

# Comparative analysis of debt sustainability of EU countries and EU candidates: the Promethee-Gaia approach

Danijela DURKALIĆ\*, Mihailo ĆURČIĆ\*\*

## Abstract

*The aim of this research is to explore, on a well-founded theoretical basis, debt sustainability, through a panel of 34 countries divided into three groups according to the economic integration level, as well as to explore whether EU candidate countries have poorer fiscal indicators than EU members. By providing a comprehensive picture of public and external debt, the research subject is a comparative analysis showing the ranking of countries in the three observed groups: EU candidate countries, the European Monetary Union candidate countries, and the European Monetary Union member countries. Using the PROMETHEE methodology, research results will show that countries that are not members of the monetary union have better sustainability performance compared to the countries that are members of the monetary union.*

*Keywords:* debt, sustainability, EU, Promethee-Gaia method

## Introduction

The negative consequences of uncontrolled borrowing have been pronounced in recent years at the level of world public debt in particular. Although there is no specific convergence value regarding the level of world debt, it is today higher than ever before, standing at the level of as much as 225% of the world's gross domestic product (IMF, 2016). Two-thirds of the debt itself is the debt of the world economy's private sector. However, it is important to stress that public debt is characterized by significant heterogeneity, meaning that not all economies are indebted equally, nor do they carry the same risk of indebtedness.

The sustainability of fiscal policy is a very wide research area today. In recent years, fiscal framework and debt sustainability have become a part of world statistics

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\*Danijela DURKALIĆ is teaching assistant / researcher at the University of Kragujevac, Serbia; e-mail: durkalicdanijela@gmail.com.

\*\*Mihailo ĆURČIĆ is teaching assistant / researcher at Military Academy, Belgrade, Serbia; e-mail: curcicmihailo@gmail.com.

for almost the majority of world countries. The hypothetical framework behind this research can be illustrated in the following way:

*If external debt sustainability is viewed as a fiscal policy sustainability criterion, then countries that are not members of the monetary union exhibit better sustainability performance compared to countries that are members of the monetary union.*

If taken as a consensus in the current literature, then there are areas in this paper where the results agree and differ from it. When it comes to the empirical analysis of public and external debt sustainability, the arithmetic mean of public debt as a % of GDP confirms the consensus. Taking into consideration the average value of debt and GDP ratio, this consensus is confirmed with the fact that EU countries that do not use the euro and candidate countries are in a similar position. On the other hand, it is shown that candidate countries for EU membership are facing high debt and low investment.

The paper is divided into several interrelated chapters. The first part of the paper discusses indebtedness through a literature review. In order to investigate any variable, it is necessary to present indicators of its economic category. In this respect, the next part of the research shows indicators for measuring, analyzing, and showing the status and course of indebtedness. The next chapter will present comprehensive empirical research of public and external debt by comparing three groups of countries. In this part, countries will also be ranked by using the *Visual Prometheus* software. Based on the defined research, through economic policy recommendations and final considerations, the final evaluation of the paper and the contribution of results will be determined.

The contribution of this paper is reflected in the performed analysis of the debt sustainability of EU countries and candidate countries for EU membership. By comparing these data, results are obtained indicating the risk of over-indebtedness, which adversely affects the stability of the monetary and fiscal systems. Using the Prometheus and Gaia method, these results contribute to more efficient decision-making on the improvement of monetary and fiscal policies, in general. The main goals in these circumstances are: to avoid unnecessary public debt, cost rationalization and efficiency in servicing the existing debt.

## **1. Literature review**

The public debt theory was popularized in the 18<sup>th</sup> century during the development of the Mercantilist doctrine. According to Van Dam *et al.* (2017), Adam Smith had redefined the borders of political economy by expunging moral and aesthetic consideration from the object of study, breaking away from mercantilist and physiocratic conceptions of trade. Today, this theory is a whole science, and debt management has become a popular scientific discipline, aimed at resolving and preventing global economic imbalances.

As early as 1776, Adam Smith emphasized that Europe was experiencing a huge increase in debt, with major European nations fairly balanced in this. According to Smith, in the long run, these debts lead to ruin (Smith, 1776). David Ricardo, as the most prominent representative of classical theory, pointed out that public debt was one of the most horrible problems affecting nations (Yadav, 2015). According to Ricardo, the only way to solve the debt problem is the surplus of public revenues in relation to public spending.

Public debt growth today has worsened all fiscal criteria, especially in the context of economic development. National economies at the margin of indebtedness and with poor macroeconomic performance have developed different models, analyses, and scenarios to forecast economic flows in terms of indebtedness. The debt crisis in Greece has created an even greater awareness of the importance of public debt management and its ongoing monitoring. In monitoring and analyzing the impact of public debt on the economy of a country, the use of debt is significant. Souzakis *et al.* (2017) argued that reduced external debt has a positive impact on growth through two main channels: capital-accumulation and factor productivity growth. If used for productive purposes and to enhance economic growth and development, debt is justified and sustainable. Although the history of monitoring and analyzing the debt of countries is a matter of concern with a long history, due to the causes of crises, decline in profitability, and economic growth, more and more attention is paid to debt sustainability of countries.

In 1991, Hakkio and Rush (1991) suggested that the co-integration between real government revenues and real government spending (including real interest rate) was an important condition for the inter-temporal budget constraint to be met.

The problem of borrowing and financing economic development through debt is also known as *Government Ponzi Game* (Bartolini and Cottarelli, 1994). In this situation, if production growth rate (output) is higher than interest rate (assuming it is unchanged), then the permanent state deficit is sustainable and it is not necessary to collect taxes in order to maintain public finances.

In theory, public debt is “sustainable” if it does not exceed the present value of expected primary surplus. Public debt sustainability and liquidity are widely discussed, primarily because a low level of debt liquidity can lead to an even greater risk of public debt sustainability. Using the model of rational expectations, Besancenot *et al.* (2004) conclude that the maximum level of debt that investors are willing to have can be much lower than a sustainable level. Their study shows that only when the government has perfect control over future resources will public debt not exceed the threshold of sustainability.

Afonso and Jalles (2013) analyze the correlation between economic growth, productivity, and public debt in the case of 155 countries. Using equations of growth, cross-sectoral dependence, and non-linear function, they conclude on a negative effect on debt ratio. For OECD countries, it is characteristic that debt maturity increases economic growth but that, in the observed period, financial crisis reduced

it. The authors also point out that fiscal consolidation promotes growth, as well as the development of financial markets. The economic growth of 10% increases the debt ratio by 0.1% in countries with debt above 90% and those below 30% of GDP. They also point out that it is possible to achieve the debt to GDP ratio threshold of below 60%.

An OECD economist, Balázs Égert (Égert, 2015), points out that the financial crisis has deepened the indebtedness of a large number of world countries characterized by fiscal and monetary expansive policies. By using simple past statistics, which proved the existence of a strong negative correlation between public debt and economic growth, he points out that economic growth is particularly slow if public debt exceeds 90% of GDP. This paper empirically shows the negative effects of debt on economic growth. Through a multi-step statistical analysis, it starts with a link between public debt and economic growth, using a regression equation:

$$\Delta y_t = \alpha + \beta DEBT_{t-1} + \varepsilon_t$$

Where  $\Delta y$  is the annual real GDP growth rate. The author uses past debt, noting that any change in debt causes a mechanical change in gross domestic product. By observing 4 debt models (debt below 30%, debt between 30% and 60%, debt between 60% and 90%, and debt over 90%), he confirms the negative correlation between GDP and public debt.

