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The Recent Financial Crisis and Its Impact on the Performance Indicators of Selected Countries during the Crisis Period : A Reply

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Abstract:

The recent financial crisis has caused a considerable slowdown in most developed countries and has also affected financial markets and growth prospects in developing countries. As the stock market is considered the barometer of any real activity, the first signs of the financial crisis were visible through the changes registered by the above performance indicators that characterized the stock markets.

The main aim of this paper is to analyze the performance of the stock market indicators during the recent financial crisis in several countries. In fact the paper is emphasizing the different ways in which the recent crisis has influenced countries with a mature capital market, as the Western European countries, Japan and the USA, and how their turn has affected the emerging ones, as the Central and Eastern European countries.

The study refers to a sample of ten selected countries and through an empirical analysis of selected indicators, such as market capitalization, turnover, share price indices and other main indicators that reflect the performance of the whole capital market provides a chronological explanation of the evolution of the events on each market during the crisis period.

Key Words: *Financial markets, performance indicators, financial crisis.*

JEL Classification: *G12, G15*

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Introduction

Economies from all over the world continue to suffer the average effect of the recent global financial crisis even today almost five years after 2009 which considered as the year when the crisis came under control. The US economy was the first country experiencing significant problems in the period up to 2009 while other developed European countries have reported somilar problems both of economic and financial nature. Nevertheless, not only the developed financial markets are affected by the economic crisis but also the small developing economies, such as the Polish and the Romanian capital markets, due to their dependence on their Western partners.

We are now witnessing the first crisis of the 21th century, the so called sub-prime crisis, which is the biggest post–war financial crisis. This crisis brought situations characterized by a pronounced instability accompanied by limited volatility and uncertainty in growth. Financial crisis is only one form of manifestation of the economic crisis and reflects the mistrust in the financial system, a significant decrease in the volume of transactions on stock exchanges and a disorder of market mechanisms.

The paper elaborated on the current financial crisis by providing a chronological explanation of the recent financial crisis in the US and in some of the biggest European economies, such as the economies in Austria and Germany, as well as the spillover effect on one of the most recent EU member states, Romania. The paper is an attempt to explain the difference in the financial markets in the above mentioned developed economies and the developing markets and the consequent difference in the impact of the recent crisis on different states.

The recent financial crisis that has spread around the world has caused a considerable slowdown in the global economic landscape, affected financial markets and decreased economic growth; above all, it creates a deep downturn for developing countries particularly at Eastern European countries following ten years of stellar expansion.

Originally called "credit crisis" by the specialists, the financial crisis, mainly, from 2007 to 2009 practically began in July 2007 with the loss of investors' confidence in the financial assets based on portfolios of mortgages securitized (asset backed securities) issued in the US. market. The immediate effect was the emergence of a major liquidity crisis followed by a fairly significant infusion of cash into the system by the Federal Reserve and European Central Bank.

Most vulnerable to this crisis were the financial institutions directly involved in operations of securitization or in mortgage lending operations. These institutions were affected by the immediate crisis' effects such as bankruptcies of these institutions. The first alarm signal was given by the bankruptcy of New Century Financial, a company specialized in providing sub-prime credits in April 2007. The

year that followed was a year of bankruptcies landslide, a year in which many financial companies were withdrawn from trading on stock markets, being then taken partly or wholly by other banks or groups of banks. Lehman Brothers is included among the major financial institutions declared bankrupt and Merrill Lynch among those taken by other financial institutions.

In the global economy this crisis brought with it a loss of confidence in the financial system which has repercussions such as severe loss of liquidity, increased interest rates and the rising cost of internal and external funding.

At a global level the effects of the financial crisis on capital market can be divided into four major categories namely direct effects on financial institutions, effects on volume and stock quotes, market effects on investor behavior and impact on capital market regulations.

The major problem that faced the emerging capital markets such as the Romanian is the withdrawal of foreign investors, as investors went in search of better returns. In the current context investors are very careful in what they invest their capital.

Literature Review

The recent financial crisis was more widespread than the previous ones, as financial systems were deeper connected into each other than before. The recent crisis began in US when the subprime mortgages defaulted. Financial institutions, which are the key intermediaries in the financial system, faced a systematic risk that froze and decreased the capital in the real economy. The subprime mortgages were designed with an interest payment, whereby the mortgagees were planning to refinance to avoid increased mortgages rates (Acharya and Philippo, 2009 ; Liapis *et al.*, 2013; Thalassinos, 2013; Thalassinos *et al.*, 2012; Thalassinos *et al.*, 2014; Thalassinos *et al.*, 2015;).

