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EMPIRICAL ANALYSIS OF CYCLICAL CHARACTERISTICS OF FISCAL POLICY IN MEMBER COUNTRIES OF EUROPEAN ECONOMIC AND MONETARY UNION

This paper explores the fiscal policy in member countries of European Economic and Monetary Union (EMU). The purpose is to determine procyclical or countercyclical elements in EMU members' fiscal policy. In order to do so, we determine correlations between certain taxes and public expenditures, on one hand, and GDP, on the other hand. The existence of strong positive (negative) correlations suggests greater countercyclical effect of taxes (expenditures) that can be explained by automatic stabilizers functioning or countercyclical discretionary measures.

Keywords: European economic and monetary union; countercyclical fiscal policy; automatic stabilizers; discretionary measures.

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ЕМПІРИЧНИЙ АНАЛІЗ ЦИКЛІЧНИХ ХАРАКТЕРИСТИК ФІСКАЛЬНОЇ ПОЛІТИКИ У КРАЇНАХ – ЧЛЕНАХ ЄВРОПЕЙСЬКОГО ЕКОНОМІЧНОГО І ВАЛЮТНОГО СОЮЗУ

У статті досліджено фіскальну політику у країнах – членах Європейського економічного і валютного союзу. Визначено процикличні або антициклічні елементи у фіскальній політиці цих країн. Для цього розраховано кореляції між певними податками та державними витратами, з одного боку, та ВВП, з іншого. Існування стійких позитивних (негативних) кореляцій свідчить про більший антициклічний ефект податків (витрат), що може бути пояснено впливом автоматичних стабілізаторів або антициклічними дискреційними заходами.

Ключові слова: Європейський економічний і валютний союз; антициклічна фінансова політика; автоматичні стабілізатори; дискреційні заходи.

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ЭМПИРИЧЕСКИЙ АНАЛИЗ ЦИКЛИЧЕСКИХ ХАРАКТЕРИСТИК ФИСКАЛЬНОЙ ПОЛИТИКИ В СТРАНАХ – ЧЛЕНАХ ЕВРОПЕЙСКОГО ЭКОНОМИЧЕСКОГО И ВАЛЮТНОГО СОЮЗА

В статье исследована фискальная политика стран – членов Европейского экономического и валютного союза. Определены проциклические или антициклические элементы в фискальной политике этих стран. Чтобы достичь этого, найдены корреляции между определенными налогами и государственными расходами, с одной стороны, и ВВП, с другой. Существование стойких позитивных (негативных) корреляций свидетельствует о большем антициклическом эффекте налогов (расходов), что может быть объяснено влиянием автоматических стабилизаторов или антициклическими дискреционными мероприятиями.

Ключевые слова: Европейский экономический и валютный союз; антициклическая финансовая политика; автоматические стабилизаторы; дискреционные мероприятия.

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I. Introduction. Since its foundation, EMU is subject for many controversies. In conditions of having a single currency and centralized monetary policy which is undera jurisdiction of European Central Bank (ECB), fiscal policy represents the only mechanism by which a country can act on sudden shocks, and more to the point, on demand shocks. The policy assignment and institutional arrangements of EMU are based on a widespread consensus that monetary policy should take care of stabilisation in the event of symmetric shocks while the smoothing of asymmetric shocks and diverging cyclical conditions falls to national fiscal policy as the single monetary policy responds only to area-wide price developments (Brunila et al., 2003). When economic cycle of a small member state is not synchronized with the rest of EMU, it suffers from the perverse effects of single monetary policy, since ECB does not adjust its monetary policy (Marinheiro, 2007). Therefore, there will always be incentives to apply contractionary discretionary fiscal policy, and it is realistic to expect they will be more pronounced in smaller member states.

The fiscal policy is analyzed basing on 3 dimensions. Automatic stabilizers are those elements of fiscal policy that tend to mitigate output fluctuations without any explicit government action (Auerbach et al., 2000). Cyclical discretionary policy represents a systematic response of a cyclically adjusted budget to the business cycle. Exogenous discretionary fiscal policy represents the part of public income and expenditure which does not depend on cyclical fluctuations. This "exogenous" measures can either reflect extraordinary fiscal stabilization efforts or destabilizing fiscal impulses associated with other objectives of public finance or noneconomic considerations (Debrun et al., 2010).

