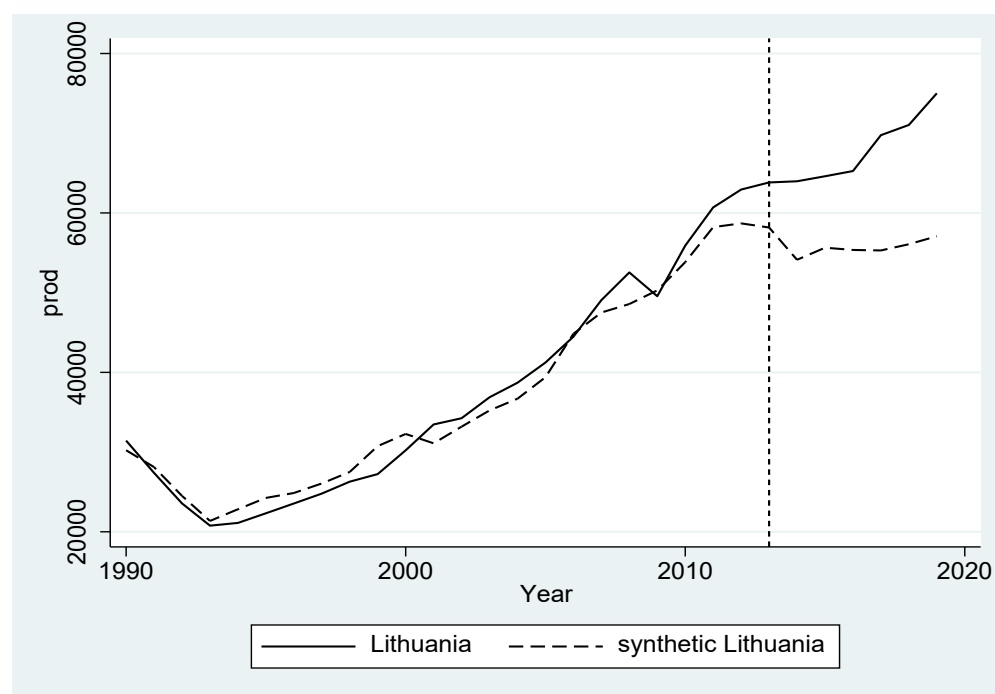

Figure 4: GDP per employer in Lithuania 1990-2019 - treatment period 2013
Source: author´s calculations

Latvia

Independent of the experience in Lithuania in 2006, it was not surprising to insiders that Latvia missed the 2008 self-proclaimed euro adoption target date the government set. Before the crisis, Latvia had the lowest debt levels after Estonia and Luxembourg, with a public debt of only 9 percent of GDP. However, due to the financial crisis, the national debt increased. The central government debt rose from 19.8 % to 44.4 % of the GDP from 2008 until 2010. To stop this trend, the Latvian government implemented restrictive

fiscal policies in 2008 to boost growth and investments. These adjustment strategies and the aim to keep the exchange rate stable led to severe contraction of the economy. (Dandashly, 2020)

The period with the highest economic growth was from 2000 to 2007, with an average annual growth rate of more than 7.74 %. Latvia has experienced the steepest economic growth, especially in the first three years after joining the European Union on the 1st of May 2004. In 2005 the GDP growth rate was 10.57%; in 2006, 9.57%;

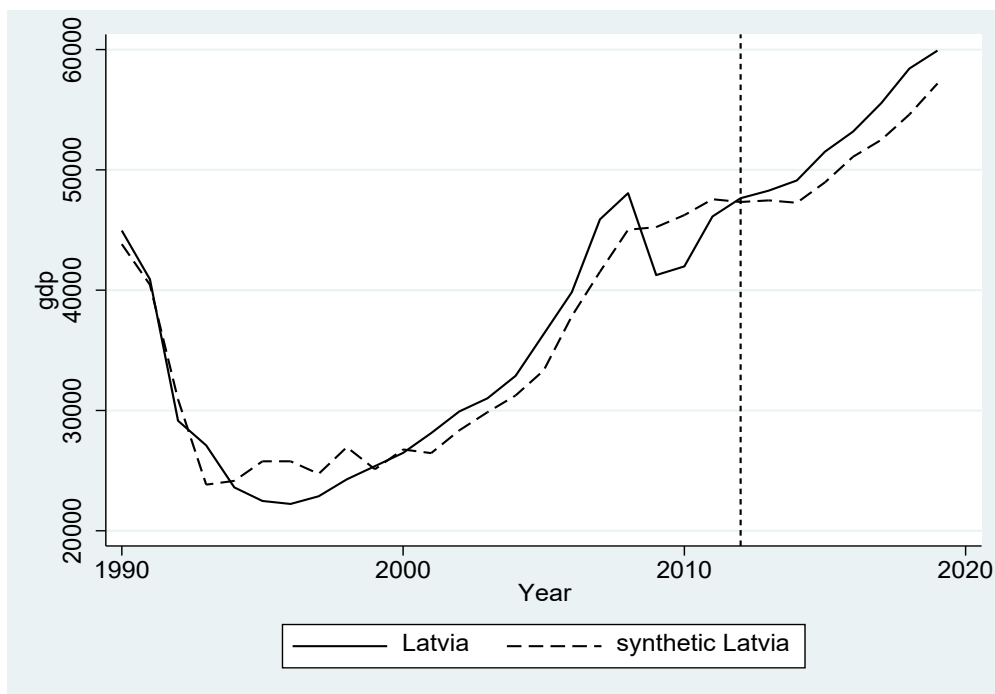and in 2007 15.19%. The annual growth rate after the first three years after joining the Eurozone was 4.18%.

