Are the Tax Systems of the EU Member States Converging?

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Abstract
The convergence of tax systems in the European Union is one possible solution to the issue of harmful tax competition among Member States. This study aims to establish if the tax system of the EU Member States are indeed converging. The overall tax burden was used as a proxy for the tax system of a Member States. The convergence analysis is based on sigma convergence calculated using the Theil index. The database includes annual information for all the 28 EU Member States, for the time period between 1965 and 2013. The results show tax convergence tendencies up until 2007 and tax divergence afterward.

Key words: taxation, convergence, tax burden, EU, Theil index

Jel Codes: H20, H30, H71

1. Introduction

Fiscal convergence in the European Union is an ever-present point of debate between EU policy makers, national representatives of the EU Member States and members of the academic and research community. The Fiscal Stability Pact of 2012 once again brought into the limelight the importance of convergence between the EU Member States. Harmful tax competition between the Member States is one of negative consequences of the lack of tax convergence within the European Union. Therefore, there are always talks and debates regarding new tax measures that could limit harmful tax competition in the EU.

The current study aims to analyze tax convergence trends in the European Union using the annual overall tax burden as a proxy for a national tax system. Sigma convergence calculated based on the Theil index will be used as a research method. Tax convergence will be analyzed for the entire European Union as well as on a regional basis. The novelty of this research consists of both the research method and the database that was used. As far as I know the Theil index has not been previously used in tax convergence analyses, tax convergence has not been previously studied for the regions that the current study proposes and there is only a very limited number of tax convergence studies done for the EU28.

The structure of this paper is as follows. Section 2 contains a brief overview of relevant literature. Section 3 covers the research methodology as well as a description of the

information included in the database. Section 4 presents the research results for both overall tax convergence in the European Union and regional tax convergence within the EU. The research conclusions are included in Section 5.

2. Literature Review

The issue of convergence within the European Union is a highly debated one and has given rise to a considerable number of studies published on this matter. Naturally, the approaches taken towards the study of convergence in the EU also cover a wide variety.

The first distinction that needs to be underlined is that some studies cover convergence within the entire European Union, while others focus on regional convergence. One of the first studies on regional convergence in the EU was published by Molle et al (1980) and it analyses 76 programming regions of the EC using data for the period between 1950, 1960 and 1970. The focus is on looking at population GDP and employment in three major sectors of the economy: agriculture, industry and services. One of the main ideas of this study that was used in many other studies and will also be used in this study is to look retrospectively at data from regardless of the moment when that country became an EU Member State.

A new approach to the study of convergence was brought by Barro and Sala-i-Martin (1992). Their article is widely considered a landmark in the analysis of convergence. The tools introduced by their research were subsequently used in numerous other studies on convergence and their results brought the study of regional convergence back into the spotlight.

The research of fiscal convergence in the European Union has also given rise to many scientific articles. Most of this literature is based on the definition of fiscal convergence as convergence towards complying with the criteria established by the Maastricht Treaty (De Bandt and Mongelli 2000; Blot and Serranito 2006; Kocenda et al. 2008). The current study regards fiscal convergence in terms of tax convergence. Tax convergence is seen as the convergence of the tax systems of the EU Member States and the overall tax burden (percentage of overall tax income in the GDP) is considered to be a suitable proxy for a country's tax system. This approach is not new and can be found in a number of other articles published on this topic (Esteve et al. 2000; Sosvilla et al. 2001; Zodrow 2003; Delgado 2006; Kemmerling 2010; Delgado and Presno 2011).

One of the most popular methods of analyzing convergence is sigma-convergence. In their research, Esteve et al. (2000) analyze a database with information from the period between 1967 and 1994 using both sigma and beta convergence. Their results point to evidence of tax burden convergence. Sosvilla et al. (2001) analyze values for the annual tax burden for the EU15 Member States and use sigma convergence based on the standard deviation as well as beta-convergence. Their research points towards two different tax convergence periods from 1967-1974 and from 1984 to 1995. Delgado (2006) studies the convergence of the tax mix using sigma, beta and gamma convergence. The study is based on data for the time period between 1965 and 2003. The results show strong evidence of fiscal convergence for the period between 1975 and 1990.

