Europe's Economic Crisis: Re - Clustering European Economies

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Abstract

National debt and distressed banks in countries such as Greece led to an ongoing recession since the beginning of Europe's economic crisis. At the same time, austerity measures, all over Europe, reshape economies in a trial to increase global competitiveness. Economic integration as a challenge for social prosperity seems more crucial than ever, while it is a matter of research whether the acquired economic policies lead to further divergence. The paper explores how economic crisis has affected 40 European economies, by using macroeconomic indexes. A re-clustering of these economies is attempted for detecting similarities and differences between European economies. The analysis reveals how close an economic integration is and how a multi – speed European economy would look like today. Moreover, it explores how European economies have transformed during the last five years, in terms of competitiveness' similarities and how the Gross National Income is related with governance indicators.

Keywords: European Economies, Multi – Speed Europe, European Integration, Competitiveness, Gross National Income per Capita, Economic Convergence, Welfare.

Introduction

Since the European Economic Community's foundation in 1957 (participating West Germany, France, Italy, Belgium, The Netherlands and Luxemburg), a series of expansion occurred, following initial Treaty's objective for continuous and balanced expansion (e.g. Pelkmans 2001, pp. 31-32). The first expansion of the Community happened in 1973 when Great Britain, Ireland and Denmark accessed. The second expansion of the Community commenced in 1981 when Greece joined, while the third expansion was on January 1st, 1986, when Spain and Portugal accessed. The fourth expansion, now called European Union (EU) took place in 1993, following the enforcement of the Maastricht Treaty, was formally conducted in 1995, when three more countries joined: Austria, Sweden, and Finland. On May 1st, 2004 took place European Union's greatest expansion (fifth expansion), when ten new members joined the integration: Cyprus, Czech Rep., Estonia, Hungary, Malta, Latvia, Lithuania, Poland, Slovakia and Slovenia. The sixth circle of expansion involved Bulgaria and Romania; while the seventh circle of EU expansion refers to the Balkan countries: Croatia, Bosnia and Herzegovina, Serbia, Montenegro, FYROM and Albania.

EU's expansion along with a series of supranational European organizations connecting state members with no EU's members, have created a complex environment in which most European countries are connected in a political or economic way (Figure 1). The European Union has a number of relationships with nations that are not formally part of the Union. Its aim is to have a ring of countries, sharing EU's political or/and economic principles and joining them in further integration

without necessarily becoming full member states. Directly or indirectly, politically or economically more than 40 European countries are connected.
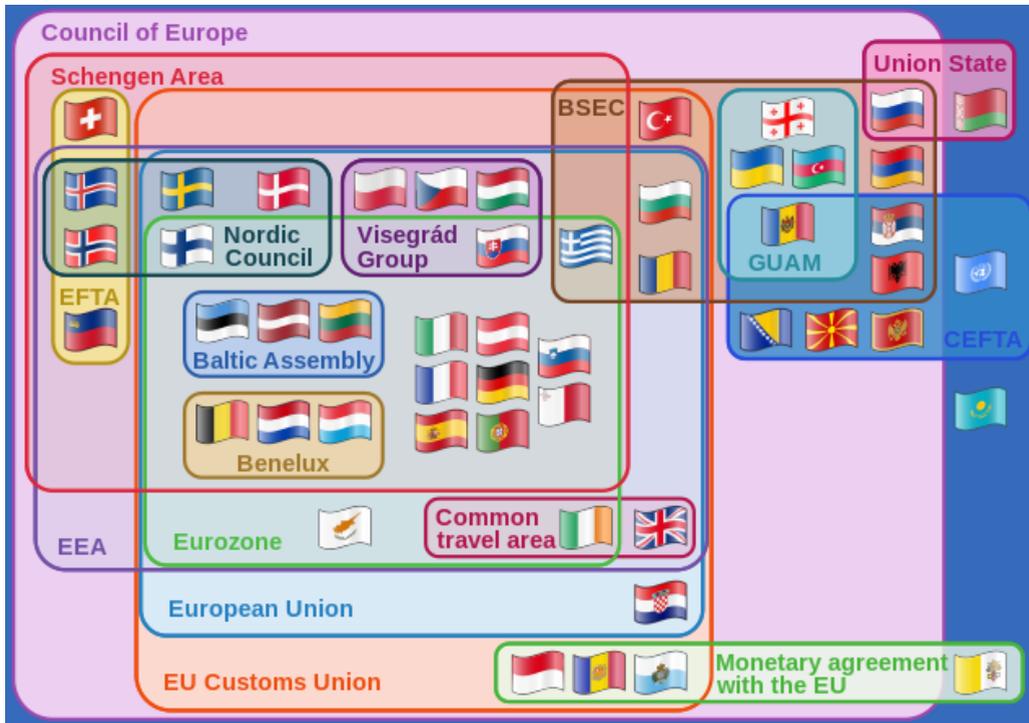