This paper is organized as follows. Section 2 provides a representation of the research works which previously dealt with the empirical analysis of the fiscal policy in EMU, EU, OECD countries and developing countries. Section 3 presents the methodology we applied for the analysis. Section 4 is dedicated to the interpretation of the results, and Section 5 concludes.

II. Previous research. Previous research deat with the characteristics of the fiscal policy in EMU and gave contrary results. Certain research works show that, after the introduction of Maastricht rules in 1992, fiscal policy of some EMU countries became procyclical. Also, the research shows that the countries which wanted to join the EMU (European Monetary Union formed in 1999) conducted a procyclical fiscal policy, so as to fulfill the conditions of the Stability and Growth Pact (SGP). On the other hand, some research works prove that, after the introduction of SGP, fiscal policy has become more countercyclical in relation to the periods before the introduction of the fiscal rules.

Gali and Perotti (2003) concluded that Maastricht rules did not lead to changes in fiscal policy in EMU in the expected way, i. e. to a greater application of procyclical measures. On the contrary, fiscal policy became a more countercyclical instrument. Marinheiro (2007), using expost data, provides evidence that a countercyclical fiscal policy is used in the EMU member states. He does not provide the final evidence whether the rules of SGP act benefited to the countercyclical behaviour of fiscal policy, at least not for all the EMU countries. However, using the real time data for the period 1999-2006, he proves that fiscal policy was designed in a procyclical manner. Dolls, Fuest and Peichl (2010), based on a sample of 19

European member states, conclude that automatic stabilizers absorb 38% of proportional income shock, and in the case of the unemployment shock, the effect grows up to 48%. Aghion and Howitt (2006) proved that a lower level in countercyclical behaviour of the member states of EMU was one of the reasons why the economic growth was lower in EMU than in Great Britain and USA during 1990s. Follette and Lutz (2010) were researching the effects of automatic stabilizers and discretionary fiscal policy in the cases of aggregate demand shocks in the USA. Badinger (2004) shows on a sample of 20 member states of OECD that discretionary fiscal policy had significant influence on the reduction of GDP fluctuations. Gavin and Perotti (1997) show that fiscal policy in the countries of Latin America was procyclical, especially in the phase of negative economic movements, whereas in developed countries fiscal policy is mostly countercyclical. Talvi and Vegh (2000) determined that fiscal policy is procyclical on the level of all developing countries.

III. Methodology and data. In this paper we use data for 17 member states of the EMU (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Cyprus, Malta, Greece, Slovenia, Slovakia and Estonia). Considering that previous researches mostly examined interconnections of the movement of the primary budget deficit (surplus) and gross domestic product as an indicator whether a country conducted countercyclical, procyclical or acyclical fiscal policy in a certain period, the focus of this paper will not be on the budget results, but on individual categories of taxes and government expenditures and their correlation with the movement of gross domestic product. The goal of this research is to determine whether there are strong correlations between movement of certain taxes and government expenditures, on one hand, and gross domestic product, on the other hand, in the observed period.

What taxes and government expenditures will we observe? In their research on countercyclical behaviour of different fiscal forms, the economists were taking into consideration different taxes and government expenditures. Fatas and Mihov (1999) were determining whether there is an inverse correlation between the size of a country, measured by participation of the total public revenue in GDP, and fluctuations in GDP. Buettner and Fuest (2009) were examining the influence of corporation income tax on investment demand stabilization. Gundersen and Ziliak (2003) were examining the influence of food stamps on the consumption stabilisation. Kopczuk (2003) considers the influence of personal income tax on GDP fluctuations. Guo J.T. and Harrison S. (2004) examine the stabilizing influence of income tax and procurements of the state on labor force fluctuations. Kniesner and Ziliak (2002) examined the influence of personal income tax on a disposable income and consumption in a situation when it comes to income shocks.