Melina *et al.* (2016) also show that economic policy makers face complex fiscal policy choices. Specifically, they apply the DIGNAR model (Debt, Investment, Growth, and Natural Resources) to analyze debt sustainability and impact on investment components in countries rich in natural resources.

Numerous authors analyze fiscal sustainability, focusing on debt sustainability in transition economies (Borgersen and King, 2013), sustainability and the double deficit problem (Neaime, 2015; Janković, 2015; Despotović and Durkalić, 2017). There is also a number of authors who analyze the debt of the European Union countries (Hallett and Lewis, 2007; Leith and Wren-Lewis, 2011; Teică, 2012; Zhang, 2014; Adam, 2015; Bergman *et al.*, 2016 and others).

Coccia (2017) observes the evolution of public debt and deficit of countries within two time horizons: before and after monetary unification (monetary unification refers to the creation of a single currency market and the transition of the country to the European Monetary Union). In his analysis, he points to deteriorating public finances, measured by public debt and deficit, by observing the countries of the European Monetary Union (EMU) and the countries of the European Union that did not meet the criteria for entering the monetary union. He particularly points out that the EMU countries applied an expansive borrowing policy instead of a savings program that could improve economic growth on the long term.

Literature review has produced the idea to analyze public finances, especially public debt, in countries already studied by the aforementioned authors. Since no author has been found to analyze the European Union candidate countries, which

poses a particular challenge for the member states, the analysis will further focus on the comparative overview and the analytical framework of the three groups of countries: (1) members of the European Union which do not use the euro, (2) EU member states that have entered the Eurozone, and (3) European Union candidate countries.

## 2. Debt indicators

Debt analysis of countries has a long history. This is best demonstrated by the fact that in 1951, the World Bank established a system for analyzing and presenting data on the debt of countries. Publications on the significance and problems of external debt were particularly evident during the 1980s debt crisis (World Bank, 2014). Bearing in mind the importance of borrowing issues in contemporary macroeconomics, there are many criteria and indicators that measure debt levels of individual economies. One of the criteria is the World Bank's criterion according to which the country is considered highly indebted if its external debt exceeds 80% of GDP and 220% of exports of goods and services. Another criterion, from the point of view of joining the European Monetary Union and the Maastricht criteria, is high indebtedness of a country if the public debt exceeds 60% of its gross domestic product.

Debt sustainability assessment relies on indicators that measure debt and debt servicing, most often in relation to GDP, exports, or public revenues. The general debt sustainability equation can be expressed as (TFFS, 2011):

$$\text{Debt indicator} = \frac{\text{Indebtedness}}{\text{Repayment capacity}}$$

Debt indicators can generally be divided into debt balance indicators and debt flow indicators. The first group of indicators mainly looks at (public or external) debt ratio in relation to GDP, exports, or public revenues, while the second group of debt indicators relates to debt servicing and repayment periods. Also, there is a division of debt indicators into solvency indicators and liquidity indicators. Basically, these two indicators are most often used to measure external liquidity and external solvency. Some of the most common criteria used in the methodology of measuring indebtedness by the IMF and the World Bank are:

- Debt to export ratio
- Debt to GDP ratio
- Average interest rate on external debt
- Average maturity of debt
- Currency structure of debt.

The most comprehensive database on debt and debt sustainability has been established by the World Bank in cooperation with the International Monetary Fund.

This database is of recent date, so analysis cannot be performed for a longer period of time. In particular, there is a shortcoming with the European Union data not shown in the International Debt Statistics, but data for all countries can be found in Quarterly External Debt Database. Some of the indicators are: External debt (% of gross national income), Concession debt (% of total external debt), Debt repayment to external debt (% of gross national income), Total reserves (% of total external debt), External debt stocks (% of exports of goods, services and primary income), Total debt servicing (% of exports of goods, services and primary income), Foreign debt (% of goods, services and primary income), Multilateral debt (% of total external debt) etc.

Regarding the countries of the European Union, the European Central Bank maintains Government Finance Statistics, with this integrated entity also facing a complex indebtedness problem estimated at over 90% of debt in relation to GDP (2016). The indicators followed by the EU are similar to those calculated by the World Bank and the IMF, and they are (Eurostat, 2017):

- total government revenue
- total government expenditure
- balance of the state, i.e. surplus or deficit of the budget
- transactions with financial assets and liabilities and
- other changes in assets and liabilities
- public debt as % of GDP
- servicing debt as % of GDP

Most authors who analysed public debt in Europe used the basic indebtedness indicator according to the Maastricht criteria – General government gross debt as a % of GDP (Coccia, 2017). Some authors have analysed extended fiscal position through next indicators (Neaime, 2015): government revenues and expenditures, budget balance, Total public debt, Debt as a % GDP, Budget balance as a % GDP). However, deep debt analysis include numerous indicators from different statistic databases.

### **3. Empirical analysis of public and external debt sustainability following the example of three groups of countries**

The paper will further investigate public debt, external debt, and their sustainability in three groups of countries. These are European Union candidates, countries that have not yet joined the European Monetary Union, and member countries of the European Monetary Union. Therefore, the emphasis is on a group of countries and its analysis, so the focus of the analysis is not on each country individually out of 34 observed, but on how much each group of countries meets certain debt criteria. For ease of reference and interpretation, EU candidate countries will be marked as CEU, the countries of the European Union which are not in the monetary union as NEMU, and countries that have given up their monetary

sovereignty and fulfilled the conditions for membership will be marked as EMU.

The time span for observing international debt statistics indicators will be limited to the period from 2004 to 2016, with a note if data is not available for some countries.

**Table 1. Structure of the sample**

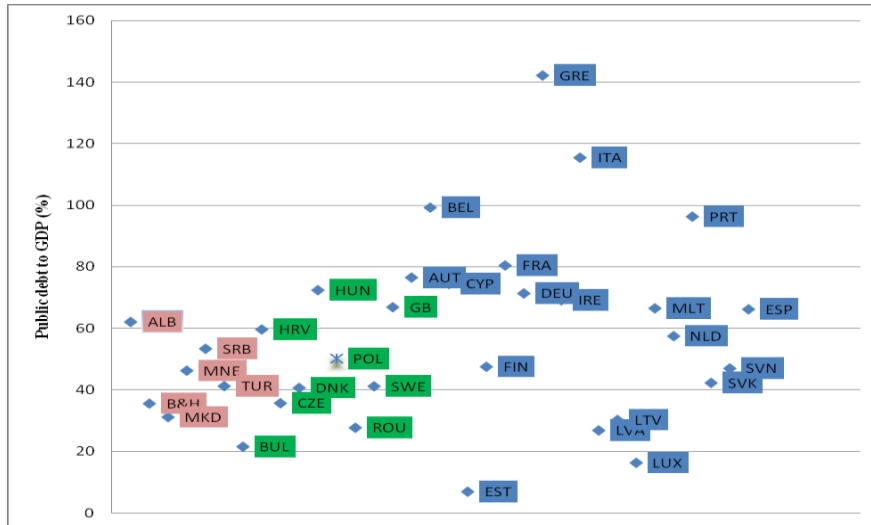
| Observed countries  | group of | Short name | Countries   |
|---|----------|------------|---|
| European Union member states  |          | EMU        | Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain |
| EU member countries that are not members of the European Monetary Union |          | NEMU       | Bulgaria, Croatia, Czech Republic, Denmark, Hungary, Poland, Romania, Sweden, and United Kingdom  |
| Candidate countries for membership in the European Union                |          | CEU        | Albania, Macedonia, Montenegro, Serbia, Turkey, and Bosnia and Herzegovina  |

*Source:* authors' calculation.