The Theil index is used a tool of convergence analysis in a number of articles. However, most of this research revolves around income convergence (Wu 1999; Cuadrado-Roura et al. 1999; Galbraith and Garcilazo 2005; Monfort 2008). Terrasi (2002) uses the Theil index in a regional analysis of convergence in the European Union. The research is undertaken for four different groups of countries EU9, EU12.1 (without East Germany), EU 12.2 (with East Germany) and EU 15. Different periods of time are used and the author compares national results with results obtained for alterative regional aggregations in order to establish whether national factors will be substituted by European ones as a result of the integration process.

3. Research Methodology and Database

The current study aims to establish the existence or lack of tax converges in the European Union. The study is constructed on two different hypotheses: the first one is that there are tax convergences tendencies in the European Union (seen as a whole group); the second one is that there are regional tax convergence tendencies in certain geographical regions in the European Union. In order to test both hypotheses the annual overall tax burden was used to define the tax system of each Member State of the European Union. The annual overall tax burden is defined as the percentage of the GDP represented by the overall tax income for each Member State. Social security contributions were included in the overall tax income.

For the second hypothesis, the EU Member States were divided into four regions based on their geographical position, their economic and political background and the moment when they became EU Members. The four regions are as follows: *West EU* which includes France, Germany, Ireland, the United Kingdom and Austria; *North EU* which includes Belgium, the Netherlands, Luxembourg, Denmark, Sweden and Finland; *South EU* which includes Italy, Greece, Portugal, Spain, Cyprus and Malta; and *East EU* which includes Hungary, Poland, Slovakia, Latvia, Estonia, Lithuania, the Czech Republic, Slovenia, Bulgaria, Romania and Croatia. Malta and Cyprus were included in the South EU region due to their geographical position, in spite of the fact that they became EU Members later than the rest of the countries included in the same group.

Each of the two research hypotheses was tested separately and the database was adjusted accordingly. Therefore, in order to test the first hypothesis, the database includes data regarding the annual overall tax burden for the years between:

→ 1965 to 1994 for the EU15 Members States
→ 1995 to 2013 for the EU27 Member States
→ 2002 to 2013 for the EU28 Member States

It was necessary to analyze data for three different time periods in order to establish if the enlargement process had any impact on the tax convergence tendencies in the European Union.

In order to test the second research hypothesis, data for each region was analyzed. However, the time period included in the research was not the same for all the four regions. For the *West EU* region and the *North EU* region the database included information for the years between 1965 and 2013. For the *South EU* region, the information used in the research was for the

367

period between 1995 and 2013. It was necessary to reduce the time period because data for Cyprus and Malta was only available starting with 1995. For the *East EU* region the time period analyzed is even shorter, form 2002 to 2013. This is due to the fact that the earliest information available for Croatia is from 2002. The time period included in the research for the East EU region is rather limited. However, this is balanced by the fact that this group includes almost twice as many countries as the other three regions.

The research method used is sigma-convergence analysis based on the Theil index. The Theil index is calculated as shown in equation (1), where Y_i is the annual overall tax burden for country *i*, $\bar{Y}$ is the average overall tax burden for the EU or for the analyzed region and *n* is the number of countries for which the analysis was done.

$$Theil = \frac{1}{n} \sum_{n}^{i=1} \left(\frac{Y_i}{\bar{Y}} * \ln \frac{Y_i}{\bar{Y}} \right)$$

(1)

For each part of the analysis the number of countries included in the study will be presented in the Results section of the paper. All the data used was collected from the Euro-stat online database.

4. Research Results

The research results are presented in two different subsections. The first subsection presents the results of the tax convergence analysis undertaken for the entire European Union, with different time periods considered for different periods in the evolution of the European Union (EU15, EU27 and EU28). The second subsection contains the results for the analysis of regional tax convergence, for each of the four smaller regions within the European Union.

4.1. European tax convergence

During the first stage of research the first hypothesis was tested. In order to reach a conclusion, sigma convergence analysis was conducted for the European Union seen as a single group and test were run for the EU15 Member States, but also for EU27 and EU28. The results are presented in a series of charts.

Chart 1 shows the results for the analysis of tax convergence tendencies for the EU15 Member States for the period between 1965 and 1994. The overall trend of the Theil index is a descending one and this would point to the existence of tax convergence in the EU for this time period. However, as is evident from the chart, the descending trend is not a constant one. There are some clear tax convergence periods that are underlined in red on Chart 1: 1974-1977, 1979-1983 and 1988-1992.

