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OBJECTIVES OF MACROECONOMICS AS THE BASIS FOR CLUSTERING OF COUNTRIES IN INTEGRATED EUROPE

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Abstract
The EU economy is characterized by a high level of productive force, developed infrastructure, high industrial concentration and specialization level and highly developed agriculture in the whole. In the same time, this region is not uniform as regards the economic development level of its constituent parts and this is creating making problems.
Countries in Europe can be divided in many ways and on different bases. In this paper will be described and discussed classification, i.e. clustering, of European countries based on indicators of achieved objectives of macroeconomic.
Parameters regarding objectives of macroeconomics for European countries will be analyzed and processed by the means of multivariate statistical analysis with the goal to cluster countries with similar macroeconomic national policies.
The clusters of countries based on objectives of macroeconomic will be discussed. These clusters will be analyzed to judge the role of economic flows in dynamics of integrative processes in Europe.

Keywords: European Union, objectives of macroeconomics, cluster analysis

1. INTRODUCTION

Establishment of the European Union has introduced the new quality elements into the international economic relations not only on this continent, but also all over the world. The influence of these large, geographically spacious units has important effects to the Member Countries, as well as to many other countries with which the former are maintaining very strong trade, economic and political relations. Today's Global economy

is characterized by many events related to changes in economic, regional, political, democratic, and social issues. The most dramatic are the changes in Europe. On the one side, are the changes in Western Europe which relate to economic and political integration of these countries, and on the other, are the changes taking place in the counties of Eastern and Central Europe, where the centrally planned economic system is being dismantled, development of transitional processes and integration in the European, and hence the World economy. Nowadays, a new dimension of the EU functioning is getting apparent, and this concerns the issues relating to the integration of Central and Eastern Europe countries and Western Balkans and to the possibility for the EU to react to the challenges arising from the necessary and increasingly close cooperation with almost all European countries. Twenty-seven countries are currently going through the process of transition. They encompass 400 million people and 17% of the total surface area. Transition is a multidimensional process which encapsulates many objectives that must be achieved, such as: liberalization of the market and prices, privatization of enterprises, domestic and foreign trade liberalization, reform of the banking system and capital market; creation, harmonization, and strengthening of the institutions and policies relevant to the functioning of a market economy; creation of conditions for attracting foreign direct investments which will enable long-term economic growth, formulation of policies of openness and credibility, strengthening of laws and legislative order, reforms within the sphere of politics, etc.

All of the aforementioned objectives can fused into five groups: 1. *Liberalization*: a process which enables free price formation and lowering of trade barriers so as to compare and make competitive a transitional economy with that of a developed economy; 2. *Macroeconomic stabilization*: a process which brings inflation under control and decreases it, for a period of time, after the initial high rate due to price liberalization. This process requires control of the budget, the monetary and credit growth (adequate fiscal, and tight monetary and credit policies), and progress through the balance of payments; 3. *Reconstruction and privatization* which includes: process of creating financial sector, reform of enterprises capable of producing goods demanded for in the market, and transformation of ownership of enterprises into private property; 4. *Conduction of social program*, which would include a care for the poor; and 5. *Legislative and institutional reforms* which encompass the need for redefining the role of the state in the economy, establishment of legal norms, laws and regulations.

2. OBJECTIVES OF MACROECONOMIC

In the economic literature the four most common objectives of macroeconomics are singled out. This is about categories which measure and estimate macroeconomic performance of a national economy:

1. stable growth of gross national product,
2. stable level of prices,
3. high employment levels,
4. stable (equal) balance of payments

For achieving these objectives several macroeconomic instruments are used. These are, in fact, instruments by which creators of economic policy influence the pace

and direction of economic activities. The four most important macroeconomic instruments are:

1. fiscal policy,
2. monetary policy,
3. income and price policies and
4. international economic policy.

Every country faces a problem of choice while defining economic policy: to the accomplishment of which objective should be given priority. An ideal economic condition would exist if domestic and foreign equilibriums were achieved, that is, a condition which can be expressed through equality of the sum of production and imports, on one side, and consumption and exports, on the other.