The sample covers a period of 13 years and 34 countries observed. Out of the total number of countries, 19 countries gave up at their monetary sovereignty and use euro currency, 9 countries are members of the European Union without membership in the European Monetary Union, and 6 countries are candidates and potential candidates for membership in the European Union. The structure of the sample is shown in Table 1.

The basic parameter of indebtedness will be the convergence criterion for membership in the European Monetary Union, according to which the country can become a member of the EMU if, in addition to other criteria, it fulfils the criterion of public debt as % of GDP (less than 60%).

For a clearer picture of indebtedness, arithmetic mean of public debt and GDP ratio in the period 2004-2016 is first shown. It is evident who the biggest “debtors” in the past thirteen-year period were. It is surprising that Figure 1 is, by debt level, dominated by the countries that were supposed to meet and maintain this criterion after entering the EMU. However, the situation is just the opposite, so the countries with the highest debt and GDP ratio include Greece, as expected, followed by Italy, Belgium, and Portugal. Also, within this group of countries (EMU), most countries, other than the Baltic countries, Slovenia, Slovakia, Finland, and Luxembourg, cross the threshold of 60%.

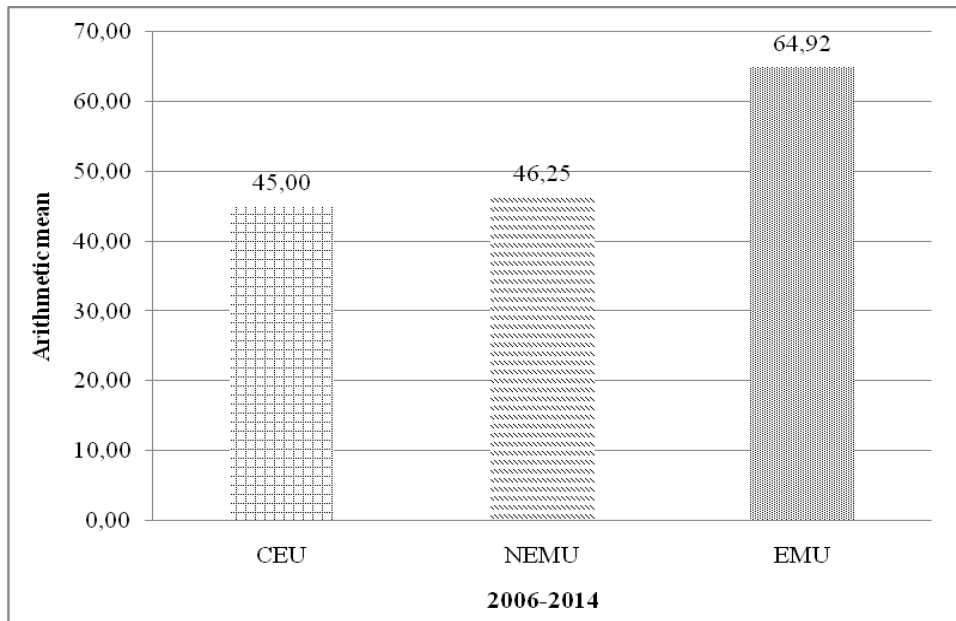
**Figure 1. Arithmetic mean of public debt (% of GDP) 2004-2016**

Source: Authors' calculation, based on IMF and Eurostat data.

It is interesting that candidate countries are in the best position when it comes to arithmetic mean of debt. A similar situation exists with NEMU countries that also take into account the debt criteria set out in the Maastricht Treaty. Based on the statistics already presented, the conclusion could be that EU and EMU candidate countries (countries marked as NEMU and CEU) are more focused on fulfilling the debt criteria than countries that have already joined the European Monetary Union.

If one observed the arithmetic mean of public debt as a percentage of GDP, as the most commonly used indebtedness measure, the situation would be surprising. The countries of the European Monetary Union which met the convergence criteria and became members of monetary union during the period 2006-2014, in particular, had the largest share of public debt within the three observed groups of countries. It is interesting that the European Union candidate countries are those that keep public debt within the allowed frames.



**Figure 2. Arithmetic mean of public debt as % of GDP**

Source: authors' calculation, based on IMF and Eurostat data.

Please note once more that the focus is on a group of countries. When talking about the high public debt of the European Union countries, the first association is Greece and Italy. However, Greece is not the sole culprit for the European debt problem, since, if Greece was omitted from the analysis, the average value of debt and GDP ratio would be 60.63% for the same period. If Italy and Belgium were also excluded, this ratio would be 54.77%, and only then would these countries fit into the Maastricht criterion. On the other hand, the EU countries that do not use euro and candidate countries are in similar positions, and this ratio is about 45% there, with the European Union candidate countries recording a better position at the group level.

### 3.1. Robustness check

One of the first steps in the One-way ANOVA test is to test the assumption of homogeneity of variance, where null hypothesis assumes no difference between the K group's variances. One method is the Barlett's test for homogeneity of variance (this test is very sensitive to non-normality).

The Levene's F Test for Equality of Variances, which is the most commonly used statistic (and is provided in SPSS), is used to test the assumption of

homogeneity of variance. Levene's test uses the level of significance set a priori for the ANOVA (e.g.,  $\alpha=0,05$ ) to test the assumption of homogeneity of variance.

**Table 2. Test of homogeneity of variances**

| $\phi$           |     |     |       |
|------------------|-----|-----|-------|
| Levene Statistic | df1 | df2 | Sig.  |
| 1,047            | 2   | 31  | 0,363 |

Source: authors' calculation.

For the score variable (shown above), the F value for Levene's test is 1,047 with a Sig. (p) value of 0,363. Because the Sig. value is greater than our alpha of 0,05 ( $p>0,05$ ), we retain the null hypothesis (no difference) for the assumption of homogeneity of variance and conclude that there is not a significant difference between the three group's variances. That is, the assumption of homogeneity of variance is met.

An alpha level of 0,05 was used for all analyses. The test for homogeneity of variance was not significant [Levene  $F(2, 31) = 1,047, p > 0,05$ ] indicating that this assumption underlying the application of ANOVA was met. The one way ANOVA of standardized test score revealed a statistically significant main effect [ $F(2, 31) = 0,677, p > 0,01$ ] indicating that all three groups of the methods resulted in the same standardized test score.

**Table 3. Anova**

| $\phi$ difference rank |                |    |             |      |      |
|------------------------|----------------|----|-------------|------|------|
|                        | Sum of Squares | df | Mean Square | F    | Sig. |
| Between Groups         | 34,827         | 2  | 17,413      | ,677 | ,515 |
| Within Groups          | 797,279        | 31 | 25,719      |      |      |
| Total                  | 832,106        | 33 |             |      |      |

Source: authors' calculation.