Figure 1 Euler Diagram connecting multinational European organizations. Source: http://en.wikipedia.org/wiki/European_integration

Up to date, there is much literature focusing on the admittance of ten new member countries to the European Union (EU) in 2004, especially on subjects such as monetary policy (e.g. Allsopp and Artis, 2003; Buti and Sapir, 2003; De Grauwe, 2002; Hefeker, 2002; Hendrikx and Maier, 2002), institutional reform (e.g. Bacaria, Chortareas, and Kyriacou, 2002; Aleskerov et al. 2002), macroeconomic policy (e.g. Gros et al. 2002), convergence criteria and changes in macroeconomic policy (Michelis and Koukouritakis 2007) and voting power (Fahrholz and Mohl, 2006). In the same time, the European Union's region is not uniform as regards the economic development level of its constituent parts, which creates a series of integration problems (Delic and Kragulz, 2005).

As Blanchard and Katz (1992), for the United States, and Decressin and Fatas (1995), for Europe, show Real convergence of economies does not necessarily happen only by monetary policies. Competeness has been recognized as a main divergence area between European economies, especially after euro's implementation (European Central Bank, 2012). Whereas, some countries gained in competeness terms, at the same time other countries registered substantial losses. Trichet (2011) and Draghi (2012) highlighted that losses in competeness can lead to countries' economic vulnerability and moreover can hinder interconnected economies from continuous development. During the last ten years, many European economies faced a period of aggregate demand growth, fuelled by expanding credit in the private sector (European Central Bank, 2012).

After financial crisis' onset in 2008 the diverging problems within Economic and Monetary Union (EMU) revealed, as well as competitiveness' differences, while in many cases, problems aggravated by inappropriate fiscal policies. Nowadays, attention focuses mainly on persistent weaknesses (European Central Bank, 2012), instead of integration processes and

mechanisms, creating a critical question about whether financial crisis affected the economies' converging process across Europe.

Countries in Europe can be divided in many ways and on different bases according to their geographical positioning, their relationship with European Union (euro area, other members of EU15, new entrants – 10 countries, west European countries out of EU, south-east European countries – candidates), their categorization from OECD (High Income and Eastern Europe economies) or their current economic situation (PIGS's economies, central and north Europe's economies, eastern Europe's economies, independent economies).

The paper describes the clustering of 40 European economies based on macroeconomic indicators, regarding competiveness, social effectiveness and gross national income per capita. The focus is primarily on medium run (five years) horizon, while parameters regarding objectives of macroeconomics will be analyzed by using multivariate statistical analysis in order to cluster countries with similar characteristics.

Their similarity is based on multivariate indicators in order to incorporate parameters such as social welfare (gross national income per capita), governmental effectiveness and social sensitivity (social effectiveness), market effectiveness and readiness to compete in global economic environment (competiveness indicator). Such an analysis is considered appropriate for the European context, as long as European Union and most European countries give emphasis not only in economic development but moreover to social welfare and political democratization.

Methodology and Results

2.1 Variables and Data

A series of data were used in order to evaluate the present situation. **Gross National Income (GNI) per capita** was used in order to reveal social welfare. Even though this variable has its own disadvantages (it does not reveal inequalities in social welfare), it is a more precise indicator than Gross Domestic Product (GDP).

Governmental effectiveness and social sensitivity was measured by using World Bank's indicators such as:

Voice and Accountability (VaA): Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

Political Stability and Absence of Violence (PSAV): Reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.

