EUROPEAN ECONOMIES FACING THE GLOBAL FINANCIAL CRISIS: ARE EMERGING ECONOMIES MORE VULNERABLE THAN ADVANCED ONES?

Smaranda CIMPOERU [1]

[1] *University of Economic Studies, Bucharest, Romania*

Abstract:

The global financial crisis has arouse many research questions regarding causes, effects and necessary policy measures. This paper tries to answer the question whether advanced and emerging European economies have been equally affected by the global financial crisis from 2007. We apply a cluster analysis for two periods (pre and post crisis), on a set of four leading indicators as suggested by the specialty literature and find four clusters of European economies. The differences of structure between the two groups of clusters may suggest that advanced economies are as much as vulnerable to a financial crisis situation as emerging economies.

Keywords: *financial crisis, crisis leading indicators, cluster analysis, global crisis effects.*

JEL: *G01, C38, E60, O52.*

1. Introduction

The wave of financial crisis that began with the subprime crisis in the US in 2007 has led to major difficulties and macroeconomic disequilibrium among the member states of the European Union. One of the aims of the macroeconomic policy instruments is to identify the possible triggers that could determine the vulnerability of an economy facing a financial crisis. As the global crisis determined important output losses and entailed massive social costs, it is of no wonder that the topic is of high relevancy for the

[1] *Lecturer Ph.D., Faculty of Cybernetics, Statistics and Economic Informatics, Department of Statistics and Econometrics, Bucharest University of Economic Studies, Romania, smaranda.cimpoeru@csie.ase.ro*

policymakers. As Kauko (2014) mentions: "excessive loan growth and asset price bubbles may have preceded crises in the past, but in a climate of general euphoria no one want to believe that history could repeat itself" (Kauko, 2014, p. 289). This is suggested by the ironic title of the popular work by Reinhart and Rogoff (2009), "This time is different". The existence of a set of leading indicators for financial and banking crisis has been studied intensively in the specialty literature. Most of the studies find that excessive growth or overheating of the economy, in terms of credit growth and asset prices usually precedes a financial crisis.

Many research questions have arisen from the topic of financial crisis. From finding the prediction power of leading indicators to determining the best method of estimation for models of assessing the risk that financial crisis would appear again. For policymakers, a question of an equal importance is whether the crisis affects equally emerging and developed economies. The studies of financial crisis episodes were focused on the emerging economies, for instance Latin America crisis in the 1980s, Asian crisis (1990s) or financial distress episodes in ex-communist central and east-European countries. The economic theory has been shaped in the belief that for advanced economies the "destabilizing, systemic, multi-country financial crisis were a relic of the past" (Reinhart, Rogoff, 2013, p. 4557). In other words, that the emerging economies are more vulnerable to financial crisis episodes than the advanced economies. Reinhart and Rogoff (2013) approach the subject and they make a thorough review of the effects different financial crisis throughout time had on the world economies. Their results show that the frequency and duration of banking crises is similar for developed and middle-income countries. However, the methodology underpinning their study is based solely on a comparative analysis for a set of macroeconomic indicators.

We propose a more thorough quantitative approach to test the hypothesis that emerging economies are more vulnerable to financial crisis episodes than the advanced economies, by means of data mining techniques, more precisely cluster analysis. From our review of the specialty literature, this is the first attempt to use the cluster analysis for identifying the impact of the crisis on the European economies. Our methodology approach tries to identify clusters of European economies prior to the global crisis eruption, based on a set of leading indicators chosen after reviewing the specialty literature. If the economic theory holds and the emerging economies are more vulnerable than advanced ones in face of a financial crisis, than the clusters

should be the same after the financial crisis had ended. If significant migrations have been registered between clusters, than the economic theory tested is not valid for the 2007 global financial crisis, in what concerns the European countries.

The structure of the paper is as follows. In the next section we review the leading indicators for financial crisis from the specialty literature, with a special focus on three of them: credit stock, GDP growth and current account balance. We make a descriptive analysis of their evolution for the European countries before and after the crisis episode. In the third section we present the results of the cluster analysis. We identify four clusters for the European economies prior to the crisis and another four after the crisis, using the indicators highlighted in the previous section. The migrations between clusters are analysed and the last section of the paper presents the conclusions regarding the hypothesis tested as well as recommendations for the policymakers.