Achievement of this ideal condition is greatly hindered by the conflict between domestic economic policy objectives and external equilibrium. Conflicts also show up within domestic equilibrium, and especially between developmental and stabilization objectives. Therefore measures of economic policy directed at achieving one objective are often found to be in direct conflict with measures for achieving another objective. In such conditions a proper estimate in assigning priorities becomes necessary. For example, rapid economic growth is often followed by inflation and balance of payments deficit, or the cost of achieving external equilibrium can be deceleration in production and lesser use of existing productive capacities. These problems of the modern world evoke a question – how can we solve several conflicting objectives simultaneously and how much for the sake of accomplishing one must we sacrifice another objective, the so-called "trade off".

3. EUROPEAN INTEGRATION PROCESSES

European Union is an economic and political reality on the European continent and one of the key factors in the international politics at the beginning of the XXI century. Each expansion of the European integration brought new challenges, which related to both the old and the new member states, but also to the functioning of the Community as a whole. On May 1st, 2004 European Union found itself in front of the fifth and, to this date, the greatest expansion. This, at the same time, represents her greatest challenge.

The basis for the European unity represents adoption of the Schuman's plan on May 9th, 1950. French foreign affaires minister Robert Schuman and famous French economist Jean Monnet, showing great political realism, revealed the plan for establishment of European Coal and Steel Community, ECSC, i.e. the plan for putting all of French and German coal and steel production under common administration, but leaving the organization open to other European states. Schuman's plan signed by six countries in Paris (W. Germany, France, Italy, Belgium, The Netherlands and Luxemburg) was adopted on April 18th, 1951. Treaty of Paris that founded ECSC was enforced on August 10th, 1952 and represents a significant step and incentive towards further economic and political integration of Europe. As the second key date we must emphasize March 25th, 1957. The six countries signed in Rome the so-called "Treaty of Rome" founding the European Economic Community (EEC). Simultaneously, a treaty was concluded on establishing European Atomic Energy Community, commonly called Euratom. These two organizations, together with ECSC make a unified entity – European

Community (EC). *Treaty of Rome*, as the cornerstone of European integration, determines the basic objectives of the EEC: 1) to coordinate and connect national economies of EEC member states and further harmonize economic development of the entire area, as a single unified economic totality, 2) constant economic expansion towards foreign countries, and 3) stabilization and improvement of living standards of the population.

3.1. CIRCLES OF EXPANSION OF THE EUROPEAN UNION

The first expansion of the Community happened in 1973 when by accession of the Great Britain, Ireland and Denmark 'the six' became 'the nine'. Accession of these three countries into Community was not easy. Namely, for a long time the Great Britain wasn't ready to accept supranationalism in international relations and to renounce a portion of its national sovereignty. Great Britain supported the idea of creating a single European free trade zone, where the custom duties would be abolished amongst the member states, but every individual state would retain a complete freedom of action when dealing with third countries. The fulfillment of the British idea happened in January 1960 when the Treaty of Stockholm established European Free Trade Association (EFTA) joined by Great Britain, Denmark, Sweden, Norway, Portugal, Austria and Switzerland, Finland obtained an associate member status. EFTA members in terms of their economic and political strength were no match in comparison with 'the six'. In August 1964 G. Britain, Denmark, Norway and Ireland had submitted for the first time, an application for joining EEC membership, but because of France's opposition, they managed, following the third attempt, to become full members of the EC on January 1st, 1973. Norway hadn't joined the integration, because during referendum on EC accession 53.5% of the electorate voted against joining. For nine years the EC functioned as the "Europe of nine".

The second expansion of the Community commenced on January 1st, 1981 when following the joining of Greece it became 'the ten'. For Greece, which from the moment of submitting her entry request until her accession into EC waited more than five years, accession represented a new economic and political perspective, in the sense of faster modernization of the backward agricultural and industrial sectors, but also introduction of a democratic, parliamentary regime following the rule of the military junta.

The third expansion of the Community was on January 1st, 1986, when Spain and Portugal joined. These two countries gained full membership after 8.5 years of waiting since the day of submitting the request for the membership entry. This accession developed with many difficulties, given the need for structural adjustment of their economies to more developed countries of the West, and their predominant agricultural orientation.

The fourth expansion, now called European Union took place in 1993, following the enforcement of the Maastricht Treaty, was formally conducted on January 1st, 1995, when three more countries joined: Austria, Sweden, and Finland; since on referendum in Norway once again the majority of electorate was against joining the European Union Norway hadn't joined. The decision on the forth expansion once again was not reached unanimously. Austria's entrance generated most opposition, and she waited more than five years to join, the longest wait of the three. Economic reasons in this case, mostly, didn't exist. The four key differences and reasons for disagreement between Austria and

the European Union were the problems that related to dual residence, transit, agriculture, and environmental protection. I case of economies of Sweden and Finland, which waited to join for 3.5 and 3 years respectively, positive effects of joining the integration were expected.