All the relevant researches state personal income tax and corporate income tax as the most important taxes in leading a countercyclical fiscal policy, therefore these two taxes are taken together into consideration in this paper. The next tax category taken into consideration is a value-added tax (VAT). Consumption taxes do not have a pronounced effect due to their regressiveness (since VAT is based on 2-3 tax rates at most). However, some researches show that VAT can be progressive (Jenkins et al., 2006). We include VAT in the analysis since we examine countries of the EMU, all

of them being member states of the the EU, and the value-added tax is often called "European tax" since it was applied in the countries of the EU in the first place. Besides introducing the above mentioned taxes in the analysis, we will observe the correlation between the total tax income and GDP.

As far as expenditures are considered, unemployment benefits are regarded as government expenditure which has a pronounced countercyclical behaviour, mostly due to the automatic stabilizers effect. Although automatic stabilizers are usually stronger on the income side of the budget due to their generosity, their effect on the expenditure side is more effective. The reason for it is that government expenditures directly enter the aggregate demand, while the influence of taxes on aggregate demand is carried out indirectly through disposable income (Swanepoel et al., 2003) Beside unemployment benefits, we include survivors benefits.

In this analysis we use data for the period 1995-2009, year by year, i.e. time series of data on absolute personal income tax, corporate income tax, VAT, total tax income, unemployment benefits and survivors benefits, as well as for the nominal GDP, for each country individually. Nominal GDP data are taken from IMF publication "World Economic Outlook", and the data on absolute and relative values of tax income and government expenditures are taken from Eurostat.

Gross domestic product is prone to cyclical fluctuations in relation to a long-run trend. As an economy goes through an economic cycle, the real GDP value deviates from trend upwardly/downwardly, in the expansion/recession phase, respectively. Taxes, as well as GDP, are prone to cyclical fluctuations. In Section 1 of this paper, we divide fiscal policy into 3 components. Automatic stabilizers and cyclical discretionary policy are determined by the economic cycle, while exogenous discretionary policy can be appreciated through exceptional changes in tax income and government expenditures which do not depend on the economic cycle. If exogenous discretionary policy is neglected as a component without a systematic character, but with a character of exception, the character of fiscal policy is determined by the effect of automatic stabilizers and the cyclical discretionary policy. The effect of automatic stabilizers is countercyclical, while discretionary policy can be countercyclical, but also procyclical. The ultimate effect of fiscal policy will depend on the coeffect of these two fiscal policy components.

In this paper we take into consideration all the cyclical movements, those influenced by automatic stabilizers, but also those influenced by which cyclical fiscal policy. We are primarily interested in knowing the size of countercyclical capacities of certain taxes and government expenditures in the defined period of time, and not in the source of countercyclical behaviour. In the very analytical method, we begin with the idea developed by Frank Bodmer and Alan Geier (2004). They tried to determine the size of structural budget deficit (a cyclically adjusted budget result) in Switzerland, and in the way they tried to determine structural income and expenditures using different statistical procedures. The first and the simplest statistical method is the application of statistical filters used to divide data time series into the values of trend and the trend deviation, one of the methods which Bodmer and Geier used is the application of HP filters, and it is the idea we are going to use in this paper. After implementing HP filther, the trend component is interpreted as a structural income (expenditure), while the rest is a cyclical component (residual

income). Structural income can be appreciated as the level of tax income which would be realized if there were no cyclical fluctuations, and therefore, no automatic stabilizers effect and no cyclical fiscal policy. We get cyclical component when we subtract trend component from the original data. We should keep in mind that cyclical component includes fluctuations of the series due to the effect of cyclical factors, but also due to the irregular factors (Bodmer et al., 2002). That irregular component represents exogenous discretionary fiscal. In this paper, the irregular component will be neglected, that is, we will suppose that it is not more importantly pronounced.

In this paper we are not directly dealing with determination of structural income and expenditures. Instead we want to determine whether there are correlations between the GDP movements and the taxes and government expenditures mentioned above. To determine the correlation we cannot use the original data, but we have to filter the data using HP filter. The original data will be used in a logarithm (we will use the natural logarithm), and then we will filter the given values for each category and for each country (we use parameter value =100 that is recommended in the references). In that way, we will get trend values for all the time series. These trend values will be subtracted from the previous data given as the logarithms, and in that way we will get values that represent cyclical component. By determining the level of correlation for cyclical components of taxes and government expenditures, on one hand, and the cyclical GDP component, on the other hand, we can determine whether there is a countercyclical, acyclical or procyclical behaviour in the tax and expenditure effect. In the case of taxes, if the correlation coefficient is positive and statistically significant, we can say that countercyclical behaviour is significant, i.e. that the influence of GDP fluctuation is successfully reduced a great deal. On the other hand, in case of expenditures, if the correlation coefficient is negative and statistically significant, we can say that countercyclical expenditure effect is significant.

