CLASSIFICATION OF EUROPEAN UNION COUNTRIES ACCORDING TO NATIONAL COMPETITIVENESS AND SOVEREIGN DEBT LEVELS

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Abstract

National competitiveness is defined by World Economic Forum as "the set of institutions, policies, and factors that determine the level of productivity of a country". Therefore, the competitiveness of the European Union member states will be analyzed in the context of the governments' economic policies implemented in the previous period that had as main effects an increased public debt and an exposure of European Union to sovereign debt crisis. This paper attempts to examine how public debt takes its toll on the competitiveness of the EU member countries. So, the researchers will explore the strength of the connection between the percentage of public debt in GDP and the national competitiveness, aiming to a further segmentation of the European Union member countries according to the results.

1. Literature review

Term "competitiveness" derives basically from competition; that is why, over time, the idea of national competitiveness lead to a series of reactions, both favorable and unfavorable. Currently, national competitiveness is seen as a major objective of any State, thus different studies and international organizations are deeply analyzing it and they are developing

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detailed hierarchies. The most established reports about national competitiveness belong to the international organization World Economic Forum, which annually publishes the Global Competitiveness Index for 139 economies.

There is not a unified definition of the term national competitiveness, and its influence factors are continuously expanding, as globalization deepens. So, the most common word used to define the competitiveness is "elusive". The word was first use by Krugman in 1994: "The bottom line for corporation is literally its bottom line: if a corporation cannot afford to pay its workers, suppliers and bondholders it will go out of business. Countries have no well define bottom line. As a result, the concept of national competitiveness is elusive". (Marginean, 2006)

The same Paul Krugman (1994) names competitiveness "a dangerous obsession". "Competitiveness is a meaningless word when applied to national economies. And the obsession with competitiveness is both wrong and dangerous". Trying to define the competitiveness of a nation is much more problematic than defining that of a corporation, and the national competitiveness objective can give rise to some risks, namely:

> ➢ the wasteful spending of government money supposedly to enhance competitiveness;
> ➢ a more serious risk is that the obsession with competitiveness will lead to protectionism and trade conflicts;
> ➢ the most serious risk from the obsession with competitiveness, however, is its subtle indirect effect on the quality of economic discussion and policymaking. (Krugman, 1994)

Michael Porter explains national competitiveness as a result of microeconomic competitiveness: "competitiveness is rooted in a nation's microeconomic fundamentals, manifested in the sophistication of its companies and the quality of its microeconomic business environment" (Ogrean, 2010), and he further elaborated, in order to sustain his theory, The Competitiveness Diamond. Porter's Competitiveness Diamond consists in two parts:

> ➢ endogenous variables: factor conditions; firm's strategy, structure, and rivalry; related and supporting industries, and demand conditions.

> ➤ exogenous variables consist of government and chances. (Cho and all, 2008)

Karl Aiginger, summarizing the definitions assigned to national competitiveness, sustains the idea that "competitiveness is the ability of a country or location to create welfare; but, in order to measure the level of competitiveness it should be undertaken an output evaluation and a process evaluation. The output evaluation (competitiveness achieved) is closely related to a welfare assessment, with a specific slant and stepwise operationalizations. Process evaluation (investigating the ability) is related to the analysis of production and technology functions, adding qualitative elements like strategies, and the strengths and weaknesses of a country". (Aiginger, 2006)

National competitiveness is defined by World Economic Forum as "the set of institutions, policies, and factors that determine the level of productivity of a country". (Schwab, 2011)

The National competitiveness Center of the Kingdom of Saudi Arabia defines competitiveness as "the ability of a nation to create sustainable value through its enterprises and to maintain a high standard of living for its citizens. Competitiveness is primarily driven by productivity – the level of output per input used, including labor and capital goods". That definition reflects the point of view of *Stéphane Garelli - Institute for Management Development, about national competitiveness: "Competitiveness of Nations is a field of economic theory which analyzes the facts and policies that shape the ability of a nation to create and maintain an environment that sustains more value creation for its enterprises and more prosperity for its people". S. Garelli had elaborated The Competitiveness Cube – "the Cube theory defines four competitiveness forces: aggressiveness vs. attractiveness, assets vs. processes, globality vs. proximity, and social responsibility vs. risk taking. The frontal face of the cube describes how competitiveness is generated within one given year. The depth of the cube introduces the time dimension and illustrates competitiveness accumulated over time, and thus the wealth of a nation."* The same author, S. Garelli offers The Golden Rules of Competitiveness . (Garelli, 2011)

However, despite so many disputes, national competitiveness remains a major objective of nations and researchers. Dong-Sung Cho, Hwy-Chang Moon, Min-Young Kim have elaborated in 2008 The Dual Double Diamond (DDD) model for measuring national competitiveness [1], as an improvement

brought to Porter's model (the Diamond model), to Cho and Moon's model (2000, The Nine Factor Model), and to Rugman's model (The Double Diamond Model).