2. Leading indicators of financial crisis

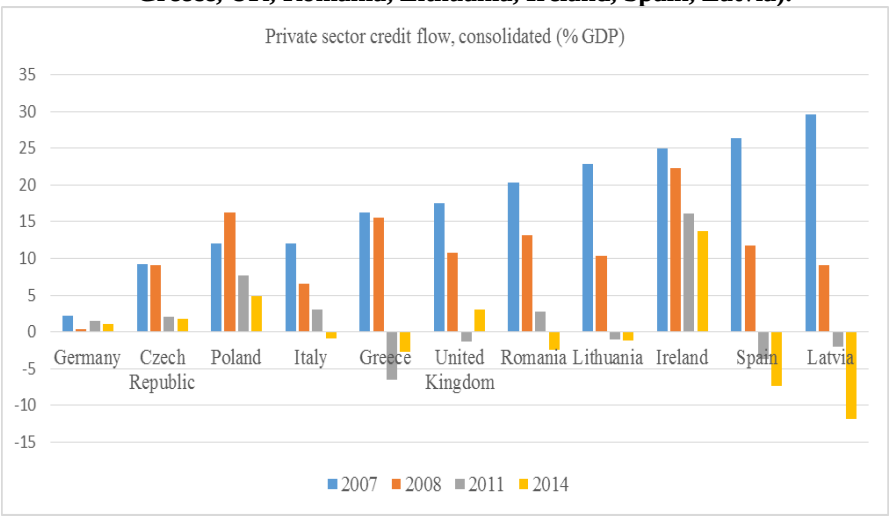
In 2012, in order to establish an Early Warning System for financial and banking crisis, the European Commission introduces a Scoreboard of indicators in order to identify possible signs of an upcoming crisis. The motivation and preliminary analysis of the Scoreboard are detailed in the Alert Mechanism Report (2012). In the Macroeconomic Imbalance Procedure, the main causes of the global crisis are identified as: persistent macroeconomic disequilibrium, increase in indebtness, decrease of competitiveness, speculative bubbles on the real-estate market. These theories constituted the starting point for the Scoreboard. In the next part of the section we will focus on three main leading indicators, reviewing their significance in the specialty literature and their evolution for the European countries.

2.1. Credit Stock

As mentioned by Kauko (2014), the lending indicators may have been the most used indicators for predicting financial crises. Economic theory associates high indebtness ratios with difficulties in supporting debt service. This is of course applicable at microeconomic, as well as at macroeconomic level. At microeconomic level, high level of indebtness for a banks' clients would lead to the negative adjustment of their credit rating. Similarly, at macroeconomic level, an excessive debt level would be a signal of the

worsening financial context and is therefore included in most of the financial crisis researches. Laina et al. (2015) make a thorough review of the leading indicators used for predicting financial crisis in the most relevant specialty studies. They group the indicators into 9 categories: Credit, Asset Prices, Financial Regulation, Financial sector size, Money aggregate, Interest rate, Exchange rate, Current account, GDP and review a total of 19 studies. The indicators belonging to the credit category are included in all 19 studies considered and prove to be statistically significant in 17 of the 19 articles reviewed.

Figure 1. Evolution of the private credit flow, consolidated (% of GDP): 2007, 2008, 2011, 2014 for a set of European countries (Germany, Czech, Poland, Italy, Greece, UK, Romania, Lithuania, Ireland, Spain, Latvia).



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The indicator can be measured in various ways. A popular measure is the credit-to-GDP ratio, as mentioned by Kauko (2014) – the amount of debt "must be somehow proportionate to the size of GDP" (Kauko, 2014, pg. 295). As a disadvantage of this approach mentioned by Davis et al. (2011) is that the indicator is very sensitive to additional variables. On the other side, it seems that the growth rate of credit stock has a stronger prediction power, but in this case significant attention should be paid to the lag-length selection. In the

studies of Jorda et al. (2011), Demirguc-Kunt and Detragiache (2000), Schularick and Taylor (2012) the credit's volume growth rate is statistically significant with a lag of minimum two years. In other studies (Barrel et al., 2010) the credit growth lagged only with one year has no power in predicting a financial crisis.

The Bank for International Settlements, under the Basel III framework, proposed the mechanism of countercyclical capital buffers requiring that the buffers should be established in economic boom, based on the evolution of the gap derived from the ratio on non-government credit to GDP. This gap is calculated as the deviation of credit growth from its long-term trend, by applying a Hodrick – Prescott filter (Jakubik, Moinescu, 2015). Babecky et al (2013) draw attention that the credit-to-GDP gap doesn't show a clear picture in what concerns signaling a future crisis, as it increases slowly before a banking crisis and begins to decrease one year into the crisis.