IV. The results. The correlation matrix (Table 1) shows that personal income tax (PIT) and corporate income tax (CIT) have considerable agreement with the GDP movements.

We observed these two taxes on aggregate, but we should keep in mind that prevailing participation in these aggregate values has personal income tax, given the participation of CIT in GDP in the majority of state members of the EMU is at very low level, while PIT is the dominant kind of tax. As the matrix shows, in the majority of countries the correlation between PIT and CIT (on aggregate) and GDP is statistically significant. Out of 10 countries, 10 countries have strong positive correlation, at the significance level of 5%, which suggests that the stabilizing effect of those taxes is important in the case of GDP cyclical fluctuations. If we increase the significance level to 10%, then there is a strong positive correlation in 11 countries. As far as VAT is considered, it shows a weaker correlation. At the significance level of 5% we have statistically significant coefficients for only 7 countries. If we increase the significance level to 10% then the correlation is slightly more pronounced, and we have positive and strong correlation in 9 countries.

Table 1. **Correlation matrix for variables PIT and CIT, VAT, TOT, UN, SUR to GDP**

	COUNTRY	PIT and CIT	VAT	TOT	UN	SUR
1	**AUSTRIA**	0,294 (0,288)	0,044 (0,881)	**0,475 (0,073)****	**-0,747 (0,021)***	**0,605 (0,084)****
2	**BELGIUM**	0,310 (0,280)	0,349 (0,222)	**0,791 (0,000)***	**-0,606 (0,084)****	-0,431 (0,247)
3	**CYPRUS**	**0,601 (0,018)***	**0,511 (0,052)****	**0,827 (0,000)***	0,064 (0,871)	-0,186 (0,632)
4	**FINLAND**	**0,788 (0,000)***	0,152 (0,603)	**0,906 (0,000)***	**-0,936 (0,000)***	-0,185 (0,634)
5	**FRANCE**	0,413 (0,126)	**0,455 (0,088)****	**0,725 (0,002)***	**-0,658 (0,054)****	-0,393 (0,295)
6	**GERMANY**	**0,580 (0,023)***	**0,788 (0,001)***	**0,658 (0,008)***	**-0,839 (0,005)***	-0,478 (0,193)
7	**IRELAND**	**0,842 (0,000)***	0,420 (0,134)	**0,875 (0,000)***	-0,574 (0,106)	0,106 (0,785)
8	**ITALY**	**0,474 (0,074)****	**0,621 (0,013)***	0,324 (0,239)	-0,466 (0,206)	-0,223 (0,564)
9	**LUXEMBOURG**	0,261 (0,347)	0,183 (0,531)	**0,728 (0,002)***	**-0,644 (0,061)****	**-0,683 (0,043)***
10	**NETHERLANDS**	**0,610 (0,016)***	**0,845 (0,000)***	**0,840 (0,000)***	**-0,920 (0,000)***	-0,383 (0,309)
11	**PORTUGAL**	**0,714 (0,003)***	**0,565 (0,035)***	**0,898 (0,000)***	**-0,736 (0,024)***	-0,261 (0,497)
12	**SPAIN**	**0,833 (0,000)***	**0,786 (0,001)***	**0,843 (0,000)***	-0,357 (0,345)	0,095 (0,809)
13	**MALTA**	0,340 (0,215)	0,070 (0,804)	0,318 (0,247)	X	X
14	**SLOVENIA**	**0,711 (0,003)***	0,024 (0,947)	**0,812 (0,000)***	**-0,699 (0,036)***	0,007 (0,986)
15	**SLOVAKIA**	**0,610 (0,016)***	-0,085 (0,772)	**0,832 (0,000)***	-0,032 (0,936)	0,264 (0,492)
16	**ESTONIA**	**0,701 (0,004)***	**0,805 (0,000)***	**0,914 (0,000)***	-0,242 (0,531)	0,416 (0,266)
17	**GREECE**	0,178 (0,525)	**0,584 (0,022)***	**0,522 (0,046)***	-0,268 (0,486)	0,241 (0,532)