### 3.2. Coverage of public debt by foreign direct investment

Since public debt coverage by an increase in tax revenues is unpopular and extremely impractical, alternative solutions must be available to cover debt. One of the practical solutions most commonly cited as a method for covering the public debt is foreign direct investment. Considering the generally well-known view that attracting foreign direct investment contributes to economic growth and development, the importance of this economic phenomenon is clear. The direct effects of foreign direct investment are reflected in the growth of employment. Both rich and poor countries want growth of investment, so the inflow of FDI is especially important for countries with poor capital, because their domestic sources are not

enough to provide it. In this regard, the use of foreign direct investment represents the achievement of long-term development goals of all countries, since both developed and underdeveloped countries have the tendency to attract foreign capital. On this basis, it is possible to investigate the amount of foreign direct investment that can cover public debt.

Observing the inflow of foreign direct investment as a share of public debt, it is possible to analyse the coverage of public debt by foreign direct investment. The budget deficit is most often covered by borrowing, which requires finding ways to cover deficit and debt. In the analysis of the ratio of foreign direct investment and public debt, these two variables are considered as % of GDP due to the ease of calculation and data availability. By setting the ratio of foreign direct investment inflows as a % of GDP and the previously mentioned public debt as % of GDP, the extent to which foreign direct investment can cover public debt in the groups of countries observed can be seen. The analysis includes three observation periods, 2005, 2010, and 2015.

Table 4 shows the coverage of public debt by the inflow of foreign direct investment by individual countries. Within the EMU group, this ratio is positive and high particularly in those countries that do not have high public debt, such as Luxembourg, Malta, Estonia, Cyprus, Ireland. However, in the case of Estonia, in 2015, investment significantly fell and even recorded a negative level in relation to the GDP, which, due to low debt, does not present a significant problem. The already highly indebted countries, Greece, Italy, and Portugal, have an estimated ratio of around 0%, which means that, in addition to high debt, they cannot attract foreign capital, and therefore, must find alternative solutions. In general, the summary for this group of countries is the decline in FDI (% of GDP) in relation to public debt (% of GDP) in the period 2005-2015, which points to the fact that foreign investors were less interested in highly indebted economies. Only Luxembourg retained a high positive coefficient.

**Table 4. Coverage of public debt by foreign direct investment (% of GDP)**

|            | EMU  |      |      | NEMU       |      |      | CEU  |                |      |     |     |
|------------|------|------|------|------------|------|------|------|----------------|------|-----|-----|
|            | 2005 | 2010 | 2015 | 2005       | 2010 | 2015 | 2005 | 2010           | 2015 |     |     |
| <b>AUT</b> | 38%  | -7%  | 1%   | <b>BUL</b> | 48%  | 17%  | 14%  | <b>AL</b>      | 6%   | 16% | 12% |
| <b>BEL</b> | 9%   | 23%  | -4%  | <b>HRV</b> | 10%  | 4%   | 0%   | <b>B&amp;H</b> | 22%  | 6%  | 4%  |
| <b>CYP</b> | 10%  | 94%  | 38%  | <b>CZE</b> | 30%  | 13%  | 3%   | <b>MKD</b>     | 6%   | 13% | 8%  |
| <b>EST</b> | 491% | 203% | -30% | <b>DNK</b> | 13%  | -9%  | 1%   | <b>MNE</b>     | 61%  | 45% | 26% |
| <b>FIN</b> | 13%  | 10%  | 12%  | <b>HUN</b> | 12%  | -20% | -3%  | <b>SRB</b>     | 11%  | 10% | 8%  |
| <b>FRA</b> | 6%   | 2%   | 2%   | <b>POL</b> | 8%   | 7%   | 6%   | <b>TUR</b>     | 4%   | 3%  | 7%  |
| <b>DEU</b> | 3%   | 3%   | 2%   | <b>ROU</b> | 37%  | 6%   | 6%   | <b>Mean</b>    | 18%  | 16% | 11% |

|             |      |      |      |             |     |    |    |
|-------------|------|------|------|-------------|-----|----|----|
| <b>GRE</b>  | 0%   | 0%   | 0%   | <b>SWE</b>  | 11% | 0% | 8% |
| <b>IRL</b>  | 85%  | 20%  | 91%  | <b>GB</b>   | 25% | 4% | 2% |
| <b>ITA</b>  | 1%   | 0%   | 1%   | <b>Mean</b> | 22% | 3% | 4% |
| <b>LVA</b>  | 43%  | 5%   | 8%   |             |     |    |    |
| <b>LTV</b>  | 18%  | 6%   | 6%   |             |     |    |    |
| <b>LUX</b>  | 168% | 372% | 198% |             |     |    |    |
| <b>MLT</b>  | 487% | 156% | 40%  |             |     |    |    |
| <b>NLD</b>  | 63%  | 23%  | 21%  |             |     |    |    |
| <b>PRT</b>  | 4%   | 4%   | 0%   |             |     |    |    |
| <b>SVK</b>  | 18%  | 6%   | 2%   |             |     |    |    |
| <b>SVN</b>  | 10%  | 2%   | 5%   |             |     |    |    |
| <b>ESP</b>  | 5%   | 5%   | 2%   |             |     |    |    |
| <b>Mean</b> | 77%  | 49%  | 21%  |             |     |    |    |

*Source:* authors' calculation, based on IMF and Eurostat data.

On the other hand, the group of NEMU countries, as a less indebted group of countries compared to the previous one, records no significant effects on debt coverage through foreign direct investment. At the beginning of the observed period, in almost all countries observed, debt coverage by foreign direct investment amounted to over 10% of GDP, which, given low debt and significant inflows in Romania, the Czech Republic, and Bulgaria, contributed to an average value of 22% in all countries in 2005. However, these values dropped significantly in 2010, and even reached a negative rate in Hungary, where public debt was significantly higher than the inflow of foreign capital expressed as % of GDP. In this group of countries, in 2015, there was a slight increase in this ratio, mainly due to the reduced debt in Hungary and the increase in this share in Sweden. In general, by observing this group of countries, there has been a significant change in debt coverage by foreign direct investment expressed as % of GDP.

The third group of countries surveyed, the EU member candidates, initially had a low inflow of foreign capital as a percentage of GDP, and these countries face high debt and low investment. Since these are countries in the transition period, it is necessary to develop optimistic strategies for the inflow of foreign direct investment. Of all the observed countries, Montenegro is significantly ahead of others according to the FDI/DEBT ratio expressed as % of gross domestic product. However, unlike the drastic differences in other groups of countries in this ratio in the period 2005-2015, it has not changed significantly in this group of countries.

### 3.3. Ratio of public revenues and public debt

Public revenues are also important in terms of debt coverage. In fact, the extent to which debt will be covered depends on taxes and spending. Given that these are sensitive social categories, equality and fairness in tax collection rates, as well as careful decision-making on increasing or decreasing public spending are essential. Public revenues are a very important category of the budget of each state, making it compulsory to compare public debt and public revenues. The same as in the previous chapter, here, one takes into account the public debt of countries expressed as a percentage of GDP and public revenues as a percentage of GDP in order to adequately compare the results. The results are shown in Table 5.