3.2. EUROPEAN TRANSITION PROCESSES

Today Europe is faced with a historical challenge of expansion into former socialist countries of the Central and Eastern Europe, and the Western Balkan. These countries have since 1989 began radical social, economic and political reforms. Basic directions of reforms are common to all transitional countries, and refer to: building market institutions, ownership transformation, functioning of the goods and services market, labor force and capital, liberalization of most of the prices, significant trade liberalization, structural adjustments, restructuring of enterprises, radical changes in public sector management, macroeconomic stability, reform of the banking system, reform of the tax system, social security and pension system reforms, export orientation, attracting foreign capital (direct investments, portfolio investments, concessions, opening of foreign affiliates, free custom areas, etc.), harmonizing domestic regulations with EU regulations, political reforms, etc. The main transition objectives in the ex-socialist countries are of both the economic and political nature, i.e. they mean to increase the economic efficiency and to attain stable democracy, as well as to get included into the European integration processes on these bases. At the European Council meeting, held in Copenhagen in 1993, the heads of the EU Member Countries agreed to accept the associated member countries from Central and Eastern Europe into the Union membership, which would have expressed their wish to do so. These countries shall become full members after having fulfilled the appropriate economic and political conditions.

On May 1st, 2004 European Union witnessed its greatest expansion to date when ten new members joined the integration: Hungary, Slovenia, Slovakia, Czech Rep., Poland, Estonia, Latvia, Lithuania, Cyprus (Greek section) and Malta. Entry of Bulgaria and Romania is expected by the year 2007. The citizens of these countries have expressed their will to join the European Union on referendums. The challenges to such a widely expanded Europe are immense. This will certainly contribute to the economic power and the strengthening of the European Union's international role, but on the other hand, will greatly hinder making decisions and their implementation. Many problems will surface due to expansion of the integration: overburden of institutions, existence of various internal and especially external priorities, strengthening of nationalism, etc. The problems of efficient economic and political functioning of the expanded European integration will most certainly derive from the fact that ten new countries according to the basic economic indicators lag far behind 'the fifteen'.

The seventh circle of EU expansion refers to the Balkan countries: Croatia, BiH, Serbia & Montenegro, Macedonia, and Albania. European Union clearly expressed its position that unification of Europe will not be complete until the Western Balkan countries become her integral part, but that the progress in the process of European integration will depend, above else, on the capability of each country to conduct economic and political reforms and adopt the basic principles of the European Union. In

May 1999 based on the proposal by the European Commission, Stabilization and Association Process (SAP) began, as a strategic approach towards the countries of the Western Balkan.

The key instrument of the stabilization and association process represent the Treaties of Stabilization and Association which are individually signed with every country of the Western Balkan, which include multiple spheres of influence, such as gradual, i.e. phased creation of free-trade areas between a certain country and the EU, obligation of a country to gradually harmonize domestic laws with the EU Law, and also various forms of support by the EU in many areas have been anticipated. Besides these, the European Union has put forward specific requests to these countries that refer to solving consequences of conflict and civil wars at the end of the XX century and creation of regional cooperation between these countries. Treaty of association is preceded by the Feasibility Study, which represents a complex social, economic and political report of the European Commission which informs the Council of Ministers of the European Union on the readiness of a candidate state to join suitable institutional relations with the EU. The countries for which the Study is being made must fulfill certain political criteria: creation of democratic institutions and the rule of law, respect of human rights, protection of minorities, respect of international obligations, etc. Based on the conclusion of the Study submitted by the EU Commission, the Council of the EU makes decision on finalizing the Treaty of stabilization and association. Numerous factors influence on how long the negotiations will last (e.g., with Croatia they lasted six months, whereas with Macedonia more than eight). Application of certain parts of Treaty of association begins when a country negotiated with reach principle agreement with the European commission, until all members of the European Union ratify it.

4. CLUSTERING OF THE COUNTRIES

In this paper we will present some results of the statistical analysis made on data regarding objectives of macroeconomics for countries in Europe. European countries included in the analysis are divided in five groups, regarding their status in integrative process in Europe.