In the case of the macroeconomic imbalance procedure, the scoreboard indicator for assessing the credit level is the private sector credit flows (transactions) expressed in percent of GDP, including loans and securities other than shares, non-consolidated data. Data sources for this indicator are: the annual financial accounts, balance sheets collected by Eurostat and the quarterly financial accounts collected by the ECB (European Commission, 2012). The threshold established in the Macroeconomic Imbalance Procedure (MIP) for this indicator is 14%, determined by the upper quartile of the historical data.

In Figure 1, we present the evolution of the indicator depicted in the MIP for a set of European economies in four time periods: 2007, 2008 and 2011, 2014. Throughout the years 2000, Germany has recorded very low levels of the credit flow, with a maximum of 2.2% in 2007. On the other hand, the Baltic countries (Latvia, Lithuania and moderately Estonia) have recorded very high levels of credit, reaching about 30% of the GDP before the crisis and negative outcomes several years after the crisis. Ireland has also registered a peak level of 40% in 2006, declining after the crisis, but unlike other countries with similar credit flow values, the indicator oscillated between positive and negative results, with a stable positive value in 2014. Slovakia, Finland, Sweden, Poland, France, Austria and Malta are the European economies that had only positive values for the private sector credit flow in the period 2003 – 2014.

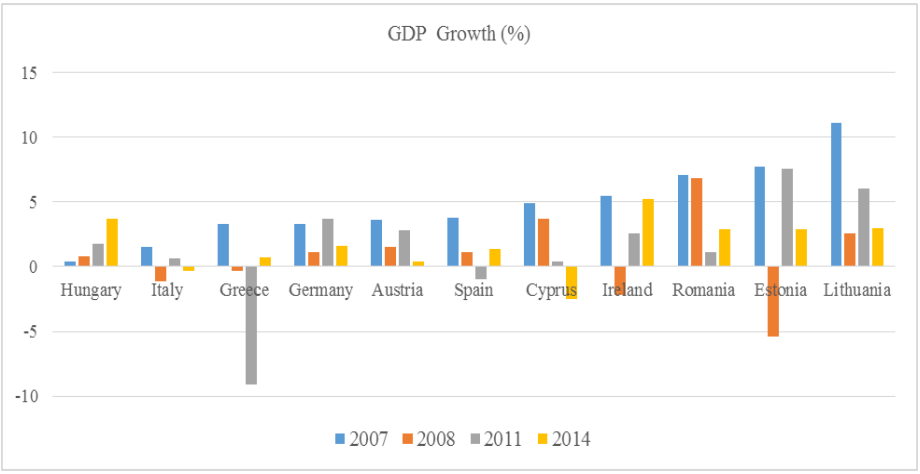
2.2. GDP growth

The GDP growth rate is usually associated with the economic development. In a boom phase of the economic cycle, we expect that the GDP will increase rapidly, while during the recession the situation will be reversed. Although empirically it would seem to be associated more with the effects of the crisis, measures related to GDP have been used also as predictors of the crisis, such as real GDP growth; however, "their significance has not been undisputed" (Laina, 2015, p. 20). The GDP growth is included as a leading indicator in 10 out of the 19 studies reviewed by Laina et al. (2015). 7 of the studies find the indicator significant, 2 of them find it somewhat significant and 1 finds no significance of the indicator.

The impact of the GDP growth may be dependent on the economies' development level (Kauko, 2014). Davis and Karim (2008) find that the slow GDP growth, lagged by two years is a good crisis predictor. On the other hand, Kaminsky and Reinhart (1999) find evidence that the economy grows at higher than average levels about eight months prior to the eruption of a crisis. Another interesting theory points out some differences between advanced and emerging economies in terms of the crisis effect on the GDP growth. Emerging economies with an accelerated growth rate might be more vulnerable to contagion from advanced economies but do not trigger crises by themselves (Jorda et al., 2011).

Kauko (2014) draws attention to the non-linearity of the impact GDP growth could have on the crisis probability, as the crisis in some countries, are caused by overheating and accelerated growth, while other crisis are determined by the slow growth on a long time period. The moderate growth of GDP is a sign of an economy's stability.

Figure 2. Evolution of the GDP growth rate: 2007, 2008, 2011, 2014 for a set of European countries (Germany, Hungary, Italy, Greece, Austria, Cyprus, Romania, Lithuania, Ireland, Spain, Estonia).



