ASSESSING THE EFFECTIVENESS OF COMPETITION POLICY IN ROMANIA USING CLUSTERS AND DISTANCES METHODS

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Abstract

For European competition policy, assessing the effectiveness of its enforcements turned out to be a problematic issue. Thus, it has proved to be difficult to assess whether the objectives are properly defined and subsequently the extent that these were achieved, whether the institutional and legal framework are well chosen and ultimately whether the actions of competition authorities produce the desired outcome as long as the performances of these institutions are not quantified in one way or another. Based upon clusters and distances methods this paper highlights the main disparities between Romania and other Member States regarding the perceived effectiveness of competition policy enforcement. Which seems to be obvious for Romania is the fact that it has the legal and also the institutional framework required to ensure a normal competitive environment, but unfortunately it is not credible and therefore is not considered as an improving competitive environment factor as long as its effects on the market are elusive for companies and consumers.

Keywords: competition policy, effectiveness, clusters, distances

JEL Classification: F15, L40

1. Introduction

In terms of legal and institutional convergence of Romania competitive environment with the EU acquis in the field, studies have shown a high degree of compliance of Romanian competition legislation since the period of the accession negotiation on Chapter 6-Competition and State Aid-, EU accession removing some of the incompatibilities due to compulsory full harmonization of legislation in this area. (Fuerea et al., 2004) Not the same can be said as related to the effectiveness of competition policy enforcement and its real contribution to improve the Romanian competitive environment.

Empirical research provides relatively diverse alternatives in terms of evaluating the effectiveness of competition policy implementation, whether taking in consideration the output of national competition agencies activity (number of decisions, budget, staff training), whether interviewing business people, experts or practitioners.

Using the survey method applied to business people, the World Economic Forum calculated annually and published in the Global Competitiveness Report the effectiveness of anti-monopoly policy index using a scale between 1(antitrust policy is considered lax and not effective at promoting competition) and 7 (antitrust policy is effective and promotes competition). Although limited to a relatively simplistic and subjective evaluation of the effectiveness with which competition policy is applied, this index can provide an overview on the perception of business representatives about the quality implementation of national antitrust regulations. The significant number of countries taken into consideration (139 countries in 2010) provides the opportunities for comparisons and analysis between different jurisdictions. In order to get a more detailed picture regarding the quality of the competitive environment in a particular country, effectiveness of antitrust policy index can be completed by other indicators calculated by WEF such as the intensity of local competition or the extend of market dominance. Even if it provides the basis for extensive studies on a large number of countries, the WEF survey results lacks scientific rigors for in-

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depth analysis regarding the reference of economic agents to competition legislation and the extent to which these regulations have lead to changes in their competitive behavior. (Nicholson, 2007)

In this context the methodology proposed by Hylton and Deng (2007) and Nicholson (2007) can eliminate some of the shortcomings of the WEF survey. While the approach proposed by WEF is related to business representatives' perspective, the competition policy scope index constructed by Hylton and Deng can complete the remarks made based on effectiveness of antitrust policy index with more detailed institutional and legislative aspects.

For an overview of competition policy development and its enforcement in CEE transition countries, the indicator developed by Campbell and Vagliasindi (2004) and calculated annually by European Bank for Reconstruction and Development may represent a benchmark in analyzing the quality of competition law implementation. Using the data provided by EBRD, some studies emphasized the gap between the new member states and EU15 group regarding the quality of actions undertaken in order to ensure a level playing field for companies. The main conclusion of these studies is that competition policy enforcement in east European transition countries is less stringent and less effective. (Hölscher and Stephan, 2009)

Analyzing the EU's competition policy effectiveness by reference to a series of subjective and objective indicators provided by the empirical studies or international organizations may allow the evaluation of its performances in terms of changes in the economic agents' competitive behavior or strictly from the point of view of legal and institutional effectiveness. Although these indicators can provide some valuable information on the quality of competition policy implementation process in different jurisdictions, not the same can be said about its contribution to consumer welfare or total welfare. Studies that have concentrated on this issue are relatively limited (Dutz and Vagliasindi, 2000; Voigt, 2006) and took into account factors such as competition law content and its implementation process, economic motivation of competition policy adoption, formal and factual independence of the specialized agencies. Unfortunately, such factors cannot be directly correlated with overall economic growth.