Government Effectiveness (GE): Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Regulatory Quality (RQ): Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

Rule of Law (RoL): Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

Control of Corruption (CoC): Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

Finally, **Global Competitiveness Index (GCI)** was used in order to shed light on how structural weaknesses have affected relative performance of European economies since economic crisis' onset in 2008. World Economic Forum developed the particular Index since 2006 and its recent findings indicate that during the crisis, the more competitive economies systematically withstood the crisis better or recovered more quickly (compared with the least competitive economies).

The sample covers a wide range of European countries including European Union's members, Eastern Europe's countries, more or less privileged economies (OECD's High or Low Income countries), as well as countries with a more "sole" role such as Russian Federation and Turkey. The whole sample is given in the Table below:

Albania - ALB	Finland – FIN	Latvia - LVA	Russian Federation - RUS
Austria - AUT	France – FRA	Lithuania - LTU	Serbia - SRB
Belgium - BEL	FYROM – FRM	Luxembourg - LUX	Slovak Rep. - SVK
Bosnia and Herzegovina - BRZ	Georgia – GEO	Moldova - MLD	Slovenia - SVN
Bulgaria - BGR	Germany – DEU	Montenegro - MNE	Spain - ESP
Croatia - HRV	Greece – GRC	Netherlands - NLD	Sweden - SWE
Cyprus - CYP	Hungary – HUN	Norway - NOR	Switzerland - CHE
Czech Rep. - CZE	Iceland – ISL	Poland - POL	Turkey - TUR
Denmark - DNK	Ireland – IRL	Portugal - PRT	Ukraine - UKR
Estonia - EST	Italy – ITA	Romania - ROM	United Kingdom - GBR
Albania - ALB	Finland – FIN	Latvia - LVA	Russian Federation - RUS
Austria - AUT	France – FRA	Lithuania - LTU	Serbia - SRB

Table 1 The sample of Europe's clustering (Source World Bank)

Even though there were no data for all European countries, a sample of 40 countries was finally gathered. The data are Cross-Sectional-Data and originating from 2013, it is a "snapshot" of the year 2013. The sample is large enough to reveal whether there is or not an ongoing procedure of socioeconomic convergence in Europe's political environment. Social welfare, governmental effectiveness, social sensitivity, market effectiveness and readiness to compete in global economic environment were used in order to re – cluster these economies and to empirically investigate the existence of a multispeed Europe and to find a relation, if it exists, between the GNI and some of these socioeconomic parameters, specifying their importance of the creation of social welfare.

2.2 Regression Analysis

The standard regression method is used with Ordinary Least Square (OLS) in order to evaluate how Gross National Income (GNI) per capita is affected by factors such as Voice and Accountability (VaA), Political Stability and Absence of Violence (PSAV), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RoL), Control of Corruption (CoC) and Competiveness (GCI) (Global Competiveness Index). In the following Pearson Correlation Matrix are shown the correlations between all these factors and corresponding p values.

        SR(GNI) VaA   PSAV   GE   RQ   RoL   CoC

VaA   0,862

       0,000

PSAV 0,710 0,885

       0,000 0,000

GE   0,887 0,935 0,787

       0,000 0,000 0,000

RQ   0,830 0,925 0,785 0,934

       0,000 0,000 0,000 0,000

RoL   0,896 0,957 0,815 0,972 0,948

       0,000 0,000 0,000 0,000 0,000

CoC   0,892 0,910 0,736 0,959 0,918 0,963

       0,000 0,000 0,000 0,000 0,000 0,000

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GCI 0,874 0,805 0,651 0,868 0,852 0,880 0,896

  0,000 0,000 0,000 0,000 0,000 0,000 0,000

Table 2 Variables' Correlations

It is noteworthy the high correlations between all the factors, with consequence the multicollinearity of the independent variables in the regression relation. At the end only few of these factors are expected to be relevant for the regression model. Instead by applying the regression method (stepwise or backward regression algorithms) between GNI as dependent variable and the other mentioned factors as independent variables, we have found a relation with two independent variables. The relationship is the following:

$$\sqrt{GNI} = 20.16x(VaA) + 45.93x(VaA)^2 + 18.16x(GCI)$$

i.e. a non linear relation with independent variables "Voice and Accountability" and "Competitiveness".

The other variables such as GE, CoC and RoL were not relevant, the null hypothesis could not be rejected, and other variables such as PSAV and RQ are rejected from the model due to multicollinearity with the remaining variables and production of auto- correlated residuals.