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In Figure 2 above we have a comparative graph for the GDP growth rate in a set of European economies in four time periods: 2007, 2008, 2011 and 2014. High growth rates of GDP before the beginning of the crisis (2006-2007) are registered in the Baltic countries (a peak of about 12% in Latvia in 2006), in the former economies form the communist block (Slovakia, Poland, Romania, Bulgaria, Czech – GDP growth around 6% in 2006), but also in Ireland and Greece. In 2009, the greatest contraction has been registered by far in the Baltic countries – with negative percentage change of the GDP of about 14%. Hungary, Slovenia, Finland, Croatia had also drops of the GDP growth rate between 6% and 8% in 2009. Although most of the European countries recorded positive levels of the GDP growth in 2011 (or a drop below 2%), Greece is the only country with a severe downturn of the GDP growth rate (-9% in 2011, -7% in 2012 and a slightly positive 0.7% in 2014). After a mild recovery of the European countries in 2011, in 2012 and 2013 negative growths have been registered again and only modest positive rates. Croatia, Italy, Cyprus and Finland are the only countries with a negative GDP growth rate in 2014, the others having very modest growth rates. The peak in 2014 of 5% was met by Ireland and growth rates of around 4% were obtained by Malta, Luxembourg and Hungary.

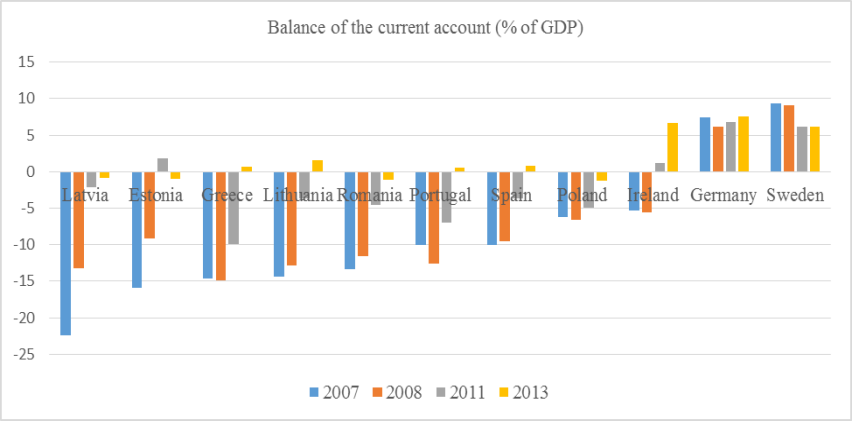
This descriptive analysis confirms our approach and research question. Although before the crisis there appears to be a pattern in the countries' development, with an accelerated growth coming from the emerging economic (Baltic countries, economies from the former Soviet block), it may seem that the crisis had not a more severe impact on these countries, although according to the theory mentioned above these countries were more inclined to contagion effects.

2.3. Balance of the current account

The balance of the current account reflects the connection between the economy and the rest of the world. A current account deficit means that the imports are higher than the exports. Kaminsky and Reinhart (1999) sustain that exports are declining before a crisis determining the deterioration of the current account balance. However a certain level for the current account deficit is considered normal. Emerging economies are usually characterized by deficits due to their engagement in extensive productive activities, financed at least partially by loans. Developed economies, with an aging population are more inclined to savings, hence the surplus of the current account.

A large current account deficit or surplus can be the signal of a macroeconomic disequilibrium. If the deficit is too high than the external debt cannot be sustained, whereas if the surplus is large it can indicate weaknesses in the internal demand. The indicator (as % of GPD) is included in the European Commission scoreboard and two thresholds are established: -4% for deficit, +6% for surplus. The thresholds are set based on the evidence found in the specialty literature and on the historical distribution of the indicator. Bussiere and Fratzscher (2006) show that for emerging economies, the current account deficit before a crisis is of -2.7% of GDP and in two years following a crisis it reaches 0.46% of GDP. Other studies (Reinhart and Rogoff, 2009) find that the average current account deficit averages 3% of the GDP a year prior to a financial crisis, for developed economies. Moreover, most of the econometric analysis support the idea that financial crisis are usually preceded by a current account deficit.

Figure 3. Evolution of the Balance of the Current Account (% of GDP): 2007, 2008, 2011, 2013 for a set of European countries (Germany, Greece, Romania, Lithuania, Latvia, Estonia, Ireland, Spain, Poland, Sweden, Portugal).