Some of our research questions are the following:
• What characterizes a financial crisis according to literature?
• To what extent can these literary theories on financial crises explain the repercussion of the recent financial crisis on each national economy?

Therefore the main aim of this study is to acquire and present the necessary knowledge regarding characteristics of financial crises from specific literary theories. In addition, we will select some indicators that will explain the repercussion on the capital market as a result of the current financial crisis. We present the main theories on financial crisis, to provide the reader with a general knowledge on the subject to facilitate further analyzing the recent financial crisis effects on the stock markets. Through the literature we found different views on financial crisis. “A financial crisis is a disruption to financial markets in which adverse selection and moral hazard become much worse, so that financial markets

are unable to efficiently channel funds to those who have the most productive investment opportunities" (Mishkin, 1992). The factors causing financial crisis are increases in interest rates, stock market declines, increases in uncertainty, bank panics and unanticipated declines in the aggregate price level (Mishkin, 1992).

In order to understand the financial crises one needs to take the psychological aspect into consideration. Akerlof and Shiller (2009) are two authors trying to explain the financial crises through a psychological perspective which they call "Animal Spirits". Akerlof and Shiller, reject the "rational man" through "behavioural economics" which is a conventional economic theory that is in favour of human motivation and capacities. They argue that if individuals were rational the depression would not exist, but since the depressions exist, the rational model is not valid. Thus, the key to understanding depressions lies in motivation and behaviours that are irrational. Akerlof and Shiller advocate that irrationality comes from the uncertainty in the market that occurs during a recession. They argued that decision is made through "a spontaneous urge to action" when individuals are uncertain. They also said that "We must pay attention to the thought patterns that animate people's ideas and feelings, their animal spirits. We will never really understand important economic events unless we confront the fact that their causes are largely mental in nature."

Thus, they used a behavioural model that is called "animal spirits" which includes non rational motivation such as "confidence", "fairness", "money illusion", "corruption", "antisocial behaviour" and susceptibility to "stories" to explain the financial crises. According to Akerlof and Shiller, the prices in the market are affected by previous experiences of high returns on assets.

Krugman (2009) introduced a framework about how financial crises emerge and how to look at the problem. The indicators used to looking in what stage of business cycle the economy is heading, are: employment, industry output, private consumption, GDP etc. Thus, when these indicators worsen an economy downturn is bound to happen, according to Krugman. His theory of financial crises includes: a burst real estate bubble, a wave of bank rushes, a liquidity trap, disturbances in international capital flows and a wave of currency crises.

Minsky (1992) contributed with a broad perspective on financial crises and describe it as a series of events that take place in a given order. Mishkin defines financial crises as a worsening of adverse selection and moral hazard where the financial markets are unable to efficiently channel funds. The main drivers according to Mishkin are: increase in interest rates, stock market declines, increases in uncertainty, bank panics and unanticipated declines in the aggregate price level.

Akerlof and Shiller (2009) treat the psychological aspect of a financial crisis. According to them, a financial crisis evolves as a result of five factors; confidence,

fairness, corruption, money illusion and stories. Akerlof and Shiller ignore "the rational man" and argue that irrational thinking causes financial crises.
Krugman explains the financial crises as a burst real estate bubble, a wave of bank rushes, a liquidity trap, disturbance in international capital flows and, a wave of currency crises.

The present era of financial globalisation has at least two important features. First, the high volatility of financial flows for emergent markets and frequency of financial crises; and second the fact that it has largely bypassed to low-income developing countries (Leijonhufvud, 2007).

Financial crises are part of the business cycle (Mitchel 1941; Gorton 1988; Allen, Gale 1998) and under certain circumstances any equilibrium of a model is characterized by contagion. Financial contagion is a process by which a crisis that begins in a country or region spreads to an economically linked region or country. Asymmetric information can determine the rise of a contagion between countries that are affected by common fundaments (Kodres and Pritsker 2002).

Since the 1990s the world economy experienced financial crises and each of them, including the recent one, spread around like a contagious disease sometimes without any fundamental explanation. What is contagion? Is a situation in which a faltering economy in one country causes otherwise healthy economies in other countries to have financial problems or it may be defined as "a significant increase in cross-market linkages after a shock to one country (group of countries)" (Forbes and Rigobon 2001). Even if the recent crisis was originated in a very specific and small segment of the US mortgage market it has spread across the borders following the model described above.