**Table 5. Coverage of public debt with public revenues (% of GDP)**

|             | EMU         |             |            | NEMU        |             |             | CEU        |                |            |            |            |
|-------------|-------------|-------------|------------|-------------|-------------|-------------|------------|----------------|------------|------------|------------|
|             | 2005        | 2010        | 2015       | 2005        | 2010        | 2015        | 2005       | 2010           | 2015       |            |            |
| <b>AUT</b>  | 75%         | 59%         | 59%        | <b>BUL</b>  | 96%         | 219%        | 136%       | <b>AL</b>      | 43%        | 45%        | 36%        |
| <b>BEL</b>  | 51%         | 49%         | 48%        | <b>HRV</b>  | 105%        | 72%         | 50%        | <b>B&amp;H</b> | 178%       | 106%       | 98%        |
| <b>CYP</b>  | 54%         | 66%         | 36%        | <b>CZE</b>  | 139%        | 101%        | 103%       | <b>MKD</b>     | 100%       | 125%       | 76%        |
| <b>EST</b>  | 702%        | 619%        | 410%       | <b>DNK</b>  | 125%        | 127%        | 118%       | <b>MNE</b>     | 90%        | 103%       | 61%        |
| <b>FIN</b>  | 118%        | 111%        | 88%        | <b>HUN</b>  | 72%         | 56%         | 65%        | <b>SRB</b>     | 66%        | 91%        | 53%        |
| <b>FRA</b>  | 75%         | 61%         | 56%        | <b>POL</b>  | 85%         | 71%         | 76%        | <b>TUR</b>     | 52%        | 79%        | 112%       |
| <b>DEU</b>  | 66%         | 53%         | 63%        | <b>ROU</b>  | 142%        | 103%        | 83%        | <b>Mean</b>    | <b>88%</b> | <b>91%</b> | <b>73%</b> |
| <b>GRE</b>  | 38%         | 28%         | 27%        | <b>SWE</b>  | 109%        | 136%        | 113%       |                |            |            |            |
| <b>IRL</b>  | 122%        | 38%         | 35%        | <b>GB</b>   | 89%         | 47%         | 40%        |                |            |            |            |
| <b>ITA</b>  | 43%         | 40%         | 36%        | <b>Mean</b> | <b>107%</b> | <b>104%</b> | <b>87%</b> |                |            |            |            |
| <b>LVA</b>  | 235%        | 91%         | 104%       |             |             |             |            |                |            |            |            |
| <b>LTV</b>  | 164%        | 95%         | 80%        |             |             |             |            |                |            |            |            |
| <b>LUX</b>  | 587%        | 220%        | 199%       |             |             |             |            |                |            |            |            |
| <b>MLT</b>  | 53%         | 56%         | 66%        |             |             |             |            |                |            |            |            |
| <b>NLD</b>  | 84%         | 73%         | 66%        |             |             |             |            |                |            |            |            |
| <b>PRT</b>  | 71%         | 42%         | 34%        |             |             |             |            |                |            |            |            |
| <b>SVK</b>  | 87%         | 85%         | 81%        |             |             |             |            |                |            |            |            |
| <b>SVN</b>  | 151%        | 107%        | 49%        |             |             |             |            |                |            |            |            |
| <b>ESP</b>  | 85%         | 60%         | 39%        |             |             |             |            |                |            |            |            |
| <b>Mean</b> | <b>151%</b> | <b>103%</b> | <b>83%</b> |             |             |             |            |                |            |            |            |

Source: authors' calculation, based on IMF and Eurostat data.

As shown in Table 5, it can be said that revenues in the group of EMU countries at the beginning of the observed period were sufficient and mainly covered debt. This ratio weakened over time and in 2015, there was less public revenue for

debt coverage, expressed as a percentage of GDP. This ratio decreased by almost the entire half, and, if looking at individual countries, Portugal, Spain, Slovenia, Ireland, Latvia, and Lithuania significantly reduced public revenues in relation to debt as % of GDP. In Greece, this ratio was the lowest since the beginning of the observed period, and reached 38% in 2005, while in 2015 it dropped to 27%, so it can be concluded that public revenues could not cover even half of debt. The countries where public revenues covered public debt fully (expressed as % of GDP) were Luxembourg, Latvia, and Estonia.

A similar situation is with another group of countries, when it comes to decline in the observed ratio. At the level of the NEMU group, public revenues (as a % of GDP) were enough to cover debt in 2005 and 2010, but in 2015 this share decreased. Although most countries reduced this ratio, public revenues in Bulgaria, the Czech Republic, Denmark, and Sweden exceeded the level of public debt as % of GDP. A significant drop in this rate was recorded in Great Britain, Romania, and Croatia, which also affected the average value of the ratio of public revenue (% of GDP) / public debt (% of GDP) to fall below 100% in 2015.

The over-indebtedness reflects negatively on the economy and triggers a drastic reduction of potential foreign investments. When it comes to the transition economies, less popular measures are often applied, in order to avoid the problem of indebtedness, such as: increasing tax rates; introduction of new taxes; temporary salary reduction in the public sector; pension reduction in the public pension fund.

A group of countries marked as CEU showed the lowest ratio of public revenues and public debt, with only one or two countries exceeding the level of 100%. Observing the beginning of the observed period, in 2005, Albania had the lowest public revenue that covered public debt, while Bosnia and Herzegovina and Macedonia had public revenues over the amount of debt shown as % of GDP. The situation was somewhat more favourable in all countries in 2010, but it worsened dramatically in 2015, when all countries decreased this ratio, with only Turkey achieving this ratio of more than 100% (112%).

### **3.4. Ranking of countries by external debt sustainability**

The objective of sustainability and high level of debt sustainability analysis by international institutions and organizations is not without a goal. In line with inter-temporal budget spending, the world and individual economies today are indebted more than ever before. This especially refers to foreign debts, which show the state and the flow of public and private sector debt. In this regard, the objective of external debt sustainability analysis is to assess the ability of a country to finance its political objectives and service debt resulting henceforth.

A key component of external debt analysis is an estimation of the country's external debt path over time. External debt sustainability analysis (DSA) is performed by the International Monetary Fund and the World Bank, accounting for

the entire evolution of debt. In order to calculate debt, they rely on the initial values of public and private debt, its maturity and manner, as well as regularity of debt servicing. In this regard, there are a number of indicators that can illustrate debt sustainability.

Based on external debt sustainability indicators, created by the IMF and the World Bank, this survey will use the following data to assess debt sustainability of the three observed groups of countries:

- 1) Share of external debt in GDP (%)
- 2) External debt to exports (%)
- 3) Share of public revenues in GDP (%)
- 4) Servicing debt to GDP (%)<sup>1</sup>
- 5) Share of total reserves in external debt (%)

**Table 6. Data sources**

|   | CEU   | NEMU   | EMU |
|---|---|--|-----|
| <b>External debt<br/>(in millions of<br/>USD)</b>                     | World Bank:<br>External debt<br>stocks, total<br>(DOD, current<br>US\$)   | World Bank: Quarterly external position: Q4<br>2014 Table C1 – Gross External Debt Position<br>(USD millions)                            |     |
| <b>GDP</b>  | UNCTAD: Data Center: GDP US dollars in current prices in<br>millions  |  |     |
| <b>Export</b>   | UNCTAD: Data Center: Exports US dollars current prices in<br>millions   |  |     |
| <b>Public revenues<br/>(% of GDP)</b>                                 | IMF: World Economic Outlook October 2016  |  |     |
| <b>Debt repayment<br/>(% GDP,%<br/>BNP)</b>                           | World Bank:<br>Total debt service<br>(% of GNI)   | European Central Bank: Statistical Data<br>Warehouse: Debt securities issuance and<br>service by EU governments, Debt service (%<br>GDP) |     |
| <b>Total reserves<br/>excluding gold<br/>(in millions of<br/>USD)</b> | IMF: Data: International Financial Statistics:<br><a href="http://data.imf.org/regular.aspx?key=60998126">http://data.imf.org/regular.aspx?key=60998126</a> |  |     |

*Source:* author representation.