Chart no.1 – Sigma-convergence results for EU15 (1965-1994)
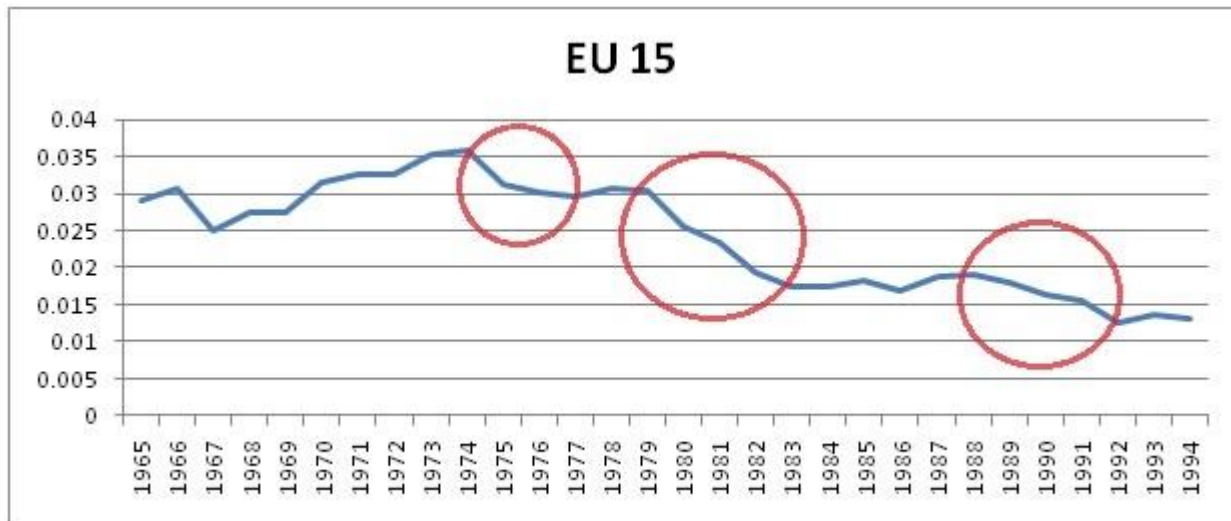
<div align="right">Source: own calculus</div>

The tax convergence analysis for the EU27 Member States is presented in Chart 2. The time period is 1995 to 2013. In spite of the fact that the overall trend of the chart is a descending one, it is difficult to say that there is evidence of tax convergence in the EU because the peak of convergence was reached in 2007 and the latest value (for 2013) is much higher than the one registered in 2007. Therefore, it would be difficult to claim the existence of tax convergence in the EU for this time period. Still, there is a considerably long convergence period from 1996 to 2007. It is marked in green on Chart no.2.

Chart no.2 – Sigma-convergence results for EU27 (1995-2013)
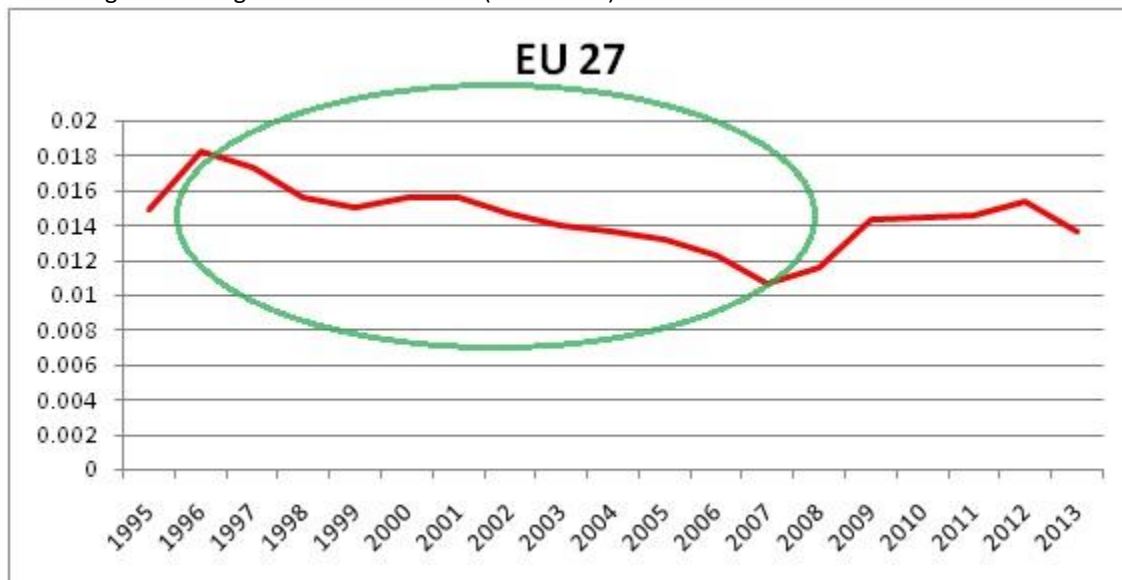
<div align="right">Source: own calculus</div>