2. Research Methodology

As harmonization of competition legislation is an important step, but often insufficient to ensure a normal competitive environment, the present paper proposes an analysis of the effectiveness of Romanian competition policy implementation after EU accession compared with other EU member States based on a series of aggregated indicators estimated by World Economic Forum and the European Bank for Reconstruction and Development. The set of indicators taken into account are:

> - *Intensity of Local Competition*, estimated by WEF, ranked between 1 (competition is limited in most industries) and 7 (competition is intense in most industries)
> - *Extent of Market Dominance*, estimated by WEF, ranked between 1(corporate activity is dominated by a few business groups) and 7 (corporate activity is spread among many competitors)
> - *Effectiveness of Antitrust Policy* estimated by WEF, ranked between 1(competition policy is lax and ineffective at promoting competition) and 7(competition policy is effective and promotes competition on the market) and
> - *Competition Policy Indicator*, estimated by EBRD for CEE transition countries ranked between 1 and 4, where 1 indicates that in the specific country there is no competition legislation or institution, 2 indicates that competition policy legislation and institutions were set up and some reduction of entry restrictions or enforcement actions on dominant firm, 3 indicates substantial reduction of entry restrictions in the specific country and also some enforcement actions to reduce abuse of market dominance and to promote competitive environment, 4 indicates significant enforcement actions to reduce abuse of market power and to promote a competitive environment and 4+ is correlated to advanced industrial economies where entry to most markets are unrestricted and there is an effective competition policy enforcement. (EBRD, 2011) Taking into account that the Transition Indicator for

Competition Policy is calculated only for CEE transition countries, the score of 4+ was attributed to EU15 countries as a proxy rating for advanced economies characterized by high levels of effectiveness of competition policy implementation.

This set of indicators was chosen because on the one hand refers to the perception of business representatives on competition policy implementation (this is the case for the indicators estimated by WEF) and on the other hand, EBRD indicator for competition policy takes into account the legal and institutional aspects regarding the competition policy and its effects on the competitive environment, EBRD's assessment being more objective than WEF's estimations, eliminating some of the shortcomings of the latter.

For measuring the convergence of competition policy's effectiveness between EU countries, from the various testing convergence methods it has been chosen methods based on k-means clusters and Minkowski distances. These methods allow the convergence measurement based on distances between two or a group of countries, highlighting the proximity or the distance between a specific country and a group of countries or their average.

3. Results based on k-means clusters

k-means clustering method allows grouping different entities based on their common characteristics and also highlights how they move in time from one group to another based on geometric distances calculation between them depending on a predetermined set of indicators. This method requires the establishment of a number of k centroids corresponding to the number of initially established clusters. After a process of successively grouping based on the movement of the centroids, a stable group of countries is obtained when centroids reached a fixed position on the graph. (Sandu and Păun, 2008)
K- means clustering method is based on the following formula:

$$J = \sum_{j-1}^{k}\sum_{i-1} \left\| x_i^{(j)} - c_j \right\|^2$$

Where $\left\| x_i^{(j)} - c_j \right\|^2$ is the distance between each country x_i^j and the centroid of each cluster c_j.