<sup>1</sup> Due to the difference in data presentation in the European Union and other candidate countries, servicing debt to gross domestic product (GDP) ratio will be used for the countries of the European Union, while for other candidate countries, the World Bank publishes debt servicing indicator as a percentage of gross national product (GNP).

The indicators are calculated by using the available statistical data of the relevant organizations and institutions, and all data sources are used to obtain the above 5 ratios expressed in percentages. The obtained statistical data will be used in the next step of the analysis – ranking of data and ranking of individual countries or groups of countries. The *Visual Promethee* program will be used for data ranking.

The decision making process consists in selecting the available options which have the ultimate goal of achieving a desired state. The multi-criteria analysis is part of the decision-making theory. Most practical problems require that decision-making is carried out on the basis of a number of criteria, due to which a large number of methods have been developed. It is characteristic for all of them to contain certain subjectivities. These subjectivities are particularly expressed in the process of assigning the heading coefficients to the identified criteria. In order to make a good decision, it is important to define appropriate alternatives and criteria. Compared to others, the advantages of the Promethee and Gaia analysis are: simplicity of application; used parameters have their economic explanation and significance; the accompanying elements of ranking are completely eliminated.

Taking into account that the problem of national debt is the domain of multi-criteria analysis, a set of possible criteria must be reduced to one criterion in order to adequately compare data. Such a possibility for comparative analysis is provided by the PROMETHEE & GAIA methodology, developed by the Canadian company *Visual Decision* by Brans and Mareschal (1986). As an adequate method for solving multi-criteria problems, the PROMETHEE GAIA methodology aims to rank the final set of alternatives (in this case, countries) based on criteria to be maximized or minimized. In the case of this paper, the criteria are the five above mentioned ratios.

Ranking by using preferences is the most commonly used method in making multi-criteria decisions. For each alternative (country), the alternative value is expressed in preferences, which have a positive and negative flow. Based on the calculated preference, the net flow of preference that synthesizes all indicators is calculated, and, based on that, the given alternative (country) is ranked.

In this paper, the alternatives are the members of the three groups of countries. Ranking will be done according to 2014 data, since it is the last year for which all the data for these groups of countries is available. According to the given parameters, these countries are ranked on the basis of the mentioned external debt sustainability indicators, analysed in the previous chapter. The weight coefficients assigned to the criteria are equal, i.e. 20%, in order to avoid a subjective assessment of the significance of each of the indicators. Also, depending on the purpose of the preference function, the first two criteria will be minimized, while the remaining criteria will be maximized. The weight of the indicators are is shown in Table 7.



**Table 7. Weights of external debt indicators**

| Criterion label | Name of the criterion          | Weight coefficient | Direction of preference |
|-----------------|--------------------------------|--------------------|-------------------------|
| C <sub>1</sub>  | External debt / GDP            | 0,20               | min.                    |
| C <sub>2</sub>  | External Debt / Export         | 0,20               | min.                    |
| C <sub>3</sub>  | Public revenue / GDP           | 0,20               | max.                    |
| C <sub>4</sub>  | Debt Service / GDP (BNP)       | 0,20               | max.                    |
| C <sub>5</sub>  | Total reserves / External debt | 0,20               | max.                    |

*Source:* author representation.

Table 8 shows descriptive statistics for 34 countries that have been compared by using the given criteria. The maximum values of the C<sub>1</sub> and C<sub>2</sub> criteria pertaining to Luxembourg show significant deviations from the average values. Although Luxembourg does not have significant public debt problems, its external debt is huge and amounts to 5661% of gross domestic product, which represents a historical value that puts it on the top position in the world according to this indicator. It is the same with the ratio of external debt and exports, which amounts to as much as 19086%. Although a small country, Luxembourg has a very large number of financial institutions and small businesses, and the main cause of indebtedness is the private sector. Due to the high percentage values shown by Luxembourg, the average values for all countries observed are high.

**Table 8. Descriptive statistics of defined criteria and alternatives in the decision-making matrix**

|                      | C1     | C2      | C3    | C4    | C5    |
|----------------------|--------|---------|-------|-------|-------|
| <b>Minimum</b>       | 50     | 74      | 26,3  | 0,7   | 0     |
| <b>Maximum</b>       | 5661   | 19086   | 57,4  | 38,2  | 42    |
| <b>Average</b>       | 360,85 | 1313,85 | 41,76 | 16,09 | 13,35 |
| <b>Standard Dev.</b> | 949,24 | 3331,06 | 7,28  | 8,44  | 14,73 |

*Source:* authors' calculation by using Visual Promethee.

Furthermore, based on the analysis of the formation of preference functions and the net flow of preferences, the ranking of countries can already be carried out. First, the countries of the EMU group will be ranked. When one classifies groups of countries by economic integration, but also according to development and other indicators, they are divided into three groups of countries that were previously taken into consideration. After ranking countries by group, the final ranking of all analyzed countries follows (34). Upon synthesizing all five criteria for observing debt sustainability, the ranking of countries that are members of the European Monetary Union is shown in Table 9.

**Table 9. Ranking of EMU countries according to debt sustainability criteria in 2014**

|     | Ranking | Country | $\Phi$  | Phi+   | Phi-   |
|-----|---------|---------|---------|--------|--------|
| EMU | 1       | ITA     | 0,1802  | 0,2534 | 0,0733 |
|     | 2       | FRA     | 0,1741  | 0,2441 | 0,07   |
|     | 3       | BEL     | 0,1522  | 0,2226 | 0,0704 |
|     | 4       | ESP     | 0,0689  | 0,1715 | 0,1027 |
|     | 5       | FIN     | 0,0584  | 0,156  | 0,0976 |
|     | 6       | PRT     | 0,0391  | 0,1224 | 0,0834 |
|     | 7       | AUT     | 0,0182  | 0,1091 | 0,0909 |
|     | 8       | DEU     | 0,0054  | 0,093  | 0,0876 |
|     | 9       | SVN     | -0,0063 | 0,089  | 0,0953 |
|     | 10      | GRE     | -0,0162 | 0,0805 | 0,0967 |
|     | 11      | NLD     | -0,0412 | 0,0625 | 0,1037 |
|     | 12      | MLT     | -0,0604 | 0,0496 | 0,11   |
|     | 13      | EST     | -0,0756 | 0,0267 | 0,1022 |
|     | 14      | SVK     | -0,0898 | 0,0363 | 0,1261 |
|     | 15      | LTV     | -0,1287 | 0,0258 | 0,1545 |
|     | 16      | IRL     | -0,1606 | 0,0176 | 0,1783 |
|     | 17      | LVA     | -0,1887 | 0,0224 | 0,2111 |
|     | 18      | CYP     | -0,2395 | 0,0412 | 0,2807 |
|     | 19      | LUX     | -0,4192 | 0,1175 | 0,5367 |

*Source:* authors' calculation by using Visual Promethee.