Currently, this topic is amply discussed because national competitiveness is seen as the solution to overcome the effects left by the economic crisis on national economies, and especially it is the way to avoid another critical moment. Most European countries cross the hard times of recovery, their economies are pressed by burdensome debt. The development of public debt and budget deficits has become a crucial policy problem in most European countries. (Neck and Sturm, 2008)

The issue of public debt was, and continues to be topical. Numerous studies have examined the sustainability of public debt (further reading: Afonso, A. - Fiscal sustainability: the unpleasant European case. Finanzarchiv, 61, 2005; the work of Bohn, H. - The sustainability of fiscal policy in the United States. in R. Neck & J.E. Sturm editors of the Sustainability of Public Debt, Cambridge: MIT Press, 2008), but also the impact of public debt on economic growth (further reading: A. Greiner, B. Fincke **-** Public Debt and Economic Growth, Dynamic Modelling and Econometrics in Economics and Finance 11, Springer-Verlag Berlin Heidelberg, 2009).

2. Methodology and empirical study

In this paper, it is further analyzed the relationship between the level of indebtedness of EU countries and the level of their competitiveness. Thus, the indebtedness is expressed through the percentage of public debt in GDP, with Eurostat as the data source, and the competitiveness level of countries covered by this study is given by the Competitiveness Index calculated annually by the World Economic Forum.

By processing the data using SPSS software, the following situation was obtained and presented in Table 1, regarding the correlation between the two indicators, calculated using the Pearson and Spearman correlation coefficients.

Table 1: Pearson Correlation & Spearman Correlation

Pearson Correlation			gci2010	pd2010
gci2010		Pearson Correlation	1	-0,030
		Sig. (2-tailed)		0,881
		N	27	27
pd2010		Pearson Correlation	-0,030	1
		Sig. (2-tailed)	0,881	
		N	27	27
Spearman Correlation			gci2010	pd2010
Spearman's rho	gci2010	Correlation Coefficient	1,000	0,082
		Sig. (2-tailed)	.	0,684
		N	27	27
	pd2010	Correlation Coefficient	0,082	1,000
		Sig. (2-tailed)	0,684	.
		N	27	27

Source: Author's own computation

After analyzing the correlation between the two factors considered, it can be seen that both Pearson coefficient (-0.030) and Spearman coefficient (0.082) have values close to zero, which shows that the competitiveness level is not directly related to the level of public debt in the whole EU and the relationship between the two variables cannot be expressed by a regression function.

In these circumstances, we move forward to the next stage of the research, namely the EU segmentation based on two indicators considered, and further, the evolution of groups of EU countries in 2008-2010 period will be analyzed; that period was marked by changes in terms of structure and competitiveness of the economies.

The main objective of the research is the segmentation of EU countries according to the economic competitiveness, namely macroeconomic stability given by the weight of public debt in GDP.

Segmentation involves grouping the states according to a certain rating determined by the degree of competitiveness (coded with the letters A, B and C), and by the indebtedness level, expressed by the percentage of public

debt in GDP (marked by signs "+" and "-" which are designed to show a positive or negative perspective).