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On one hand, a few countries in the European Union (Denmark, Germany, Luxembourg, Netherlands, Austria and Sweden) have registered only surplus of current account for the entire period 2002 – 2013, however we cannot identify a pattern of erosion of the indicator in the years following the financial crisis. On the other hand, for countries with a large deficit before the crisis, we notice a reduction of the deficit in the post 2008 period. The evolution of the current account balance for some of these countries, such as the Baltic countries with very large deficits, Greece, Romania, Spain or Portugal can be observed in Figure 3 above. In Bulgaria, the deficit decreased from a negative 23% in 2008 to a balanced 0.1% in 2011 and -0.8% in 2012. For Cyprus the decrease was done on a slower pace, from a deficit of 16% in 2008 to a deficit of 7% in 2012.

3. Case Study

The purpose of the case study is to evaluate whether the financial crisis that emerged in 2007 and was experienced in 2008 by most of the European countries has produced similar effects to different groups of economies. That is, the question we are trying to answer is to what extent one can state that the emerging European economies have been more affected by

the global financial crisis than the advanced European economies. In order to test this hypothesis we adopt a method based on a cluster analysis. It is worth mentioning that this is a novel approach that we haven't found in the specialty literature as far as our research has been conducted.

We base our comparative analysis on three indicators that we have detailed in the first part of the article. These indicators are briefly reiterated in what follows.

- A variable measuring the development of the banking sector – namely "The private sector credit flow", defined in the Macroeconomic Imbalance Procedure ("the net amount of liabilities in which the sectors Non-Financial corporations, Households and Non-Profit institutions serving households have incurred along the year" - as defined by Eurostat); the indicator is expressed as percentage of GDP;
- An indicator for the economic development – the growth rate of the GDP; as per Eurostat methodology: "for measuring the growth rate of GDP in terms of volumes, the GDP at current prices are valued in the prices of the previous year and the thus computed volume changes are imposed on the level of a reference year" (Eurostat).
- A variable showing the equilibrium of the economic system – the balance of the current account, calculated as percentage of GDP.

The cluster analysis is conducted on the three indicators for two periods: before and after the crisis. For conducting the analysis before the crisis we take into account the period 2004 – 2007 for all three indicators, whereas for the aftermath of the crisis we consider the period 2010 – 2014. We exclude from the analysis the years 2007 and 2008, as the macroeconomic indicators have known chaotic evolution during this structural break.

The countries from the sample include the European economies, but we have excluded the outliers: Luxembourg (outlier for the Credit Flow variable), Latvia (outlier for Credit Flow, Balance of the current account), Cyprus (outlier for the Credit Flow), Bulgaria (outlier for Balance of the Current Account). We have also chosen to exclude Malta from the initial sample given the small size of the economy. Thus we have a final sample of 23 countries (in the parenthesis we noted the codes of the countries as they are mentioned in the dendrograms): Austria (AU); Belgium (BE); Croatia (CR); Czech Republic (CZ); Denmark (DEN); Estonia (EST); Finland (FIN); France (FR); Germany (G); Greece (GR); Hungary (HUN); Ireland (IRE); Italy (IT); Lithuania (LIT); Netherlands (NET); Poland (PL); Portugal (POR); Romania

(RO); Slovakia (SVK); Slovenia (SVN); Spain (SP); Sweden (SW); United Kingdom (UK).

3.1. Results of the cluster analysis before the crisis

The dendrogram (Figure 4) shows how the clusters before the crisis are created. We reiterate that the period considered for the variables in this first part is 2004 – 2007. The analysis suggests four groups of economies, if we take a cut-off value of 50 for the dissimilarity measure. The dissimilarity measure used it the Euclidean distance, all calculations were performed using Stata 13 software.

A first cluster (that we will define as Cluster 1) is comprised of: Austria, Belgium, France, Italy, Germany, Czech Republic, Poland and Slovakia. Three sub-clusters can be delimited – one formed by Austria, Belgium on one side, France and Italy on the other side; a second sub-cluster with Germany and a third one with central-east European countries: Czech, Slovakia and Poland (all three have acceded the EU in 2004). From Table 1 with the summary statistics of each indicator, we notice that the countries in this cluster are characterized by the lowest average of the credit flow from all four groups of economies, a moderate GDP growth and slightly negative balance of current account. We could consider the countries in this cluster with a "Stable development", most of them are founding members of the EU, while the surprise is the presence of the economies form the ex-soviet block of Czech, Slovakia and Poland in this cluster. This shows their stable and healthy development after 1990.