Based on the positive and negative net flow of preferences, a synthesized indicator is formed in Table 9, reducing all the indicators to one value and in this way giving a general picture of debt sustainability in the EMU group. As noted in Table 9, Italy has the best ratio of debt liquidity and solvency, and thus holds the first position. After the top ranked Italy, the second and third positions belong to France and Belgium, which also have favorable foreign debt ratios. Interestingly, despite the mentioned crisis in Greece and the appearance of “Grexit”, Greece is on the 10<sup>th</sup> position among the observed 19 countries. Understandably, Luxembourg holds the last position, precisely because of the enormous external debt.

This is followed by the ranking of countries belonging to the European Union but not members of the European Monetary Union. Considering the positive and negative net flows of the observed 5 debt sustainability criteria, Hungary is the best ranked in this group of countries, followed by Denmark. Although they have a high share of external debt in GDP and exports, Denmark and Hungary have an adequate debt servicing ratio and total foreign currency reserves. The worst ranked country among the observed 9 countries is the United Kingdom, which also has a very high external debt of as much as 307% of GDP. In addition, the United Kingdom also has poor debt servicing in relation to GDP. The data on the NEMU group of countries is shown in Table 10.

**Table 10. Ranking of NEMU countries according to debt sustainability criteria in 2014**

|      | Ranking | Country | $\phi$  | Phi+   | Phi-   |
|------|---------|---------|---------|--------|--------|
| NEMU | 1       | HUN     | 0,2381  | 0,2457 | 0,0076 |
|      | 2       | DNK     | 0,1261  | 0,1787 | 0,0526 |
|      | 3       | HRV     | 0,1248  | 0,1566 | 0,0318 |
|      | 4       | CZE     | 0,1007  | 0,1653 | 0,0646 |
|      | 5       | SWE     | 0,0634  | 0,1299 | 0,0665 |
|      | 6       | POL     | 0,05    | 0,1187 | 0,0687 |
|      | 7       | ROU     | 0,0178  | 0,144  | 0,1262 |
|      | 8       | BUL     | 0,0026  | 0,1447 | 0,142  |
|      | 9       | GB      | -0,1143 | 0,0349 | 0,1492 |

*Source:* authors' calculation by using Visual Promethee.

What remains is the ranking of candidate countries and potential candidates for joining the European Union. Of the six countries observed, only Bosnia and Herzegovina is a potential candidate, while the other five countries have candidate status. However, when it comes to external debt sustainability, Serbia is the best ranked country within the CEU group of countries, as it has shown a favorable debt servicing coefficient. Right next to Serbia, Bosnia and Herzegovina is second. Although all CEU countries have the share of external debt in GDP below 70%, Albania's debt servicing is the worst and it holds the last, sixth position.

According to the parameter of the external debt sustainability, among the candidate countries, the best positioning is held by the Republic of Serbia, with the coefficient of servicing the external debt of 0.1387. This result has, to a certain extent, influenced the stability and efficiency of the monetary and fiscal system.

**Table 11. Ranking of CEU countries according to debt sustainability criteria in 2014**

|     | Ranking | Country | $\phi$  | Phi+   | Phi-   |
|-----|---------|---------|---------|--------|--------|
| CEU | 1       | SRB     | 0,1387  | 0,1823 | 0,0436 |
|     | 2       | BiH     | 0,0965  | 0,1664 | 0,0698 |
|     | 3       | MNE     | 0,0373  | 0,124  | 0,0867 |
|     | 4       | TUR     | -0,005  | 0,1104 | 0,1154 |
|     | 5       | MKD     | -0,0483 | 0,1435 | 0,1918 |
|     | 6       | AL      | -0,0986 | 0,1341 | 0,2327 |

*Source:* authors' calculation by using Visual Promethee.

By analyzing the groups of European Union countries by membership and categorization, the final ranking and grouping of all three groups of countries into one whole can now be carried out. The goal of group ranking is to determine the ranking of countries within the European Union and to compare their external debt sustainability criteria with candidate countries and potential candidates for membership in the economic union.

**Table 12. Ranking of EMU, NEMU, and CEU countries according to debt sustainability criteria in 2014**

| Ranking | Country    | $\phi$ | Phi+   | Phi-   | Ranking | Country    | $\phi$  | Phi+   | Phi-   |
|---------|------------|--------|--------|--------|---------|------------|---------|--------|--------|
| 1       | <u>HUN</u> | 0,2381 | 0,2457 | 0,0076 | 18      | DEU        | 0,0054  | 0,093  | 0,0876 |
| 2       | ITA        | 0,1802 | 0,2534 | 0,0733 | 19      | <u>BUL</u> | 0,0026  | 0,1447 | 0,142  |
| 3       | FRA        | 0,1741 | 0,2441 | 0,07   | 20      | <b>TUR</b> | -0,005  | 0,1104 | 0,1154 |
| 4       | BEL        | 0,1522 | 0,2226 | 0,0704 | 21      | SVN        | -0,0063 | 0,089  | 0,0953 |
| 5       | <b>SRB</b> | 0,1387 | 0,1823 | 0,0436 | 22      | GRE        | -0,0162 | 0,0805 | 0,0967 |
| 6       | <u>DNK</u> | 0,1261 | 0,1787 | 0,0526 | 23      | NLD        | -0,0412 | 0,0625 | 0,1037 |
| 7       | <u>HRV</u> | 0,1248 | 0,1566 | 0,0318 | 24      | <b>MKD</b> | -0,0483 | 0,1435 | 0,1918 |
| 8       | <u>CZE</u> | 0,1007 | 0,1653 | 0,0646 | 25      | MLT        | -0,0604 | 0,0496 | 0,11   |
| 9       | <b>BiH</b> | 0,0965 | 0,1664 | 0,0698 | 26      | EST        | -0,0756 | 0,0267 | 0,1022 |
| 10      | ESP        | 0,0689 | 0,1715 | 0,1027 | 27      | SVK        | -0,0898 | 0,0363 | 0,1261 |
| 11      | <u>SWE</u> | 0,0634 | 0,1299 | 0,0665 | 28      | <b>AL</b>  | -0,0986 | 0,1341 | 0,2327 |
| 12      | FIN        | 0,0584 | 0,156  | 0,0976 | 29      | <u>GB</u>  | -0,1143 | 0,0349 | 0,1492 |
| 13      | <u>POL</u> | 0,05   | 0,1187 | 0,0687 | 30      | LTV        | -0,1287 | 0,0258 | 0,1545 |
| 14      | PRT        | 0,0391 | 0,1224 | 0,0834 | 31      | IRL        | -0,1606 | 0,0176 | 0,1783 |
| 15      | <b>MNE</b> | 0,0373 | 0,124  | 0,0867 | 32      | LVA        | -0,1887 | 0,0224 | 0,2111 |
| 16      | AUT        | 0,0182 | 0,1091 | 0,0909 | 33      | CYP        | -0,2395 | 0,0412 | 0,2807 |
| 17      | <u>ROU</u> | 0,0178 | 0,144  | 0,1262 | 34      | LUX        | -0,4192 | 0,1175 | 0,5367 |

Source: authors' calculation by using Visual Promethee.