The groups and belonging countries are:

1. *Euro area*: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain.
2. *Other members of EU15*: United Kingdom, Denmark and Sweden.
3. *New 10 EU members*: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia.
4. *West European countries out of EU:* Iceland, Norway and Switzerland.
5. *South-east European countries out of EU (candidates):* Albania, Bosnia and Herzegovina (B and H), Bulgaria, Croatia, Romania, Serbia and Montenegro (S and M), the former Yugoslav Republic of Macedonia (FYR M) and Turkey.

For these countries and the five years period, are analyzed following data [1]:

GDP - Gross domestic product *(Percentage change over the preceding year, 1999-2003);*

UIR - Standardized unemployment rates *(Per cent of civilian labor force, 1999-2003);*

CPR - Consumer prices *(Percentage change over the preceding year, 1999-2003);*

IOUT - Real gross industrial output *(Percentage change over the preceding year, 1999-2003).*

The goal of the analysis was to see how the countries will be clustered on the basses of achieved objectives of macroeconomics and the techniques used are methods of multivariate statistical analysis: principal component analysis and cluster analysis.

4.1 PRINCIPAL COMPONENT ANALYSIS

Principal component analysis is technique which is used to check correlation between variables and remove redundancy in the data caused by it [2]. The elementary data matrix is reduced so that the number of variables describing research units is reduced. New variables are the factors and each factor represents the whole group (highly correlated mutually) of original variables. Factors are not correlated mutually, but the majority of the original variability in data is conserved. Each unit then achieves its values for each of those factors. The new matrix still contains almost all unredundanced information contained in the previous matrix.

The matrix used in the analysis described here, had 36 rows (countries- research unites) and 20 columns (variables). In principal component analysis for the data, executed in SPSS [3], it is concluded that in the analysis can be continued with five factors, i.e. principal components. These five factors describe 88% of total original variability in data. The new matrix, which was used in farther analysis, had 36 rows, but only five columns. In the addiction, variables in this matrix are unredundanced and not correlated.

From the rotated component matrix, presented in Table 4.1.1., it can be seen what variables are important for each factor [2]. It can be seen that the first factor, i.e. component, represents   influence of consumer prices (CPR) and the second regards unemployment rates (UIR). Other tree components are formed from data regarding GDP and real gross industrial output (IOUT) for specific years. The third component is connected with data for years 2002 and 2003, the forth for the year 2000, and the fifth for the year 2001.

	Component				
	1	2	3	4	5
GDP99	**-.854**	-.110	.127	.226	-.292
GDP00	2.229E-02	-1.09E-02	.372	**.678**	-.134
GDP01	-.122	-1.95E-02	.224	.278	**.776**
GDP02	.354	8.859E-02	**.819**	.212	.197
GDP03	9.765E-02	.206	**.868**	7.743E-04	.162
UIR99	6.684E-02	**.984**	9.761E-02	2.558E-02	2.620E-02
UIR00	4.752E-02	**.985**	.135	-1.61E-02	6.454E-02
UIR01	7.950E-02	**.982**	.146	-7.78E-03	6.212E-02
UIR02	5.107E-02	**.989**	.112	-1.07E-02	-3.13E-02
UIR03	6.153E-02	**.989**	5.225E-02	1.420E-02	-4.55E-02
CPR99	**.927**	-1.41E-02	.205	5.717E-02	-.237
CPR00	**.964**	.149	2.078E-02	.138	-4.49E-02
CPR01	**.952**	.168	-5.17E-02	.184	-5.96E-03
CPR02	**.840**	-6.36E-02	.284	8.894E-02	-.419
CPR03	**.803**	-.122	.276	3.313E-02	-.399
IOUT99	**-.672**	-.190	-1.44E-02	.419	-.406
IOUT00	7.537E-02	2.424E-02	7.677E-02	**.866**	.144
IOUT01	-.147	8.935E-03	.331	-.192	**.627**
IOUT02	.142	5.130E-02	**.710**	.420	.101
IOUT03	-9.59E-02	.198	**.846**	7.354E-02	6.573E-02

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Table 4.1.1 Rotated component matrix

4.2 CLUSTER ANALYSIS

The second step is the use of factor scores matrix for finding clusters of countries. Cluster analysis is the technique used for solving problems of this kind [2]. The main target in clustering is to find units, countries, with similar values for factors, i.e. countries with similarity in data on objectives of macroeconomics.