The Variance Inflation Factor (VIF) of the variable GCI is less than 4. The VIF factors of the variable VaA and her square is of the order of 9 something to be expected due to nonlinearity. The R^2, R^2(adj.) and R^2(pred.) for the given relation are positive (even if there is not exist the constant term in the relationship) and they are very close with corresponding values of 98.37%, 98.24% and 98.07%. In the following diagrams are shown the real values and fitted values versus order and the real values as a function of fitted values. The Durbin Watson statistic and the t test between the residuals and the Lag 1 of them indicate independency.
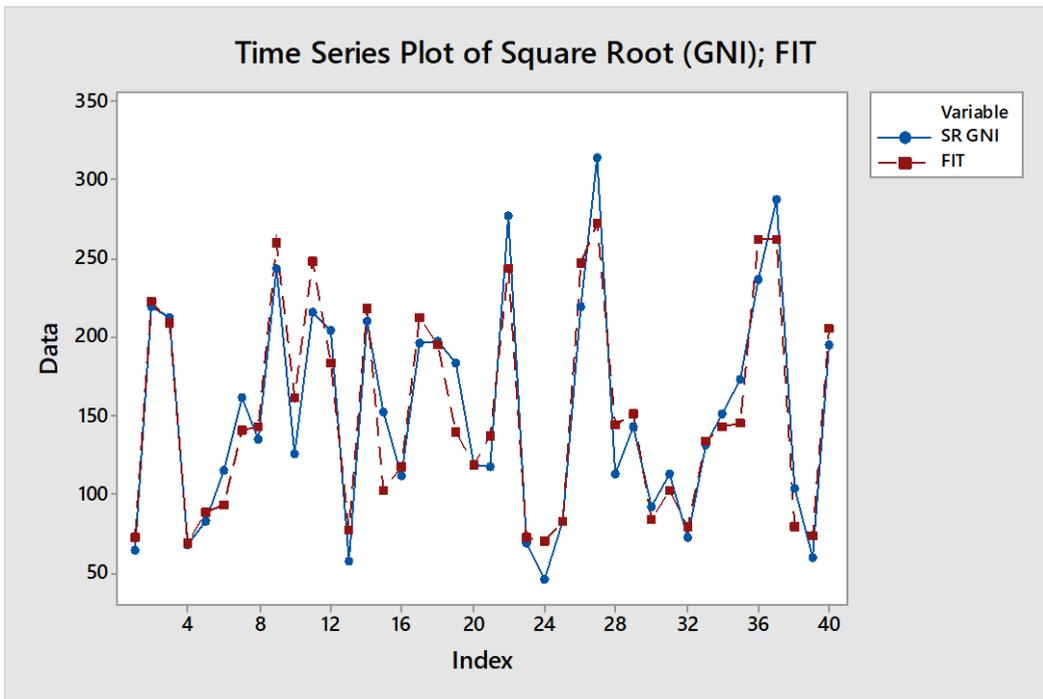