The results for the analysis done on data from the EU28 Member States for the period between 2002 and 2013 are presented in Chart 3. The overall trend of the chart is only a slightly descending one; the Theil index value for 2013 is almost the same as the one for 2002. The peak of convergence was reached in 2007, which coincides with the conclusion of the analysis conducted for only 27 Member States. If we compare Chart 2 and Chart 3 for the period between 2002 and 2013, we can see that the evolution of tax convergence is the same in both cases. Therefore we may conclude that adding Croatia to the database did not influence the overall tax convergence tendencies in the European Union. There is a convergence period from 2002 to 2007 (as marked on Chart 3) that is part of the longer convergence period shown in Chart 2.

Chart no.3 – Sigma-convergence results for EU28 (2002-2013)
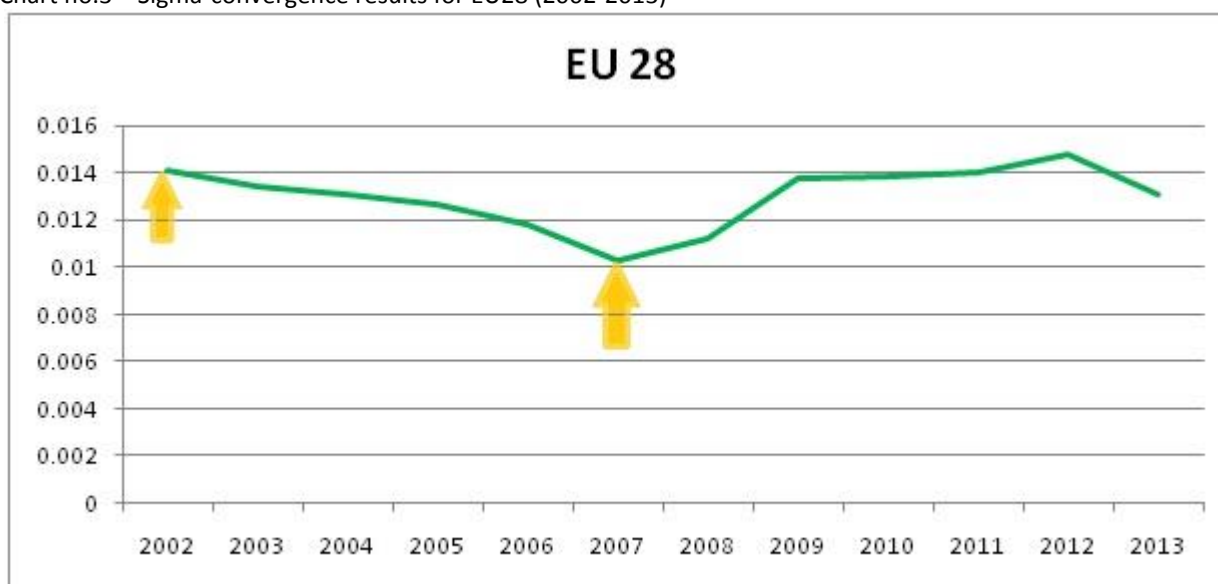
Source: own calculus

All in all, the first research hypothesis can be confirmed for EU15 for the period between 1965 and 1994. We can also confirm the hypothesis for EU27 and EU28 until 2007. However, after 2007, tax convergence tendencies can no longer be observed among the EU Member States.