Correlation matrix shows Pearson correlation coefficients (except for Malta for UN and SUR variables). P-values are in brackets. With the selected significance level $\alpha = 0,05$ (5%) if p value is lower than α, then we have statistically significant value of Pearson correlation coefficient. (*) shows the values of correlation coefficient that are statistically significant at the significance level of 5%; (**) marks Pearson correlation coefficients that are statistically significant at the significance level of 10%. Data for unemployment and survivors benefits for Malta were not available

If we observe the correlation of total tax income (TOT variable) and GDP, we notice there is an extremely strong correlation for the most of the countries. In 14 countries there is a strong positive correlation at the significance level of 5%, and in Italy and Malta alone we have insufficiently strong correlation. We can conclude that total tax income have a significant countercyclical capacity. Why does the total tax amount have the most pronounced countercyclical behaviour, even more pronounced than PIT and CIT? We can look for the reasons in other taxes that we did not include that can have an important countercyclical behaviour. Those are, in the first place, social security benefits, which change with the

unemployment rate. The importance of social security benefits is great, because they are one of the most generous items in tax income in all the member states of the EMU.

As far as the expenditures are considered, we observe the correlation between unemployment benefits (variable UN) and survivors benefits (variable SUR) to GDP. We expect negative coefficients since we suppose that in situations when GDP is decreasing, i.e. when it is below trend, unemployment expenditures and survivor expenditures should increase. For unemployment benefits we can notice that there is a negative correlation for all the state members, except Cyprus, but the correlation is not strong. With the significance level of 5%, we have strong negative correlation in only 6 countries, whereas the situation is slightly better when the significance level is 10%, and we have strong correlation in 9 countries. With the survivors benefits we did not notice any statistically important patterns.

Table 2 shows average participation of tax and expenditure categories in GDP. As we can see, in all the countries, except in Slovenia and Slovakia, aggregate participation of PIT and CIT is greater than the participation of VAT in GDP. Given their relative participation in GDP is greater, and the level of correlation in the movement of these two taxes and GDP is greater than the correlation between VAT and GDP, countercyclical effect of these two taxes will be greater than the VAT effect. As far as unemployment benefits and survivor benefits are considered, their participation in GDP is less important than the participation of taxes, and considering that the level of correlation is weaker than with PIT and CIT, they have a lesser countercyclical potential from these taxes.

Table 2. **Average participation of taxes and government expenditures in GDP (in %)**

	COUNTRY	Average participation of PIT and CIT in GDP	Average participation of VAT in GDP	Average participation of TOT in GDP	Average participation of UN in GDP	Average participation of SUR in GDP
1	AUSTRIA	12,78	7,71	44,65	1,53	2,13
2	BELGIUM	16,16	6,66	46,06	3,27	2,63
3	CYPRUS	9,56	7,38	31,90	0,05	0,05
4	FINLAND	17,56	8,06	44,73	2,31	0,93
5	FRANCE	9,85	6,96	45,05	2,04	1,86
6	GERMANY	10,64	6,24	40,95	1,99	2,29
7	IRELAND	12,39	6,91	31,82	1,35	0,82
8	ITALY	13,99	5,69	41,12	0,47	2,51
9	LUXEMBOURG	13,84	5,34	38,30	0,88	1,97
10	NETHERLANDS	10,50	6,76	39,19	1,36	1,36
11	PORTUGAL	8,55	7,41	33,53	1,05	1,52
12	SPAIN	10,09	5,41	34,76	2,52	1,99
13	MALTA	9,83	6,64	31,66	x	x
14	SLOVENIA	7,67	8,06	38,12	0,70	0,81
15	SLOVAKIA	7,15	7,30	33,43	0,74	0,89
16	ESTONIA	8,33	8,55	32,35	0,18	0,14
17	GREECE	7,65	6,62	33,66	1,29	1,19

Data for unemployment and survivors benefits for Malta were not available.