Figure 2 Observation values and fitted values versus order (alphabetical order of the countries). The fitted values are very close to the observations.
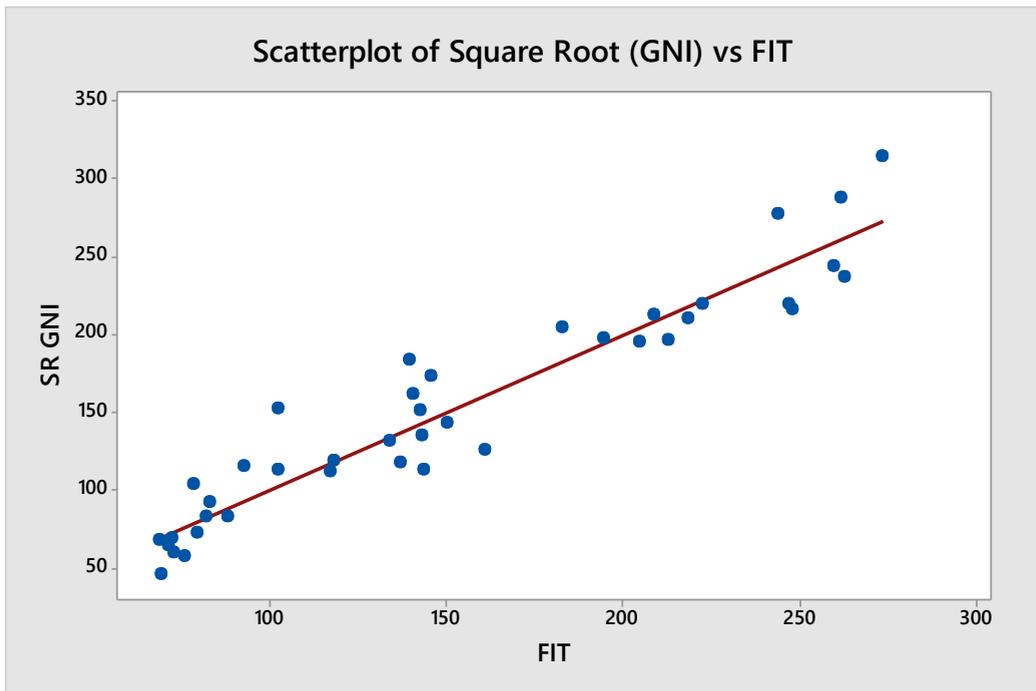
Figure 3 Observation values versus fitted values. All points are in a well-defined strip which indicate the constancy of the variations.

Different tests for heteroscedasticity of the residuals were carried out such as the White test (White 1980), Breusch-Pagan-Godfrey test (Breusch & Pagan 1979, Godfrey 1978) and Glejser test (Glejser 1969) without to reject the null hypothesis of Homoscedasticity.

2.3 European re - clustering

Hierarchical Clustering and Chebychev's algorithm was used to create groups of countries with similar patterns. The procedure attempts to identify homogenous groups based on the selected variables. At the starting point each case is a distinct cluster, while the procedure groups similar clusters (with the smallest distance) until only one is left. "Distance" is a measure of how apart two cases are and "similarity" refers to the degree in which the same cases are alike. There is not a wide acceptable distance's measure for all clustering applications, but there are some common characteristics such as: i. distance is always positive, ii. distance from a point to itself is always zero, iii. distance from a point to another cannot be greater than the sum of the distance from the same point to any other point and iv. distance from a point to another is always the same with its inverse.

Researchers avoided the usage of Euclidean distance which seams suitable for only continuous variables and used Chebychev's algorithm which incorporates categorical variables as well. Chebychev's algorithm is based on the maximum attribute difference and it calculates the absolute magnitude of the differences between coordinates of a pair of data vectors (Bock & Krisher, 1998) and is given by:

$$d(x, v) = \max_{i=1,2,...,n} |x_i - v_i|$$

In the clustering method are taken into account all available variables, i.e. GNI, VaA, PSAV, GE, RQ, RoL, CoC and GCI.

The results are presented in Figure 4, with five main groups of countries to be presented. The **first group** incorporates Switzerland, Norway and Luxembourg. All three countries have rather high standards in social wellbeing while their economies are characterized as highly competitive. It is worth mentioning that two out of three countries are not members of E.U., while the next more similar countries (but out of group) are Denmark and Sweden.

The **second group** involves France, Germany, Finland, Austria, Netherlands, Belgium, Sweden and Denmark. These countries are High Income Countries (according to OECD), they are E.U.'s members and supposed to be some of the most powerful European economies.

The **third group** is separated in two distinct subgroups involving:

United Kingdom, Ireland, Italy, Spain, Cyprus and Iceland. This subgroup has a tendency to resemble in socioeconomic terms with the previous group. This resemblance is the result of E.U.' policies in many aspects of economic, political and social life.

Greece, Portugal, Czech Republic and Slovenia. This subgroup involves some of the least developed European Union's countries in socioeconomic terms. Even though there are great similarities with countries such as Cyprus, Spain and Italy, the main difference lies on the willingness to implement a reforming agenda capable to evolve national socioeconomic structures.

The **fourth group** involves Estonia, Slovenia, Croatia, Hungary, Poland, Lithuania, Latvia, Turkey and Russian Republic. It is a mixed group involving recent E.U.'s members, an acknowledged candidate (Turkey) and Russian Federation, a "contradictory" partner. E.U.'s members were all members of Warsaw Pact and located in Eastern Europe, while their entrance in the Union took place after 2004. This group has the willingness to follow Union's socioeconomic patterns but the results indicate a far distance from Western Europe's countries.