The literature states different types of contagion. The first is contagion through interlinkages between banks and financial institutions, the second one is contagion of currency crises and the third one is contagion through financial markets (De Franklin, Gale, 2007). There are some researches that suggest that financial crises are the result of fundamental macroeconomic conditions. A dramatic example of this debate surrounds the "financial crisis" in East Asia during the late 1990s. A number of papers (Radelet, Sachs, Cooper & Bosworth,1998) highlight the role of the international capital flows in determining the financial instability resulting contagion.

The recent financial crisis initiated in the US has now become a global phenomenon as Nikolson (2008) recognized. Across Europe, Asia and in the US crashes of stock exchanges have been occured. The recent crisis affected not only the capitalist economies but also some socialist economies like the Russian one.

Concerning the cause of the recent crisis Bartlett (2008) argued that this crisis was started with the downfall of US sub-prime mortgage industry being obvious that the

intensity of this collapse was significant. So, the major reason of the recent global financial crisis is the US subprime mortgage industry (Yilmaz, 2008). Khatiwada and McGirr (2008) stated that " many of these sub-prime mortgages actually never made it on the balance shees of the lending institutions that originated them" while enlisting the factors that made this US sub-prime mortgage crisis turn into a global banking crisis due to the fact that they were attractive to the foreign banks by high investment grading.

Emerging markets have often paid a high short-term price for relying on foreign capital, as a long list of emergeing financial crises attests such as the present one. So we can 'think of capital flows as a medicine with occasionally horrible side effects' (Rodrik, 1998).

The literature places a part of the blame either on the emerging markets or on policy failings of the official and multilateral sectors. There are some suggested reforms to the global financial system to date focused largely either on institutional and policy changes required (Mishkin, 2006) or international crisis-resolution procedures which would only come into play once a crisis is already well under way (Roubini and Setser, 2004).

Methodology and Data

The theoretical models summarized above have guided our choices regarding the prefered financial indicators. Indicators such as share price indices, stock market turnover and stock market capitalization were chosen, in order to describe and explain the impact of the crisis on capital markets. The article employed a quantitative research where the empirical data were collected from the period 2006 to 2009 in order to take into consideration the real changes happened before and during the recent crisis; it is imperative to examine the years prior to the beginning of the crisis as well as their development in the meantime.

The main role of stock markets is to finance the economy by raising capital in the medium and long-term. Another important function they have is that capital markets provide liquidity to the economy. The stock market is also the instrument of important reorganizations and restructurings in different sectors of the economy. Stock markets accurately reflect the overall situation of an economy, the trends, the developments and it's perspectives. Particularly useful for this purpose is the study of stock market indices, calculated as an average of developments and trading volume for a representative sample of shares or for all the shares. It also facilitates exchange reorientation and restructuring of the economic activity in the country under consideration.

For the present study we have chosen three important indicators to analyze in order to see the way how the actual crisis has affected the capital markets in 10 countries.

The selected 10 countries are the following: United States of America, Japan, Austria, Germany, Spain, Greece, Romania, Hungary, Poland and Slovenia.

To achieve the proposed objectives of this study we will focus our research on data regarding the capital markets from the countries mentioned above. The three indicators chosen are:

1. Share price indices are normally based on a selection of shares, aim to represent share price movements in stock markets. Stock indices express the evolution rate securities in a market. The significance of an index is on it's structure. Thus, evidence of the first generation, in which also include actions whose issuers have the same area of activity (Dow Jones Industrials, Financial Times, Nikkei, etc.) have a limited capacity information. Indices of the second generation, also called composite index (NYSE, FT-SE - 100), have a higher degree of relevance, due to capture a larger number of firms belonging to different fields, including banking institutions, insurance companies in the transport industry, telecommunications, etc. Because of that we chose to analyze indices of second generation for each selected country. The number of stocks used in the national indices varies as well as their weightings and the releted formula used (Laspeyres-price-index, Paasche-price index). The share price indices used for this study were rebased to 2001 = 100.