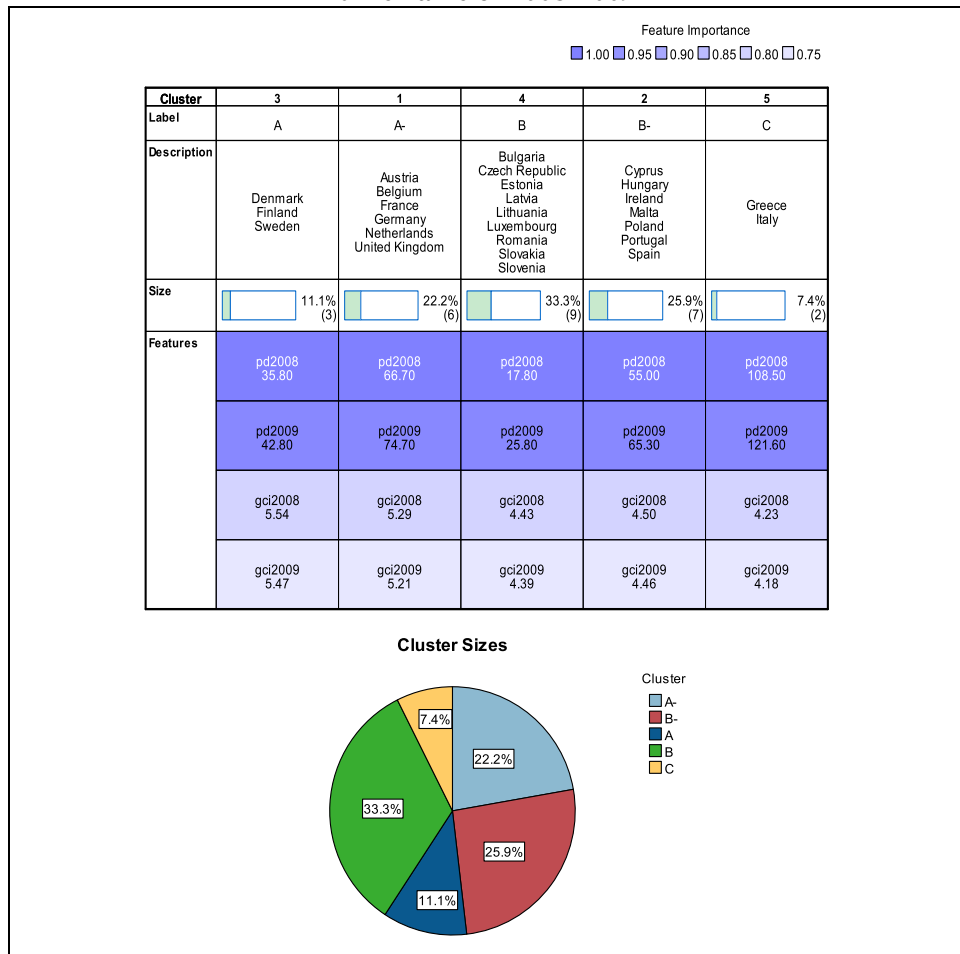Thus, after the study, EU countries will be classified into the following clusters:

Table 2: Clusters of EU countries by competitiveness index and public debt degree

Rating	Characterization	Features
A	High competitiveness	High competitiveness index Low degree of debt
A-	Highly competitive, with negative perspective of macroeconomic stability	High competitiveness index High degree of debt
B+	Medium competitiveness with positive perspective	Medium competitiveness index Very low degree of debt
B	Medium competitiveness	Medium competitiveness index Low degree of debt
B-	Medium competitiveness with negative perspective	Medium competitiveness index Medium degree of debt
C	Medium competitiveness with negative perspective of macroeconomic stability	Medium competitiveness index with negative perspective Very high degree of debt (more than 100% of GDP)

Source: Author's own computation

Using the Two Step Cluster method with SPSS software, the first segmentation is conducted in the years 2008 and 2009 and targets the situation in the tumultuous period of the economic crisis. The analysis is focused on the segmentation of the EU countries based on the competitiveness level and macroeconomic stability in the context of the European Union threatened by a debt crisis. Thus, the following situation was obtained for the period 2008-2009:

Figure 1: Clusters of EU countries according to established rating, in the timeframe of 2008-2009