Finally, the **fifth group** is separated in two distinct subgroups involving:

Bulgaria, Romania and Montenegro. This subgroup involves two E.U.'s members and an acknowledged candidate. All three can be described as "countries in transition" because of their willingness to implement E.U.'s reforming agenda but facing serious problems in terms of global competiveness and social prosperity.

Albania, FYROM, Serbia, Bosnia and Herzegovina, Georgia, Ukraine and Moldova. This subgroup involves Western Balkan's countries (most of which are E.U.'s candidates) and Eastern Europe's countries (which are far away from being E.U.'s members).

A visual representation of the distance at which clusters are combined is given by the following dendrogram. The dendrogram is read from left to right and represents is country as a sole cluster (left end) towards the creating of a sole cluster containing all countries (right end). The position of the line on the scale indicates the distance at which clusters are joined, while the range varies from 1 to 25 (a ratio representing the original distances).

In order to compare the regression analysis with the cluster analysis a second cluster analysis is done between the variables as they appear in the regression relation. The results of clustering are exactly the same as using all the above mentioned variables.
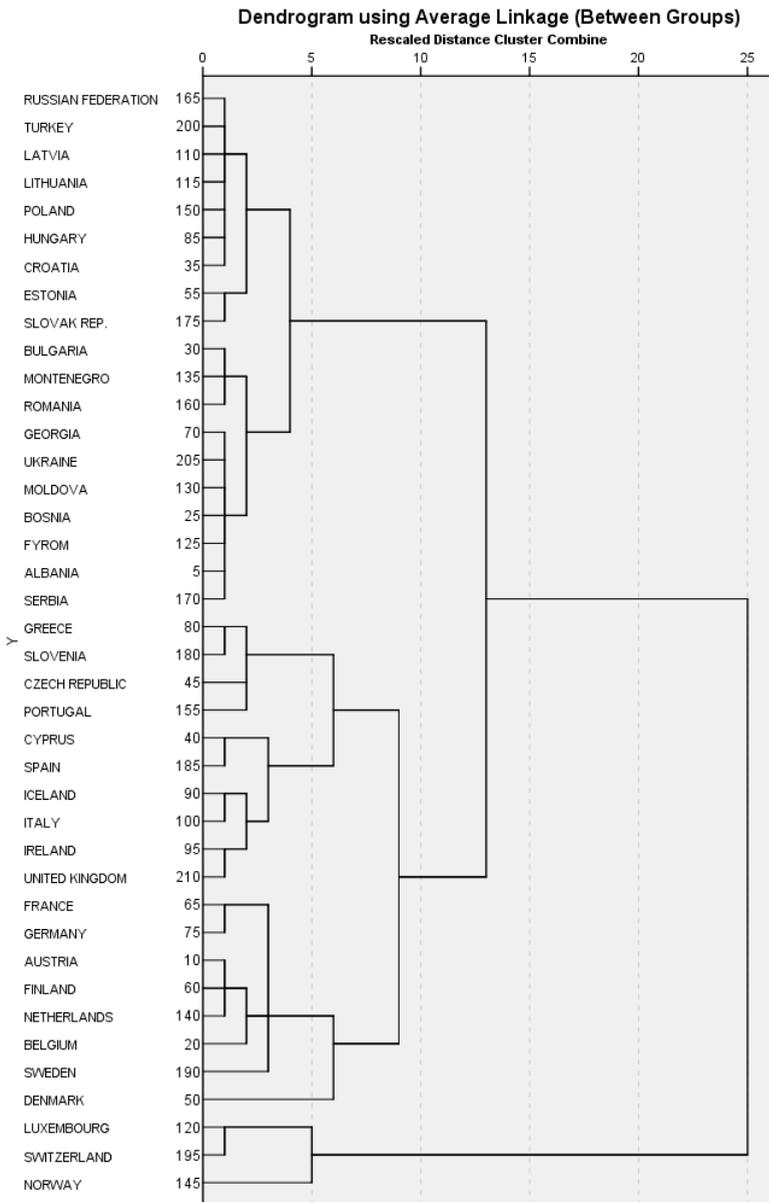
Figure 4 Dendrogram using average linkage between groups