The results are presented in a simplified form in table 1 in which are differentiated the four clusters obtained and the movements that occurred between them after Romania's accession to European Union. Clusters' analysis presented in table 1 points out that after EU accession Romania has not registered significant changes regarding the effectiveness of competition policy implementation. If in 2008 Romania was placed in cluster 3 with countries like Bulgaria, Greece, Latvia, Lithuania, Poland, Czech Republic, Slovenia and Hungary, in 2009 went to cluster 2 with Italy, Bulgaria, Latvia, Lithuania and Slovenia, and finally in 2010 returned to cluster 3 alongside Bulgaria, Latvia, Portugal, Slovenia and Hungary. Analyzing the distances between each country and cluster's centroid, Romania seems to register a slight decrease of the distances toward its cluster centroid, indicating an increasing convergence within the cluster. Interesting is that only cluster 1 in 2008 and 2009 and cluster 2 in 2010 are composed exclusively of EU 15 countries (the same countries for the entire analyzed period). The other two clusters are heterogeneous both with EU 15 countries and new member states. Thus, countries like Estonia, Poland, Czech Republic and Slovakia gradually moved to clusters composed mostly from EU15 countries, their convergence with these clusters increased after 2008. Although Romania's cluster membership changed in 2009, when in cluster 2 were also Portugal and Italy due to a sharp reduction in the efficiency with which it was perceived the implementation of competition policy, in 2010 Romania remained in cluster 3 with some of the countries that were in the same cluster in 2008 such as Bulgaria, Latvia, Lithuania, Slovenia, Hungary and Portugal, all of these countries being placed far away from EU25 and EU15 average.

Table no.1 K-means clusters and distances between EU countries and clusters' centroids (2008-2010)

2008	Distances toward cluster's centroid	2009	Distances toward cluster's centroid	2010	Distances toward cluster's centroid
Austria	0.494	Austria	0.401	Italy	0.618
Belgium	0.326	Belgium	0.362	Greece	0.618
Denmark	0.383	Denmark	0.226	Austria	0.348
Finland	0.303	Germany	0.606	Belgium	0.344
France	0.481	Netherlands	0.302	Denmark	0.280
Germany	0.663	Sweden	0.641	France	0.532
Netherlands	0.356	Italy	1.121	Germany	0.697
Sweden	0.402	Bulgaria	0.687	United Kingdom	0.77
Italy	0.000	Latvia	0.313	Netherlands	0.389
Bulgaria	0.829	Lithuania	0.720	Sweden	0.518
Greece	0.780	**Romania**	**0.565**	Bulgaria	0.812
Latvia	0.359	Slovenia	0.778	Latvia	0.333
Lithuania	0.312	EU10	0.468	Lithuania	0.568
Poland	0.281	Estonia	0.503	Portugal	1.008
Portugal	1.045	Greece	0.543	**Romania**	**0.374**
Czech Republic	0.911	Poland	0.427	Slovenia	0.900
Romania	**0.830**	Portugal	0.452	Hungary	0.415
Slovenia	0.646	Hungary	0.422	EU10	0.401
Hungary	0.479	Finland	0.505	Estonia	0.452
EU10	0.190	France	0.458	Finland	0.824
Estonia	0.625	Ireland	0.384	Ireland	0.432
Ireland	0.417	Luxembourg	0.673	Luxembourg	0.459
Luxembourg	0.558	United Kingdom	0.429	Poland	0.641
United Kingdom	0.590	Czech Republic	0.872	Czech Republic	0.911
Slovakia	0.647	Slovakia	0.677	Slovaia	0.622
Spain	0.460	Spain	0.507	Spain	0.346
EU25*	0.299	EU25	0.453	EU25	0.105
EU15	0.299	EU15	0.224	EU15	0.536

* Cyprus and Malta were excluded from analysis because of EBRD lack estimates regarding competition policy index.

　　Cluster1　　　　　Cluster2　　　　　Cluster3　　　　　Cluster4

An even clearer picture of Romania's convergence towards EU25, EU15 and EU10 average is provided by the analysis of distances between final cluster centers presented in tables 2-4. As the proximity matrix shows, in 2008 cluster 3, with Romania being part of it, was most distant to cluster 1composed by countries like Austria, Belgium, Denmark, Finland, France, Germany, Netherlands and Sweden. In the same time, the distance registered by cluster 3 toward cluster 1 is inferior to those registered by cluster 2 (which included only Italy in 2008), the degree of convergence of the latter toward EU25 and EU10 average being lower compared to cluster 3. In 2009, Romania's convergence toward

EU25 and EU10 averages decreased, the distances between clusters' centroids increased compared with 2008. Moreover, the cluster which includes Romania registered the highest distance toward cluster composed exclusively of EU15 countries and EU25 average. Although 2010 brought a slight increase in Romania's convergence towards EU25 average, its cluster remains far away from other three clusters.