Feature Importance

☐ 1.00 ☐ 0.95 ☐ 0.90 ☐ 0.85 ☐ 0.80 ☐ 0.75

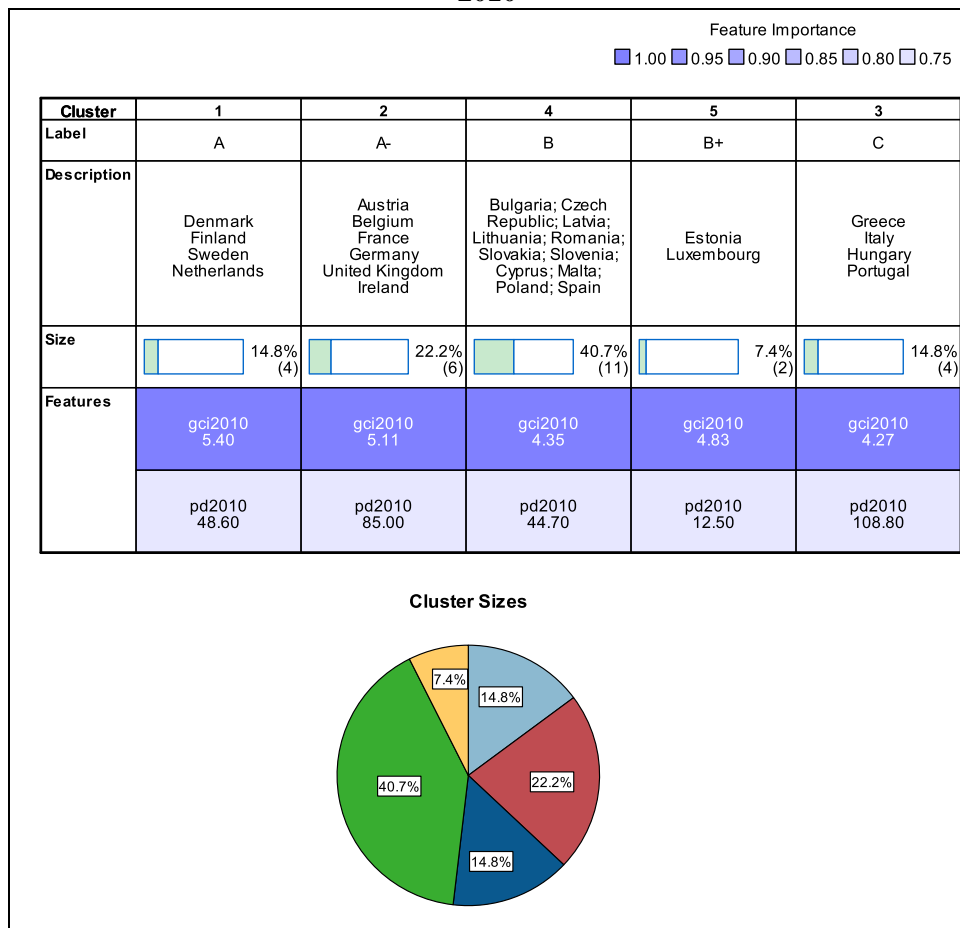| Cluster	3	1	4	2	5
Label	A	A-	B	B-	C
Description	Denmark Finland Sweden	Austria Belgium France Germany Netherlands United Kingdom	Bulgaria Czech Republic Estonia Latvia Lithuania Luxembourg Romania Slovakia Slovenia	Cyprus Hungary Ireland Malta Poland Portugal Spain	Greece Italy
Size	11.1% (3)	22.2% (6)	33.3% (9)	25.9% (7)	7.4% (2)
Features	pd2008 35.80	pd2008 66.70	pd2008 17.80	pd2008 55.00	pd2008 108.50
	pd2009 42.80	pd2009 74.70	pd2009 25.80	pd2009 65.30	pd2009 121.60
	gci2008 5.54	gci2008 5.29	gci2008 4.43	gci2008 4.50	gci2008 4.23
	gci2009 5.47	gci2009 5.21	gci2009 4.39	gci2009 4.46	gci2009 4.18

Cluster Sizes

Source: Author's own computation

It can be noticed that in cluster A, with a high competitiveness index and a low degree of public debt, we can find Denmark, Sweden and Finland; and in cluster C – with a medium competitiveness index with negative perspective and a very high degree of debt (more than 100% of GDP) - is Greece and

Italy. Romania is in cluster B which implies a medium competitiveness index and low degree of public debt.

Developing the same analysis in 2010, the following results were achieved

Figure 2: Clusters of EU countries according to established rating, in 2010

Feature Importance
1.00 0.95 0.90 0.85 0.80 0.75

Cluster	1	2	4	5	3
Label	A	A-	B	B+	C
Description	Denmark Finland Sweden Netherlands	Austria Belgium France Germany United Kingdom Ireland	Bulgaria; Czech Republic; Latvia; Lithuania; Romania; Slovakia; Slovenia; Cyprus; Malta; Poland; Spain	Estonia Luxembourg	Greece Italy Hungary Portugal
Size	14.8% (4)	22.2% (6)	40.7% (11)	7.4% (2)	14.8% (4)
Features	gci2010 5.40	gci2010 5.11	gci2010 4.35	gci2010 4.83	gci2010 4.27
	pd2010 48.60	pd2010 85.00	pd2010 44.70	pd2010 12.50	pd2010 108.80

Cluster Sizes

7.4% 14.8% 22.2% 40.7% 14.8%

Source: Author's own computation

It may be noted that the Netherlands has improved its position, going from A- to A, while Hungary and Portugal have moved from B- to C. Romania has maintained its position in cluster B.