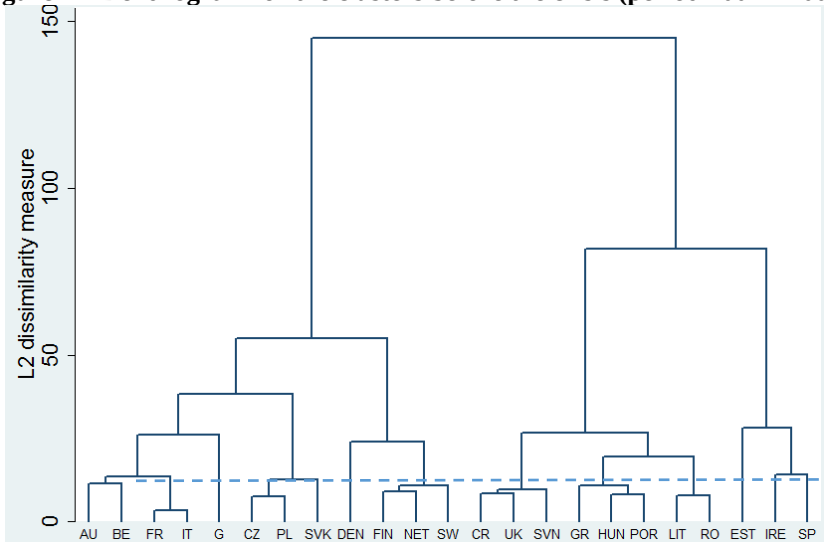
The second cluster of economies is centered around Finland, Netherlands and completed by Sweden and Denmark. We can define Cluster 2 as the Scandinavian cluster considering that three out of four countries in this cluster are situated in the Nordic part of Europe. Although they are characterized by the lowest GDP growth from all four groups of economies, this is the only cluster with a positive balance of the current account. The credit flow has a moderate average. From a macroeconomic equilibrium point of view this is the "Very stable" group of economies.

The third cluster is comprised of: Croatia, Slovenia, United Kingdom, Greece, Portugal, Hungary, Romania, Lithuania. This cluster is dominated by the emerging economies from the ex-communist block like Croatia, Slovenia, Romania, Hungary or Lithuania, but we also find the emerged economies of Greece, Portugal or even UK. The group of economies is characterized by an

accelerated pace of the credit flow (still at the borderline of the 14% threshold), triggering the GDP growth and a significant deficit of the current account, as can be seen from Table 1. We can denote this group as the "Accelerated Growth" group of economies.

A fourth cluster of economies is delimited in the right side of the dendrogram and is formed of only three countries: Estonia, Ireland and Spain. Looking at the macroeconomic indicators (Table 1), the credit flow for this group of countries is almost double than the one of the previous group, with an average of 26%. The average value is also significantly higher than the threshold of 14% defined in the Macroeconomic Imbalance Procedure. The negative average of the balance account is also below the threshold defined by the EU (-8% average for the fourth cluster versus the threshold of -4%). The GDP growth pace is the highest of all four groups, sustained by the credit expansions. We can define the countries in this cluster as the "Heated economies". From an economic theory point of view, the last two groups of economies are the most vulnerable in a crisis situation, as the economy is overheated. We will see if the theory holds considering the migrations between the clusters after the crisis.

Figure 4 – Dendrogram for the clusters before the crisis (period 2004 – 2007)



Source: author's calculation

Table 1 – Summary of the indicators for the clusters before the crisis

	Average of Credit flow (% of GDP)	Average of GDP growth (%)	Average of Balance of the Current account (% of GDP)
Cluster 1	6.7625	3.8812	-0.6844
Cluster 2	12.9062	3.2625	5.7687
Cluster 3	14.4719	4.4625	-7.3125
Cluster 4	26.375	5.925	-8.0917

Source: author's calculation

3.2. Results of the cluster analysis after the crisis

The same method of constructing the clusters is applied on the 23 economies, but based on the three economic variables registered for the period 2010 – 2014. The associated dendrogram and the table with the indicators average are presented in Figure 5 and Table 2. The cut-off value of the dissimilarity measure is taken at 40, so that we obtain a number of four clusters to ensure the comparative analysis with the ante-crisis situation.