Figure 5: GDP in Latvia 1990-2019 - treatment in 2012

Source: author´s calculations

The productivity in Latvia has been growing since the year 1996 to 2019. The highest growth was in the period of economic growth from 2000 to 2007. However, during the financial crisis, the development of productivity slowed down.
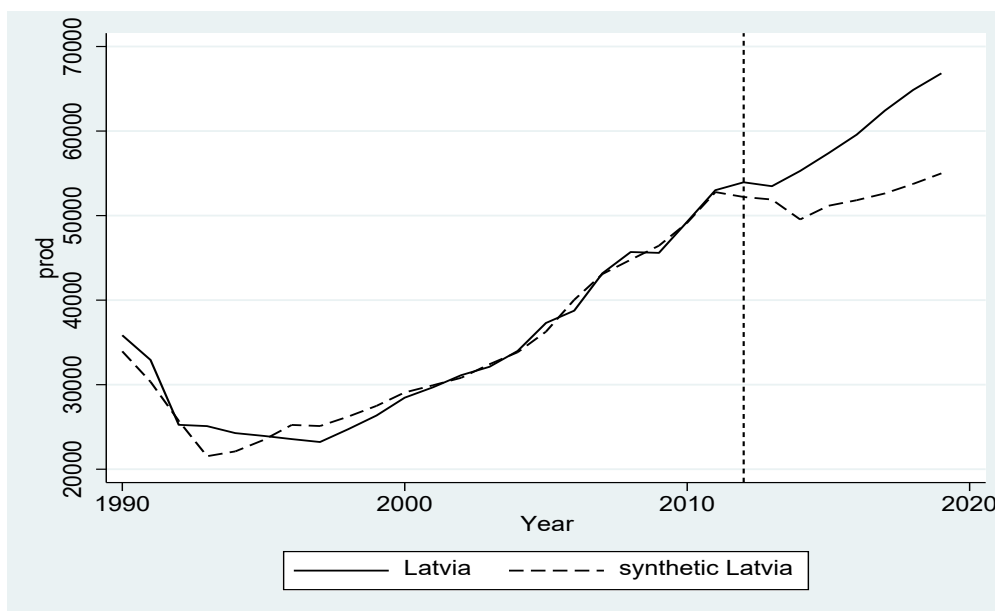

Figure 6: GDP per employer in Latvia 1990-2019 - treatment period 2012

Source: author´s calculations

CONCLUSION AND RECOMMENDATION

We have examined the effect of the accession to the Eurozone using the method of synthetic control groups. The results indicate that the decision to enter the Eurozone could significantly increase productivity – measured as a gross domestic product over employment. Or in other words - if these Baltic countries did not enter Eurozone, their GDP per employer would be lower than the actual performance. Moreover, it is noticeable that the effect of joining the monetary union materializes before the euro adoption itself. It confirms that the findings in studies (Boltho,2020; Žúdel & Melioris, 2016) meet the Maastricht criteria and stimulate the economic policy in the last two years before entering the Eurozone also has a significant impact on the financial performance of the new member countries. Also, another conclusion is that the accession to the Eurozone or ERM II has not increased or decreased the gross domestic product in Baltic countries as much as the productivity has increased. From the literature review of the paper that deals with this topic, the entry into the monetary union also affects other macroeconomic variables. Moreover, accession to the European Union has a larger impact on a member state´s economy than the adoption of the single currency itself. Therefore, it would also be beneficial to pursue research not only in terms of the impact of the euro adoption but also in terms of joining the European Union, considering other macroeconomic variables, as well as international trade, foreign direct investment, the openness of the economy, export, import, value-added.

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