4.2. Regional tax convergence

The second part of the research is focused on testing the second hypothesis. As previously stated, the number of states included in each group and the studied time period differ from one region to the next.

For the West EU region, 5 Member States were included in the research group and the Theil index sigma-convergence results are presented in Chart 4. The overall trend is an ascending one which points to a lack of tax convergence for this region, for the entire period between 1965 and 2013. However, there are two shorter convergence periods, as circled on Chart 4, from 1979 to 1984 and from 2003 to 2007. The peak of convergence for this region was achieved in 1976 and the Theil index value for 2013 (the last year included in the analysis) is much larger

that the convergence peak. This fact also supports the lack of tax convergence conclusion for this region.

Chart no.4 – Sigma-convergence results for West EU (1965-2013)
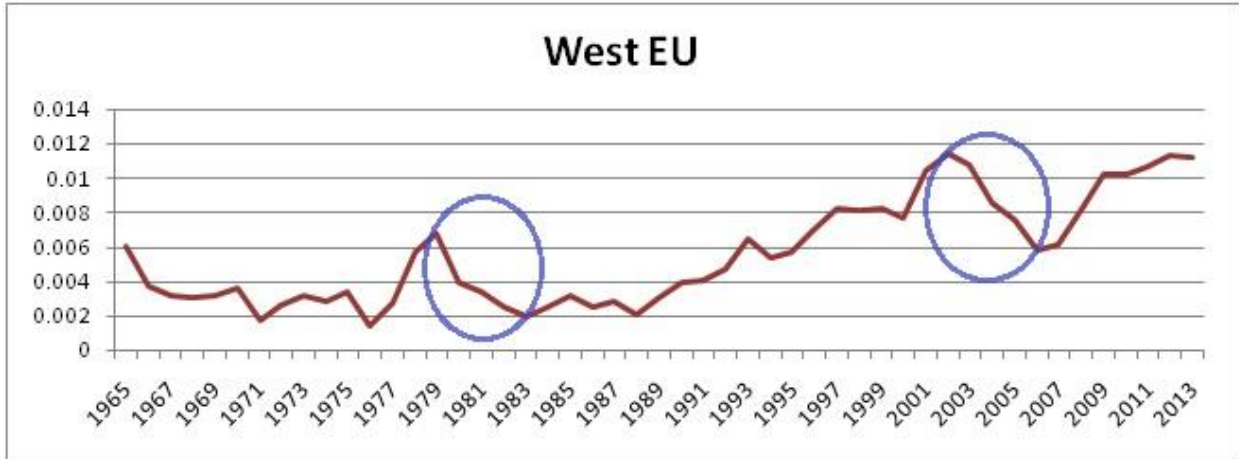
Source: own calculus

As far as the analysis for the North EU region is concerned, the number of EU Member States included in this region is 6. The results are shown in Chart 5. The overall trend of the Theil index values is a slightly ascending one. The shape of the chart points to a conclusion of lack of tax convergence for this region as well. Still, there are a few shorter fiscal convergence periods for these six Member States, for example 1979 to 1985 or 2005 to 2009, as circled on Chart 5. The peak of convergence for this region was reached in 1965 (the first year of the analysis) and this reinforces the conclusion regarding the lack of overall tax convergence among the Member States included in this EU region.