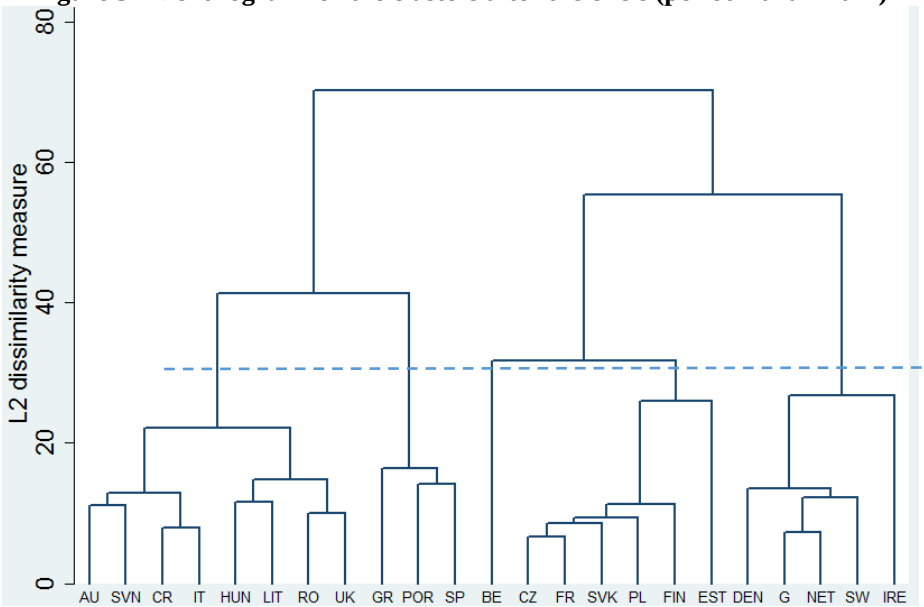
A first group of economies (left side of the dendrogram in Figure 5 and denoted as Cluster 1 in Table 2) is defined by: Slovenia, Croatia, Hungary, Lithuania, Romania, United Kingdom, Italy and Austria. The first six economies are grouped in the third cluster of "Accelerated growth" economies in the ante-crisis analysis, while Italy and Austria were in the first cluster of "Stable and Healthy development". We noted that based on the economic theory, these countries are prone to be affected by the financial crisis. This is confirmed by the indicators reflected in Table 2 – the average GDP growth places this group as the second most affected by the financial crisis, but still the average is positive. The credit flow is negative, showing a contraction of the financial sector, while the balance of the current account suggests a stable evolution of the macroeconomic context. We can consider that these countries are in the "recovering" phase after the global crisis.

The second group of economies (Cluster 2 in Table 2), continuing from right to left in the Dendrogram (Figure 5) is a small cluster of three economies: Greece, Portugal and Spain. As can be seen from Table 2, this

group is characterized by the weakest performance registered after the global crisis, with a negative GDP growth, contraction of the credit stock and current account deficit slightly below the threshold defined by the EU. Greece and Portugal were in the "accelerated growth" group of countries before the crisis, while Spain was in the "heated" economies cluster. The migration of the three economies into the "Not recovered" group of economies after the crisis is a confirmation of the economic theory mentioned above.

In the third cluster we find: Belgium, Czech Republic, France, Slovakia, Poland, Finland and Estonia. The average indicators for this cluster show a comfortable GDP growth, an increase in the credit flow and a manageable deficit of the current account. We can state that this is the "Recovered" set of economies after the crisis. The first five countries in this group were situated in the first cluster of "Stable" economies before the crisis, so their presence in this cluster is predictable. The same comment is valid for Finland. However, Estonia was situated before the crisis in the "heated" economies zone and we would have expected to be more affected by the financial crisis.

Figure 5 – Dendrogram for the clusters after the crisis (period 2010 – 2014)



Source: author's calculation

Table 2 – Summary of the indicators for the clusters after the crisis

	Average of Credit flow (% of GDP)	**Average of GDP growth (%)**	**Average of Balance of the Current account (% of GDP)**
Cluster 1	-0.575	1.0375	-0.3375
Cluster 2	-3.8467	-2.16	-4.1167
Cluster 3	4.4543	1.9086	-1.3429
Cluster 4	3.152	1.524	6.37

Source: author's calculation

The last group of countries (Cluster 4 in Table 2) is comprised of: Denmark, Netherlands, Sweden, Germany and Ireland and has the best evolution of the macroeconomic indicators from the four clusters defined. The first three countries emerge from the Scandinavian group which was very stable and sound before the crisis; Germany was also in the safe and stable part, whereas Ireland was, as Estonia, among the most vulnerable to crisis economies.

The migration of Estonia and Ireland from the vulnerable side to the "well recovered" economies it's surprising and the particularities of these economies should be studied more in depth. Austria and Italy are the only two economies that have migrated from "Stable" economies (first two clusters in the ante-crisis situation) to "Recovering" countries (first two clusters in the post-crisis image), being the countries for which the indicators have shown a significant downgrade after the crisis. These conclusions show that a universal pattern cannot be established and one must take into account economies' specific features.