Finally, the set of criteria and alternatives obtained (countries) are shown in Table 12. According to the net flows of preferences and the five criteria, of all 34 countries, Hungary is ranked the highest. Italy and France are positioned immediately after Hungary. Of all the observed countries, Luxembourg still holds the most undesirable position – the last one. Among the worst ranked countries are Cyprus and Latvia. What is the most interesting are the 10 best-ranked countries. Looking closely, out of the 10 first-ranked countries, four belong to the NEMU group and two belong to groups of candidate countries – CEU. The results show that only the remaining four countries of the 10 first-ranked ones belong to EMU. This can

point to a very important situation and set an enigma as to the real effectiveness of the renunciation of the sovereignty of one's national currency and the use of euro.

Does the fiscal data of the European Monetary Union countries show poorer parameters in relation to non-EMU countries? Is the monetary union a solution for the future and does a monetary union disturb fiscal parameters? In addition to the candidate countries being ranked among the 10, the focus is on the external debt sustainability criterion. These countries are generally not yet fully prepared for membership in the highest monetary union, although perhaps, by fiscal indicators, some show satisfactory parameters.

#### **4. Recommendations for economic policy in the future**

The issue of indebtedness and sustainability of fiscal parameters is a widespread topic, of interest to an increasing number of researchers, scientists, and economic policy makers. Excessive government spending in relation to production can lead and led to the serious problem of states' functioning in the past. If spending is greater than production, then the state borrows beyond its own borders, which creates a long-term unsustainable problem. The problem that arises then does not only concern fiscal policy, but also the wider economic framework of the whole country: from financial market disturbances, current account deficits, employment problems, inflation, and, ultimately, the overall economic development of a country. The situation is even more complex given the existence of economic integration in the country and the world. Then, the problem of indebtedness is not confined to only one country and one nation, but to the whole region to which it is economically connected. For this reason, it is necessary to find alternative solutions, when it comes to debt servicing and debt financing. In general, it is necessary to develop debt management strategies.

Financial inflows have had very important roles in historical development. Given that three alternative ways of financing spending are tax increases, money printing and borrowing, the question of the best solution for one economy arises (Drakos, 2001). Given the enormous debt problem in the world, the question revolves around what policy effect would be mutually beneficial to all parties and solve the problem of over-spending and insufficient and inadequate production.

When debt problems cross borders, debt reduction strategies become a necessity. In order to prevent the problems of moratorium and bankruptcy, there are a number of proposals to ease the debt crisis. The basic solution to the problem is seen in the strengthening of economic growth. In that sense, Soukiazis *et al.* (2017) highlight a series of proposals for economic policy-making, aimed at economic growth:

- Fiscal policy towards a friendlier taxation policy
- Equilibrium of budget policy
- Reducing financial cost (for example foreign interest rate)

- Relative prices neutral
- External equilibrium and constant relative prices
- Reducing the import sensitivity of exports
- External balance and less dependence of exports on imports.

Debt analysis and the successful policy of higher growth to cover public debt most often relate to the external sector. It is necessary to create a competitive economy, orient towards exports, increase trade revenues, and reduce import dependency.

European economic policy today is increasingly turning to a budget rule, where high taxes try to solve the problem of debt financing. However, debt should be viewed from the perspective of the private and public sectors. There is also a divergence of debt among countries. For this reason, it is necessary to define a long-term sustainable debt policy. Author Coccia (2017) suggested to redesign the socioeconomic environment in order to eliminate the basic conditions that cause debt problems considering the specificity of countries, thus enabling the European society and institutions involved to do better in the future than the best they can do today.

Also, some authors point out that the monetization of debt within the European Union will not create an inflation problem (Neaime, 2015a). Authors pointed out that euro currency printing by the ECB will most likely not lead to more money in circulation in the real sector and, subsequently, will not cause inflation rates to increase.

According to the experience of developing countries that met various ways to tackle debt crisis, Borrowing was the means of financing the economy. Nevertheless, the key issue in terms of borrowing is the way of using borrowed funds. If funds are used for productive purposes, the debt will pay itself off. However, if the increase in production is not sufficient to cover the loan interest and principal, borrowing is not a good solution for the economy. If a loan is used to finance spending, the economy is in a serious debt spillover problem, because debt and interest increase without any productive effect.

## **Conclusions**

In contemporary economic trends and with the emergence of economic integration, it can be freely said that indebtedness is a chronic problem of the world economy. Improving the quality of public finances today is a strategy for the permanent implementation of the fiscal policy of countries. It is shown that the analysis of indebtedness is always a current topic by the presented situation in which none of the observed countries is without debt. Thus, absolutely all countries are indebted.

Based on previous debt experience, it can be pointed out that the problem of indebtedness is present in almost all socio-economic formations. From the transfer of the debt burden to future generations, inter-temporal budget constraints, and other

issues, the phenomenon of debt is always and constantly present. In order to anticipate and prevent the enormous consequences of the debt crisis, leading monetary and economic institutions, such as the International Monetary Fund and the World Bank, have developed debt indicators. In particular, the difference between liquidity and solvency indicators in terms of debt is observed.

The empirical analysis presented shows a situation in which there is no country without debt and there is no production and spending without indebtedness. The difference is only in the level and way of covering that debt. In this paper, debt coverage is shown as a ratio of debt and foreign direct investment and public revenues. According to these indicators, observed at an average value, the EMU countries have the best coverage of public debt. However, considering external debt sustainability, the situation is quite the opposite; those countries that have shown good public debt coverage have the poorest external debt sustainability performance. This will point to the conclusion that these countries have developed a financial and private sector that generates more loans than the state does. This situation confirms the hypothesis set at the beginning of the survey, which indicates that members of the monetary union show poorer performance of external debt sustainability.

This research paper represents an adequate theoretical, scientific, and social contribution to debt management, pointing in particular to countries' indebtedness. Including the theoretical framework, it first shows the historical development and the emergence of debt in countries. Using debt indicators today and the availability of data, the scientific contribution is reflected in the statistical ranking of countries and the determination of debt sustainability of individual countries. Other papers did not include a comprehensive analysis of all EU countries and potential EU candidates, which reflects the advantage of this paper. This contributes, in a unique way, to new knowledge of the state, trends, and solutions to the problem of indebtedness.

Taking into consideration the presented statistics, it is obvious that the EU and EMU candidate countries (countries marked as NEMU and CEU) pay more attention to fulfilling debt criteria than countries which are already EU members. There are no significant differences between EU countries and candidate countries in terms of debt and GDP ratio. It also indicates that candidate countries record a better position at the group level.

The results of this study indicate the necessity of sustaining public debt within acceptable limits, which is the risk of consequences in case of over-indebtedness. Also, they present instructions for the sustainability of public debt which can be used in different systems. The over-indebtedness of the state, which consists in foreign and domestic debt, reflects negatively on its economy and affects a drastic reduction of potential foreign investments. In the transition economies, less popular measures are often applied in order to avoid the problem of indebtedness, such as: increasing tax rates; introduction of new taxes; temporary salaries reduction in the public sector; pension reduction in the public pension fund.

Future research can focus on conflicting economic situations. Therefore, future research questions can focus on an economic category or more, which may provide an answer as to why the debt side of one country shows the worst performance, and on the other hand, the productive side shows the best performance. Perhaps the answer is precisely in the use of debt-based funds. By incorporating the basic parameters of economic development in future research, a concrete answer to this question could be obtained. Also, one of the important statistical indicators that relates to the economic strength of one country is net international investment position (NIP to GDP). Future research could include this indicator, which compares financial assets, on the one hand, and liabilities of one country, on the other.

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