2. Stock market turnover measures the total value of shares traded (domestic and foreign shares and closed-end investment funds only, to avoid double counting). In order to reach a more accurate comparison level in turnover figures, the World Federation of Exchanges introduced a new split which distinguishes three main categories of trades according to the facility/way used to effect the trading:
   - *Trades effected through the Electronic Order Book*. This category includes all transfers of ownership done by way of trades automatically executed through the Exchanges' electronic order books. This is the platform where price discovery takes place.
   - *Negotiated Deals*: This category includes all transfer of ownership done by way of trades executed away from the electronic order book, and involving at least one exchange's member intermediary. These trades are bilateral negotiations that are not exposed to the market until the trade is completed. Trades can be executed in a number of ways, including special trading platforms, trading by telephone or other structures, and are reported by the member to the exchange's authorities.
   - *Other Trading Activity*: This category includes certain trade-related activities. These figures enable some exchanges to complete the picture of their trading activity by restoring the full chain of transactions. Some of this exchange business is due to local

securities laws. For these markets, this includes a number of trading or trade-related activities which cannot be reported in the other two sections, and therefore in the total.

3. Stock market capitalization is an indication of the size and performance of stock markets, and therefore important for private investor capital in the economy. Stock market capitalization is calculated by multiplying the volume of shares quoted on the stock market by their market value. The series covers common and preferred shares, and shares without voting rights. Excluded are investment funds; rights, warrants, convertible instruments; options, futures; listed foreign shares and companies whose only business goal is to hold shares of other listed companies.

In this article we used monthly data for the indicators presented above from January 2006 till December 2009 from the stock market of each country in the sample. The corresponding indices are the following : DJIND, NIKKEI 225, ATX, DAX 30, IBEX 35, ASEGENL, BETC, BUX, WIG and SBI index. The number of observations for each index is 48. This number is also valid for the other two indicators: the stock market turnover and the market capitalization. Analyzing the monthly data we noticed that August 2007 is identified as the structural break point separating the pre-crisis and the crisis period. So for each indicator we have 20 pre-crisis observations and 28 crisis observations.

In Table 1 we presented the annual average value for the share price indices for each selected country during the study period. It is obvious that during 2006 and 2007 the average value of this indicator has a growing trend but for the last two years the trend is a descending one. We can also find that the percentage of decrease regarding the share market indices is bigger in the emerging markets than in the developed ones. For example when in the US the decrease was of 14.53% in 2008 and 21.12% in 2009, the average value in Romania, which is an Eastern European emerging market the decrease in 2008 was 32.45% and in 2009 48.76%. Analyzing the data collected we found that the effects of the crisis were stronger felt on the emerging market indices rather than on the indices of developed markets.

Table 1 : *Annual average value of the share price indices (rebased to 2001 = 100)*

State/Year	2006	2007	2008	2009
United States	111.825	129.058	110.300	87.000
Japan	133.241	140.308	100.441	77.100
Austria	340.375	398.900	290.341	184.083
Germany	105.050	133.058	110.566	89.383
Spain	138.038	168.183	134.591	113.183
Greece	141.333	172.358	120.450	76.991
Romania	912.358	1231.141	831.533	426.016
Hungary	326.558	378.141	286.200	232.533
Poland	299.791	410.308	282.991	222.600
Slovenia	251.400	472.541	364.050	193.966

Graph 1 represents the evolution of the share price indices for the selected countries. As it is shown from the average value of this indicator the reactions to the sub-prime crisis that occurred on US mortgage market are visible on the stock market. It is clear from the graph the contagion phenomenon described above concerning the financial crises in general, in particular concerning the actual crisis. It is also observed that the lowest values for this indicator were registered in the first three months of 2009.