Chart no.5 – Sigma-convergence results for North EU (1965-2013)
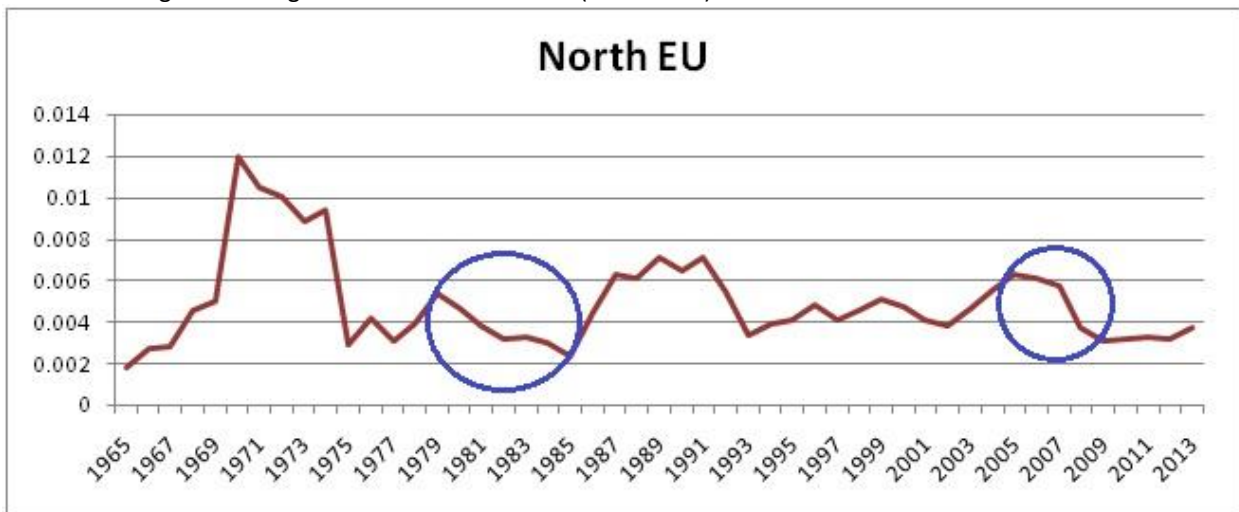
Source: own calculus

The South EU region includes 6 Member States and the analyzed period is between 1995 and 2013. The results are shown in Chart 6. The overall trend of the chart is a descending one, which points to the conclusion to tax convergence between these 6 countries. A clear convergence period can be observed from 1997 to 2005, as shown on Chart 6 by the arrows. The peak of convergence was reached in 2005. In spite of the overall conclusion of tax convergence for the entire period, the values of the Theil index for the last three years included in the study have increased from one year to the next, which shows that currently the tax system of these six Member States are diverging.

Chart no.6 – Sigma-convergence results for South EU (1995-2013)
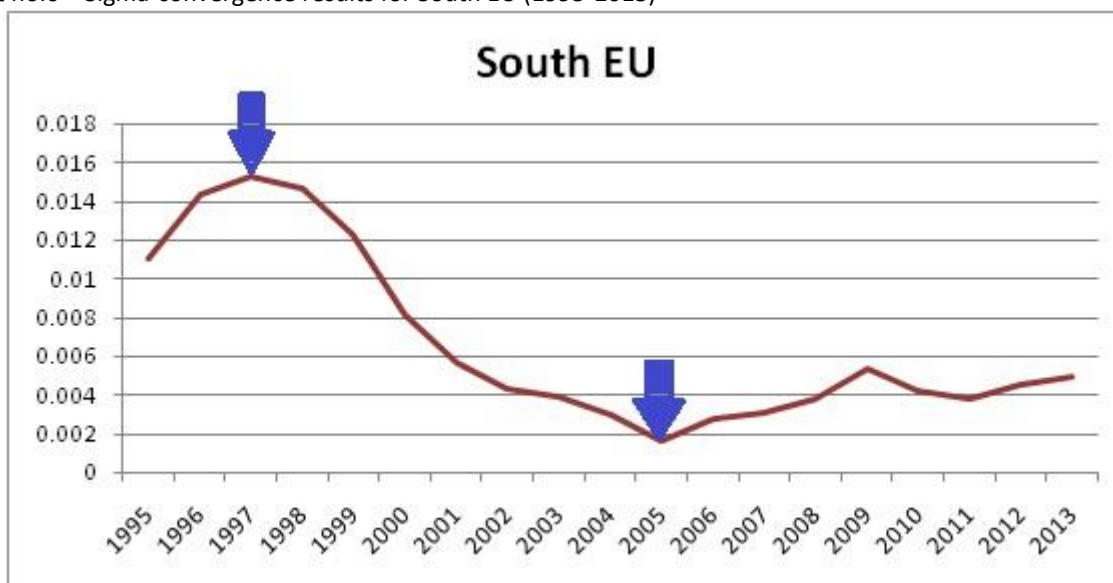
Source: own calculus

The fourth analyzed region, East EU, consists of 11 Member States. Therefore it is the largest region of the four. However, for the countries included in this region information was only available for the period between 2002 and 2013, a relatively short timeline. The overall trend of the chart is a slightly ascending one, which means a lack of tax convergence tendencies among the countries included in this region. Given the reduced time period, no shorter convergence periods were considered. The peak of convergence for this region was reached in 2006 and the tax divergence that followed could be explained by the fact that after 2006 measures started to be taken to counteract the effects of the global financial crisis and some of these measures were of a fiscal nature.