Table no. 2 Distances between Final Cluster Centers 2008

Cluster	1	2	3	4
1		2.596	2.563	1.125
2	2.596		1.295	1.596
3	2.563	1.295		1.470
4	1.125	1.596	1.470	

Table no.3 Distances between Final Cluster Centers 2009

Cluster	1	2	3	4
1		2.659	2.225	.928
2	2.659		.790	1.743
3	2.225	.790		1.335
4	.928	1.743	1.335	

Table no.4 Distances between Final Cluster Centers 2010

Cluster	1	2	3	4
1		2.171	1.040	1.138
2	2.171		2.527	1.175
3	1.040	2.527		1.358
4	1.138	1.175	1.358	

4. Results based on Minkowski distances method

Based on the same set of indicators were calculated Minkowski distances between Romania and the other EU Member States and EU25, EU15 and EU10 averages. The results obtained using this method can complete and detail the conclusions of k-means cluster analysis. The calculation of Minkowski distances is based on the following formula:

$$d_p(x_i, x_j) = \left(\sum_{k-1}^{d} |x_{ik} - x_{jk}|^p \right)^{\frac{1}{p}}$$

Where *d* is the number of dimension given by the number of parameters taken into account, *p=2* for Euclidian distances and *p=1* for Manhattan metric distances.

The results are presented in a simplified form in table 5. The lowest and the highest distances registered by the Member States toward EU25, EU15 and EU10 averages are marked in different colors. Regarding the distances of Romania toward EU25 average, they registered a downward trend after joining the European Union, from a value of 1.702 in 2008 to 1.409 in 2010. These results confirm the conclusions of k-means clusters analysis. Thus, in Romania the divergence with the EU25 average was reduced in terms of conditions that characterize the competitive environment. However its performances remain limited. From the group of new EU Member States, the highest degree of convergence toward the EU25 average is registered by Estonia which obtained the smallest distance to EU25 average of all new Member States. Poland is another example of a new member country with a significant change towards increasing convergence with the EU25 average, from a value of 1.242 in 2008 to 0.557 in 2010.

While most of new Member States, including Romania, have managed to increase the degree of convergence toward EU25 average, countries like Bulgaria, Lithuania, Slovakia and Czech Republic experienced a reverse situation. Although with a relatively minor performance registered in comparison with other member countries, the convergence of Romania with EU15 and EU10 averages has improved after the EU accession. Compared with EU15 average, the lowest degree of convergence was registered by Bulgaria, and the highest level by countries such as Ireland, United Kingdom and France.

Table no. 5: Minkowski distances between EU's member states and EU25, EU15 and EU10 averages

Member States	EU 25			EU 15			EU10		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
Austria	1.709	1.376	1.161	1.213	0.885	.656	2.738	2.239	2.047
Belgium	1.130	1.072	1.351	0.637	0.535	.831	2.195	1.976	2.232
Bulgaria	1.948	1.843	2.012	2.478	2.457	2.631	0.911	0.947	1.123
Denmark	1.369	1.197	1.082	0.932	0.631	.488	2.435	2.108	2.007
Estonia	0.395	0.487	0.364	0.905	1.004	.940	0.912	0.736	0.707
Finland	1.244	0.897	0.893	0.800	0.377	.535	2.320	1.805	1.739
France	0.936	0.837	.860	0.475	0.332	.300	2.021	1.745	1.782
Germany	1.984	1.924	1.874	1.502	1.397	1.344	3.015	2.790	2.742
Greece	1.127	1.221	1.215	1.543	1.687	1.699	0.887	0.961	0.931
Ireland	0.653	0.543	0.430	0.361	0.361	.598	1.714	1.417	1.184
Italy	1.464	1.477	1.240	1.745	1.857	1.539	1.346	1.322	1.331
Latvia	1.519	1.306	1.329	2.094	1.890	1.927	0.462	0.614	0.591
Lithuania	1.351	1.867	1.841	1.896	2.457	2.445	0.445	1.059	1.014
Luxembourg	0.649	0.849	0.520	0.642	0.636	.343	1.555	1.631	1.404
United Kingdom	0.855	0.830	1.208	0.422	0.320	.631	1.927	1.741	2.123
Netherlands	1.734	1.650	1.602	1.255	1.096	1.025	2.791	2.541	2.507
Poland	1.242	0.845	0.557	1.768	1.456	1.166	0.338	0.263	0.483
Portugal	1.064	1.159	1.241	1.466	1.580	1.658	1.127	1.039	1.109
Czech Republic	0.810	0.871	0.942	1.313	1.069	1.129	0.752	1.282	1.337
Romania	1.702	1.438	1.409	2.240	2.035	2.031	0.814	0.651	0.528
Slovakia	0.506	0.616	0.561	0.838	0.873	1.113	1.048	1.125	0.648
Slovenia	1.346	1.224	1.173	1.903	1.805	1.718	0.531	0.569	0.714
Spain	0.636	0.546	0.370	0.390	0.548	.531	1.541	1.325	1.184