Conclusion

The results indicate a direct relationship between "Gross National Income" and two independent variables: "Voice & Accountability" and "Competiveness". European context involves parameters affecting both social involvement and economic competiveness. Democracy and economic growth are E.U.'s pillars leading to high incomes and socioeconomic prosperity. Because "Voice & Accountability" is very strong and positive correlated with "Rules of Law", "Control of

Corruption", "Government Effectiveness" and "Regulatory Quality", it is important to include in the meaning of "Voice & Accountability" not only freedom of expression-association and free media but also the quality of Democracy i.e. the meaning of the other variables such as political and social stability, the function of justice, social and police system, etc.

In terms of homogenization, Europe is far beyond from success. Even between E.U.'s members there are great differences which reveal a deep divergence. The leading countries are becoming more competitive and sensitive in democratic aspects, while a series of countries are stable or deteriorate in terms of political and economic reforms in their national structures. All leading countries more or less are working in the frame of the term "Soziale Marktwirtschaft".

A multi – speed Europe is revealed in Figure 5. Five distinct groups separate forty European countries, while the results indicate that divergence occurs even within European Union's structures. High income and competiveness's countries (first and second groups) have the resources to maintain the necessary reforms in order to expand their citizens' socioeconomic privileges.

The third group has an ambiguous role. Even though groups' countries have an average competiveness's degree, its national prosperity remains high. It is essential to understand that the group's Gross National Income is on average 15.000 euros larger than the next groups corresponding variable. United Kingdom is the group's leading country, while the subgroup of the four (Greece, Portugal, Slovenia and Czech Republic) has the tendency to deteriorate.

The next two groups (fourth and fifth groups) are the most vulnerable to future changes. Small competiveness is linked with small social prosperity. The willingness to implement E.U.'s reforming agenda may decrease as national income remains rather small.

The main result of the present study proves to be a divergence Europe. The results may probably change in the next years but not towards a more convergence path. The results of economic crisis and migration problem act as a disintegrator factor, while E.U.'s economic and political inventories run dry.
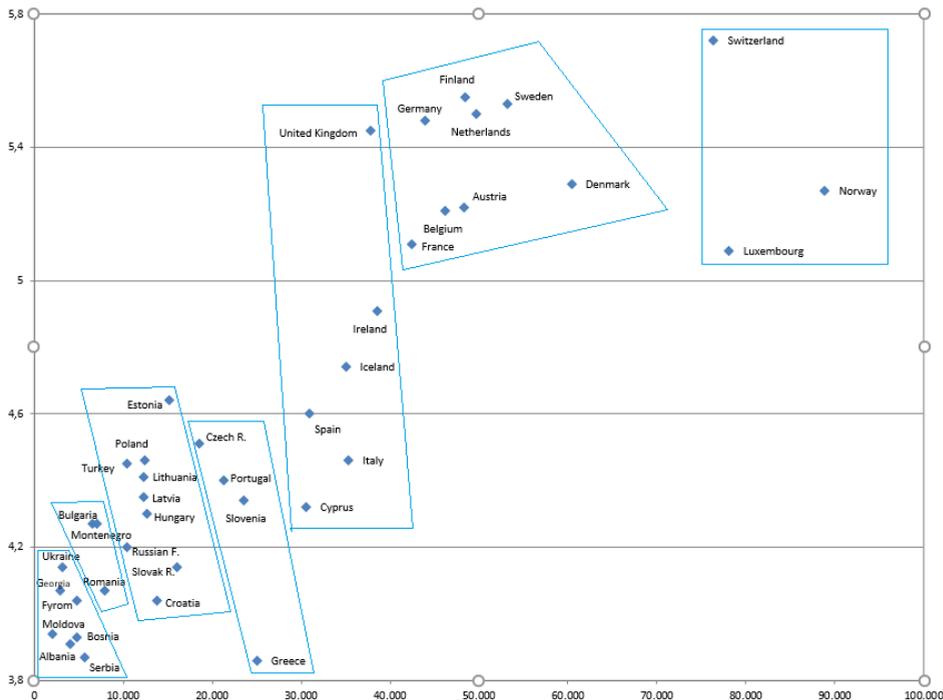

Figure 5 A multispeed Europe.