All countries are classified by cluster analysis in one of mutually exclusive clusters, which are completely covering the observed territory.

There exist different techniques and methods for clustering elements. They are basically divided on hierarchical and nonhierarchical methods. Analysis described here is performed in SPSS, by the means of agglomerative hierarchical Ward's method and squared Euclidean distance [3]. In each step of the procedure, the new element is joined to the "nearest" cluster. The dynamics of agglomeration can be graphically observed in dendrogram. From the same chart it can be seen how distant the elements and the clusters are. Different number of clusters can bee identified, depending on wonted hierarchical level.

Dendrogram regarding clustering of European countries described in this paper is given in Chart 4.2.1.

Rescaled Distance Cluster

```
        C A S E              0         5        10        15        20        25
Label                 Num    +---------+---------+---------+---------+---------+

1 Germany               5
1 Italy                 8
1 France                4
1 Portugal             11
2 UK                   15
2 Denmark              13
4 Norway               27
1 Netherlands          10
4 Switzerland          28
1 Finland               3
3 Hungary              19
1 Luxembourg            9
3 Malta                22
1 Belgium               2
2 Sweden               14
1 Spain                12
1 Austria               1
4 Iceland              26
3 Cyprus               16
3 Slovenia             25
1 Ireland               7
5 Albania              29
5 B and H              30
5 FYR Macedonia        33
1 Greece                6
3 Czech Republic       17
3 Slovakia             24
5 Bulgaria             31
5 Croatia              32
3 Poland               23
3 Estonia              18
3 Latvia               20
5 Romania              34
3 Lithuania            21
5 S and M              35
5 Turkey               36
```

Chart 4.2.1 Dendrogram

4.3. CLUSTERS

Dendrogram can be cut at different distances. Dendrogram in Chart 4.2.1. is cut three times in order to form hierarchical structure of clusters. The clusters – supergroups, groups, subgroups and their members are given in Table 4.3.1.

Supergroup	Group	Subgroup	Country
SGA	**GA1**	**GA11**	1 France
			1 Germany
			1 Italy
			1 Netherlands
			1 Portugal
			2 Denmark
			2 UK
			4 Norway
			4 Switzerland
		GA12	1 Austria
			1 Belgium
			1 Finland
			1 Luxembourg
			1 Spain
			2 Sweden
			3 Cyprus
			3 Hungary
			3 Malta
			3 Slovenia
			4 Iceland
	GA2		1 Ireland
			5 Albania
SGB	**GB1**	**GB11**	1 Greece
			3 Czech Republic
			3 Poland
			3 Slovakia
			5 Bulgaria
			5 Croatia
		GB12	3 Estonia
			3 Latvia
			5 Romania
		GB13	3 Lithuania
	GB2		5 B and H
			5 FYR Macedonia
SGC			5 S and M
SGD			5 Turkey

Table 4.3.1 Clusters

The structure of clusters is formed of four supergroups: SGA, SGB, SGC and SGD. SGA consists of two groups (GA1, GA2) with their subgroups, as well as the supergroup SGB (groups GB1, GB2). The fact that Serbia and Montenegro and Turkey are the only members of the supergroups SGC and SGD, respectively, means that macroeconomic flows in these countries differ from all other countries analyzed here. Members of subgroups are very similar in their achievements and, as the level of the clustering increases, the differences between the members of the same cluster (group or supergroup) are increasing too, but they are still more similar to the countries in their cluster then these from the others.

5. CONCLUSION

From the dendrogram in Chart 4.2.1 and corresponding Table 4.3.1 it can be seen that the countries observed in this analysis (excluding Serbia and Montenegro and Turkey) are grouped in two big groups. The only country candidate clustered in supergroup **SGA** is Albania, while the only country member of EU clustered in **SGB** is Greece. Subgroup **GA11** consists of developed West European countries, while in the subgroup **GA12** are clustered other old members of the Union, as well as some of the new members. Members of **SGB** are new members of EU and the candidates, i.e. South-east European countries out of EU.

From the clustering of the countries presented in this paper it can be concluded that degree of achieved objectives of macroeconomics, although showing differences among the countries, is not judgmental in determination of the order of countries to be joined to European Union.

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