Sweden	1.243	1.270	1.412	0.859	0.766	.887	2.304	2.148	2.293
Hungary	1.352	1.201	1.055	1.910	1.792	1.665	0.605	0.499	0.368

In table 6 are presented Minkovski distances between Romania and other EU's Member States. As it can be noticed, the highest distances are between Romania and Germany, but the result is not surprising taking into consideration the different stage in which these two jurisdictions are in terms of competition policy. Although the general trend is to increase the convergence towards the developed countries of EU, Romanian competitive environment is still far away from them. As long as there are examples such as Estonia, Poland, Czech Republic and Slovakia, new EU Member States, that have managed to increase the convergence towards EU25 average, reducing the distances between them and jurisdiction with long tradition in competition policy implementation, it means that also for Romania is possible to improve the competitive environment by increasing the effectiveness of competition policy and proving its values to business representatives. In addition, a healthy competitive environment might be a precondition for the required flexibility, openness and ability of Romania to adjust to the changes to different economic and social challenges. (Ivanescu, 2010)

Table no. 6 Minkowski distances between Romania and EU's member states

	2008	2009	2010
Austria	3.288	2.627	2.526
Belgium	2.776	2.398	2.700
Bulgaria	0.780	0.848	0.671
Denmark	2.922	2.543	2.462
Estonia	1.631	1.364	1.208
Finland	2.841	2.251	2.128
France	2.598	2.240	2.249
Germany	3.561	3.156	3.203
Greece	1.466	1.435	1.025
Ireland	2.243	1.884	1.587
Italy	1.424	1.466	1.490
Latvia	0.662	0.803	0.373
Lithuania	1.047	1.151	0.720
Luxembourg	2.027	2.022	1.825
United Kingdom	2.541	2.216	2.594
Netherlands	3.321	2.944	2.961
Poland	0.898	0.903	1.004
Portugal	1.760	1.634	1.364
Czech Republic	1.378	1.552	1.755
Slovakia	1.602	1.434	1.118
Slovenia	0.510	0.574	0.927
Spain	2.149	1.800	1.664
Sweden	2.862	2.598	2.766
Hungary	1.202	0.998	0.720

5. Conclusions

Taking into account the nature of the indicators analyzed and based upon clusters and distances methods this paper highlighted the main disparities between Romania and other Member States regarding

the perceived effectiveness of competition policy enforcement. Which seems to be obvious for Romania is the fact that it has the legal and also the institutional framework required to ensure a normal competitive environment, but unfortunately it is not credible and therefore is not considered as an improving competitive environment factor as long as its effects on the market are elusive for companies and consumers.

This state of affairs requires a more active presence of Competition Council on the market towards strengthening an appropriate competitive behavior which must be assumed by public authorities, companies and consumers. In the same time, the responsibility of ensuring a qualitative competitive environment shouldn't be exclusively attributed to Competition Council but also to all economic actors that should understand and assume the values of undistorted competition and its contribution to welfare improvement.

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