Table 3: Table summarizing the situation of clusters and evolution of the EU member states

Country	pd2010	gci2010	2010	Evolution	2008-2009
Sweden	39,8	5,56	A	↔	A
Finland	48,4	5,37	A	↔	A
Netherlands	62,7	5,33	A	↑	A-
Denmark	43,6	5,32	A	↔	A
Germany	83,2	5,39	A-	↔	A-
United Kingdom	80	5,25	A-	↔	A-
France	81,7	5,13	A-	↔	A-
Austria	72,3	5,09	A-	↔	A-
Belgium	96,8	5,07	A-	↔	A-
Ireland	96,2	4,74	A-	↑	B
Luxembourg	18,4	5,05	B+	↑	B
Estonia	6,6	4,61	B+	↑	B
Czech Republic	38,5	4,57	B	↔	B
Poland	55	4,51	B	↑	B-
Cyprus	60,8	4,5	B	↑	B-
Spain	60,1	4,49	B	↑	B-
Slovenia	38	4,42	B	↔	B
Lithuania	38,2	4,38	B	↔	B
Malta	68	4,34	B	↑	B-
Slovakia	41	4,25	B	↔	B
Romania	30,8	4,16	B	↔	B
Latvia	44,7	4,14	B	↔	B
Bulgaria	16,2	4,13	B	↔	B

Portugal	93	4,38	**C**	↓	**B-**
Italy	119	4,37	**C**	↔	**C**
Hungary	80,2	4,33	**C**	↓	**B-**
Greece	142,8	3,99	**C**	↔	**C**

Source: Author's own computation

Figure 4: Clusters situation in 2010 reflected on the Europe map
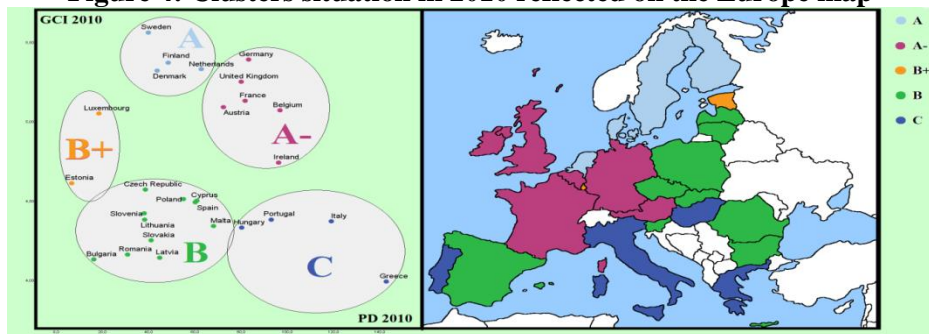
Source: Author's own computation

3. Conclusions and implications

As presented in the chart above, five clusters have been identified that grouped the EU countries. Thus, one important issue is the value of 70% in terms of public debt to GDP. States which have exceeded this value (clusters A- and C) were identified as economies with a negative perspective regarding the current situation, caused by the too high level of debt. In the chart above you can see how Greece, mainly, but also other components of cluster C (characterized by medium degree of competitiveness with negative perspective of economic stability) is at a considerable distance from the cluster A, for example, and these are the countries most exposed to a debt crisis.

Furthermore, economies with a very low value of public debt (6.6% of GDP, Estonia and Luxembourg with 18.4% of GDP), distance themselves from cluster B (which were part of in 2008-2009) and have positive outlook in terms of raising economic competitiveness, especially because of confidence from investors.

As for countries that have a degree of debt between 20% and 70%, they fall into two categories, namely cluster rated A (high degree of economic competitiveness) and B rating (average degree of economic competitiveness). As it can be seen, in cluster B, from 11 states, 10 have joined the EU after 2004, and members of cluster A based their policies on economic discipline and sustainable growth, which has caused them to become the most competitive economies in the European Union.

In the future, Luxembourg is expected to approach the cluster A and even to be integrated into this group of countries with high competitiveness and with a reduced risk of exposure to a debt crisis.

From a geographically point of view, we see that countries in northern Europe are highly competitive, and as we move to southern Europe, the competitiveness decreases and the risk of occurrence of a debt crisis with negative effects on economic competitiveness is increasingly higher.

In conclusion, we can state that the economic competitiveness of a country rises as public debt degree increases to a level of approximately 60% of GDP, then the degree of competitiveness decreases as increases sovereign debt over that limit.

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