The period of 1995-2009 also includes two very important moments: the first one is the formation of the EMU in 1999, and the introduction of the single currency, and the second one is the beginning of the economic crisis. There is a question whether fiscal policy was unambiguous during the whole period of time. Marinheiro (2007) shows that, in the period before Maastricht, all the countries had procyclical discretionary fiscal policy. After the introduction of euro in 1999, all the countries, except Greece and Italy, led acyclical (neutral) fiscal policy. Marinheiro used expost data to get to these conclusions. Following these conclusions, we will divide the period 1995-2009 into 3 subperiods: the first subperiod (1995-1999) is the period before the introducion of euro as a single currency; the second subperiod (2000-2004) is the period after the formation of EMU and the introduction of euro; the third subperiod (2005-2009) is the period which is marked by the appearance of the world economic crisis effect in its second half. We will only deal with the taxes, while the expenditures will be kept out of the analysis.

Table 3. **Correlation matrix for the subperiods (1995-1999, 2000-2004, 2005-2009)**

	COUNTRY	PERIOD 1995-1999			PERIOD 2000-2004			PERIOD 2005-2009		
		PIT and CIT	VAT	TOT	PIT and CIT	VAT	TOT	PIT and CIT	VAT	TOT
1	AUSTRIA	-0,837 (0,077)	-0,530 (0,358)	-0,802 (0,103)	0,302 (0,621)	0,681 (0,206)	0,567 (0,319)	0,833 (0,080)	0,481 (0,519)	0,892 (0,042)
2	BELGIUM	0,235 (0,703)	-0,276 (0,654)	-0,002 (0,998)	0,842 (0,073)	0,936 (0,019)	0,941 (0,017)	0,201 (0,799)	0,173 (0,827)	0,951 (0,013)
3	CYPRUS	0,423 (0,478)	0,765 (0,132)	0,974 (0,005)	0,432 (0,468)	-0,632 (0,252)	0,895 (0,040)	0,856 (0,064)	0,673 (0,214)	0,819 (0,090)
4	FINLAND	0,487 (0,405)	0,744 (0,149)	0,818 (0,091)	0,871 (0,054)	0,042 (0,946)	0,880 (0,049)	0,995 (0,000)	-0,714 (0,286)	0,989 (0,001)
5	FRANCE	-0,438 (0,460)	-0,893 (0,042)	-0,846 (0,071)	0,947 (0,014)	-0,340 (0,576)	0,855 (0,065)	0,940 (0,017)	0,843 (0,073)	0,928 (0,023)
6	GERMANY	0,343 (0,572)	0,625 (0,260)	0,155 (0,803)	0,675 (0,211)	0,904 (0,035)	0,691 (0,196)	0,799 (0,105)	0,967 (0,033)	0,901 (0,037)
7	IRELAND	0,883 (0,047)	0,741 (0,152)	0,948 (0,014)	-0,700 (0,188)	0,061 (0,922)	-0,708 (0,181)	0,980 (0,003)	0,713 (0,287)	0,988 (0,001)
8	ITALY	0,646 (0,239)	-0,058 (0,926)	0,893 (0,042)	-0,041 (0,947)	-0,515 (0,375)	-0,629 (0,256)	0,751 (0,143)	0,934 (0,020)	0,867 (0,057)
9	LUXEM-BOURG	-0,543 (0,344)	0,862 (0,060)	0,690 (0,198)	0,600 (0,285)	0,675 (0,212)	0,887 (0,045)	0,250 (0,685)	-0,828 (0,172)	0,948 (0,014)
10	NETHE-RLANDS	-0,631 (0,253)	0,395 (0,511)	0,743 (0,150)	0,975 (0,005)	0,707 (0,182)	0,797 (0,106)	0,920 (0,027)	0,903 (0,036)	0,974 (0,005)
11	PORTUGAL	0,799 (0,105)	0,865 (0,058)	0,969 (0,006)	0,948 (0,014)	0,854 (0,065)	0,790 (0,112)	0,585 (0,300)	-0,473 (0,527)	0,975 (0,005)
12	SPAIN	0,694 (0,194)	-0,117 (0,851)	0,919 (0,027)	-0,590 (0,295)	0,480 (0,413)	0,386 (0,521)	0,941 (0,017)	0,939 (0,018)	0,946 (0,015)
13	MALTA	0,419 (0,482)	-0,354 (0,559)	0,178 (0,775)	0,395 (0,511)	0,368 (0,543)	0,470 (0,424)	0,570 (0,316)	-0,106 (0,865)	0,384 (0,523)
14	SLOVENIA	0,678 (0,209)	*	0,685 (0,202)	0,975 (0,005)	-0,477 (0,417)	0,988 (0,002)	0,784 (0,116)	-0,829 (0,171)	0,876 (0,052)
15	SLOVAKIA	-0,440 (0,458)	-0,054 (0,932)	0,649 (0,236)	-0,651 (0,234)	0,692 (0,195)	0,377 (0,531)	0,857 (0,063)	-0,948 (0,052)	0,937 (0,019)
16	ESTONIA	0,645 (0,240)	0,706 (0,183)	0,981 (0,003)	-0,627 (0,258)	-0,154 (0,804)	-0,417 (0,485)	0,946 (0,015)	0,874 (0,052)	0,980 (0,003)
17	GREECE	0,483 (0,409)	0,635 (0,250)	0,704 (0,185)	0,308 (0,614)	0,946 (0,015)	-0,044 (0,944)	0,562 (0,324)	0,989 (0,001)	0,960 (0,009)