Chart no.7 – Sigma-convergence results for East EU (2002-2013)
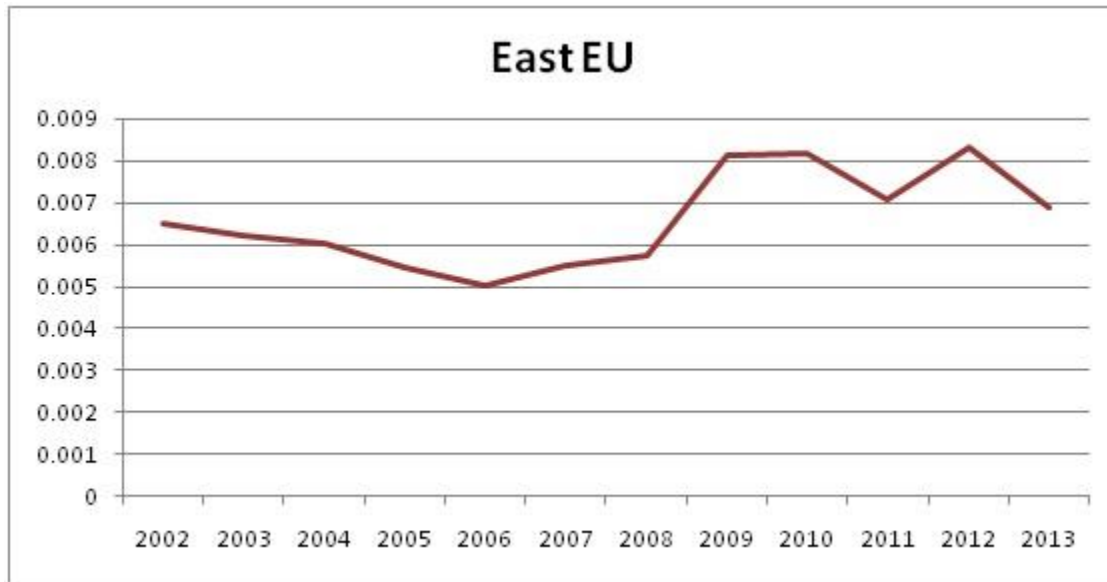
Source: own calculus

As a general conclusion for regional tax convergence, the second research hypothesis cannot be confirmed. There was evidence of regional tax convergence for only one of the four regions. For the other three regions, the empirical data only supports the existence of short tax convergence periods within the larger time periods analyzed.

5. Conclusions

The purpose of this study was to analyze tax convergence trends in the European Union, both on the level of the whole union and on a regional level. Therefore, two research hypotheses were defined. The first hypothesis is that there are tax convergences tendencies in the European Union as a single group of countries. The second hypothesis is that there are regional tax convergence tendencies in certain geographical regions in the European Union. For the second part of the research, four geographical regions were delimited within the European Union.

The first research hypothesis was only partially confirmed. Evidence of tax convergence was found for the EU15 from 1965 to 1994 (with shorter time periods with stronger tax convergence trends), for the EU27 from 1996 to 2007 and for the EU 28 from 2002 to 2007. Therefore the addition of Croatia to the EU did not affect the overall tax convergence tendencies. After 2007 there was no evidence of tax convergence. One of the explanations for this could be the negative effects of the worldwide financial crisis on the Member States of the European Union.

The second research hypothesis was only partially confirmed for the South EU region from 1997 to 2005. For the other three regions, the hypothesis was rejected overall. However, evidence of shorter tax convergence periods was found. For the West EU region tax convergence periods were established between 1979 – 1984 and 2003 – 2007. For the North EU region, there was

evidence of tax convergence from 1979 to 1985 and from 2005 to 2009. For the East EU region there was no significant evidence of tax convergence.

The current research has a series of limitations and concerns. One of the limitations is the relatively short time period analyzed for the East EU region which is due to the fact that data regarding Croatia is available only starting with 2002. Also, the criteria used when dividing the EU Member States into regions is a point of concern. Further research could be done using other regions determined based on other criteria such as similarities in tax systems between the Member States included in a certain region.

Acknowledgement

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