Conclusions

The focus of this paper was to test whether the global financial crisis from 2008 had more severe effects on emerging European economies than on advanced ones. The economic theory suggests that emerging economies are more vulnerable to contagion effects from financial stress situations triggered by the advanced countries.

We use a cluster analysis to test this theory and to obtain a classification of the European economies based on their recovery level after

the crisis. Using the evolution of three macroeconomic indicators, we obtain four groups of economies before the crisis that we denoted as: Very Stable, Stable Development, Accelerated Growth and Heated Economies, in the ascending order of their assumed probability to be affected by a financial crisis. In other words, we would expect that the economies in the "Heated" group are the most vulnerable to a crisis, considering the behaviour of the indicators as reviewed from the specialty literature in the first part of the paper. When repeating the analysis after the crisis, we obtain four clusters, corresponding to the four groups before the crisis, as: Well recovered, Recovered, Recovering and Not recovered economies. For instance, 6 of the 8 countries in the "Accelerated growth" are found in the "Recovering" group. Italy and Austria have migrated in the "Recovering" group from the "Stable development" cluster. An interesting evolution is of the "Heated economies", comprised of Estonia, Spain and Ireland – Spain being the only one found in the "Not Recovered" group, while Estonia is in the "Recovered" section and Ireland in the "well recovered" cluster. This is a very surprising finding and shows that the overheating theory does not hold in all cases. Moreover, emerging economies like Czech, Poland and Slovakia are grouped together with advanced economies, while Greece and Portugal have similar characteristics to Croatia, Slovenia or Hungary.

All our findings are evidence of the different levels of development for the member states, the fact that each economy has certain particularities when facing a stressful situations and furthermore, that the macroeconomic policies cannot be applied to groups or categories of countries but have to take into consideration the special features of the macroeconomic context.

References

- Alert Mechanism Report (2012), European Commission.
- Babecky, J., Havranek, T., et al. (2013),"Leading indicators of crisis incidence evidence from developed countries", Journal of International Money and Finance 35: 1 – 19.
- Barell, R., Davis, E., Karim, D., Liadze, I. (2010), "Bank regulation, property prices and early warning systems for banking crises in OECD countries", Journal of Banking & Finance 34: 2255 – 2264.
- Bussiere, M., Fratzscher, M. (2006), "Towards a new early warning system of financial crises", Journal of International Money and Finance 25: 953–973.

- Cimpoeru, S. (2015) "Modelarea econometrică a crizelor financiar – economice", Editura ASE, Bucuresti, ISBN 978-606-505-916-0.
- Davis, E. P., Karim, D., Liadze, I., (2011): "Should Multivariate Early Warning Systems for Banking Crises Pool Across Regions?" Review of World Economics 147, pp. 693–716.
- Davis, E.P., Karim, D. (2008), "Could early warning systems have helped to predict the sub-prime crisis?" National Institute Economic Review 206: 35–47.
- Demirguc-Kunt, A. & Detragiache, E. (2000), "Monitoring Banking sector fragility: A multivariate Logit Approach", World Bank Economic Review, vol. 14, no.2: 287 – 307.
- Jakubik, P., Moinescu, B. (2015), "Assessing optimal credit growth for an emerging banking system", Economic Systems, vol. 39 (4): 577 – 591.
- Jorda, O., Schularick, M., Taylor, A.M. (2011), "Financial crises, credit booms and external imbalances: 140 years of lessons". IMF Economic Review 59: 340–378.
- Kaminsky, G.L. & Reinhart, C.M. (1999), "The twin crises: the causes of banking and balance-of-payments problems", American Economic Review 89: 473–500.
- Kauko, K. (2014), "How to foresee banking crises? A survey of the empirical literature", Economic Systems 38: 289 – 308.
- Laina, P., Nyholm.J., Sarlin, P. (2015), "Leading indicators of systemic banking crises: Finland in a panel of economies", Review of Financial Economics, vol. 24: 18 – 35.
- Reinhart, C.M. & Rogoff, K.S. (2009) "This Time is Different: Eight Centuries of Financial Folly", Princeton University Press, New Jersey.
- Reinhart, C.M. & Rogoff, K.S. (2013) "Banking crises: an equal opportunity menace", Journal of Banking and Finance, vol. 37: 4557 – 4573.
- Schularick, M., Taylor, A.M. (2012). "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008." American Economic Review 102(2): 1029 – 1061.