* Data for VAT for the period 1995-1999 were not available for Slovenia.

Following the evidence provided by Marinheiro, we expect that the correlation coefficients will grow in time. Correlation matrix with subperiods shows that. Following the correlation between total tax income and GDP, we notice that in all the countries, except Cyprus, Italy and Estonia, there was a growth in correlation coefficient during the time, i.e. there was an increase of the countercyclical fiscal policy behaviour. In the last subperiod, we have the strongest correlations, since for all the countries, except for Cyprus, Malta, Italy and Slovenia there are statistically significant correlations.

The first and the second subperiod have a significantly smaller number of strong correlations. In the first subperiod (1995-1999) we have strong positive correlations for only 6 countries, and in the second subperiods (2000-2004) we have only 5 positive and strong correlations. Also in the first and the second subperiods, we have a greater number of negative correlations, whereas in the third subperiod we have no negative correlations. Looking at the given results we can say that they are in agreement with the results from the previous research.

The results should be regarded with a level of caution, even though they are not in contradiction to the results from the previous research. The basic lack of this analysis is relatively short time series. With the prolongation of the time series and probably with the introduction of quartal data instead of the yearly data, the results would be more representative and statistically more significant. Also, it should not be omitted that we neglected the irregular component of taxes and government expenditures during the analysis, which could affect the given results to some extent, especially in a situation where almost all the member states of the EMU applied a great number of exceptional measures with the start of economic crisis.

V. Conclusions. The results of the analysis show that PIT and CIT are taxes which have the most pronounced countercyclical effect. VAT has significantly lower countercyclical effect. Total tax income have a significant countercyclical effect, since between total tax income and GDP there are the strongest correlations. Between the unemployment benefits and GDP there are negative correlations for all the countries, but only correlations for 6 countries are statistically significant. With the survivors benefits there are no significant rule patterns.

Trying to determine whether total taxes have the same countercyclical effect during the entire observed period, we divided it into 3 subperiods: the period until the introduction of single currency (1995-1999), the period after the introduction of single currency (2000-2004) and the period which marked the beginning of the economic crisis in its second half (2005-2009). We noticed that countercyclical behaviour of taxes is the greatest in the last period, which could be explained by the appearance of the recession when, as a rule, countercyclical fiscal policy is more significant than in the expansion phase. During that period for majority of the countries there are statistically strong positive correlations. During the first two periods, there is no such pronounced countercyclical behaviour, since in the first period we have 6 statistically significant correlations, and in the second one, only 5. Also, in the first period we have 3 negative correlation coefficients, and in the sec-

ond one, we have 4. Such results suggest that fiscal policy in the first and the second periods in a certain number of countries was not so countercyclical, i.e. it moved towards acyclical behaviour, and in some countries towards procyclical behaviour.

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