Graph 1 : *Evolution of share price indices*

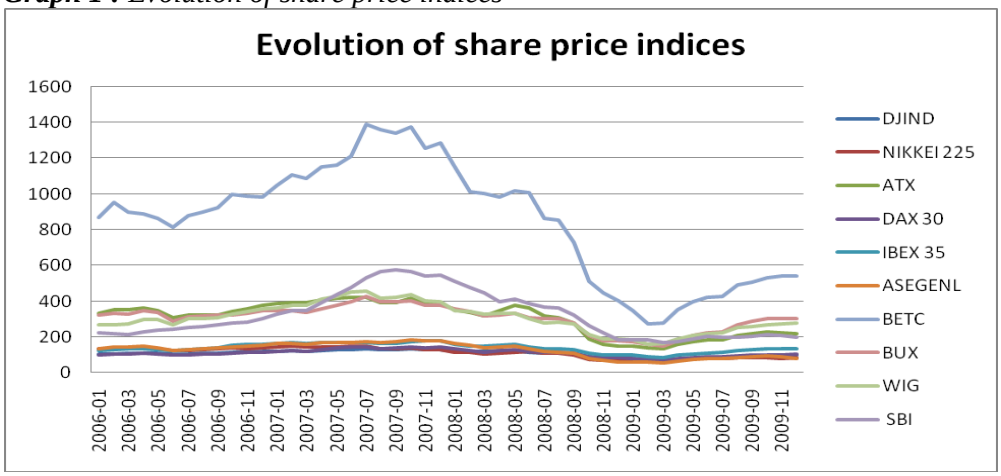


Table 2 presents the annual average value for the stock market turnover for each selected country during the study period. US is the only state from our sample were the values in 2008 are higher than the values recorded in 2007. Analyzing the average values it is clear that the percentage of the decrease registered in emerging markets are higher than those registered on developed markets. While on developed markets the percentages of drop are around 20% in the emerging markets is about 40%. So the events on the US market created a deep downturn in the developing countries particularly in Eastern European countries.

Table 2 : *Annual average value of the stock market turnover billions Euros*

State/Year	2006	2007	2008	2009
United States	2218.663	2677.923	3984.199	2800.178
Japan	403.504	406.953	330.031	249.776
Austria	5.407	7.878	5.987	3.037
Germany	180.404	262.012	220.704	134.709
Spain	127.453	179.899	137.879	95.762
Greece	7.111	10.216	6.501	4.227
Romania	400.503	339.217	188.631	132.329
Hungary	2.037	2.888	1.745	2.723
Poland	3.679	5.321	3.993	3.447

Slovenia	0.135	0.272	0.133	0.090

Graph 2 presents the evolution of the stock market turnover. The trend registered by this indicator on the US market is followed by the indicators from the rest of the countries included in our sample. The shrinkage in market turnover is largely a global phenomenon, resulting from price effect and a drop in the trading of non-HSI stocks by retail investors. The lower values of the indicator were determined, from a macro-economic perspective, by the loss of wealth in the stock and the property markets. Another factor that we should take into consideration to explain the descendent trend of the stock market turnover can be the flow of capital because, especially for the emerging markets, the capital flow to the local stock market from abroad has been declined. The flow of capital is sensitive to market sentiment (Lee, Poon 2003) So taking into consideration the poor performance of the local market in the last two years it is not surprising that capital might have flowed to other markets.

Graph 2 : *Evolution of stock market turnover*

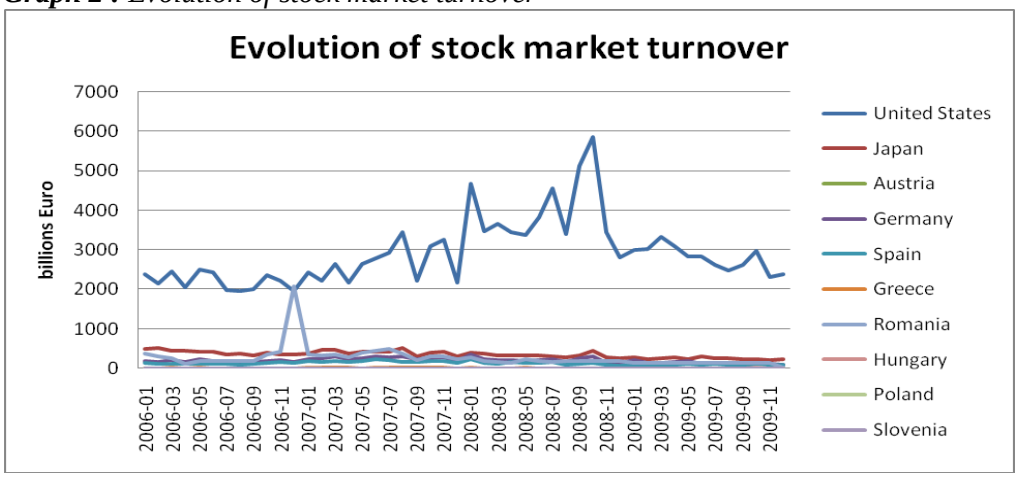


Table 3 presents the annual average value for the stock market capitalization for each selected country during the study period and Graph 3 presents the evolution of the market capitalization. As it is we stated above 2008 is the year when it is notable the decrease using annual data. What it has been discovered is the fact that for two of the countries in the sample the percentage of the decrease in 2009 is lower than in 2008. This situation is for US and Japan's stock markets were we found a drop of 24.08% and 24.37% in 2008 from 2007 while in 2009 the drop was 17.79% for the US market and 12.52% for Japan.

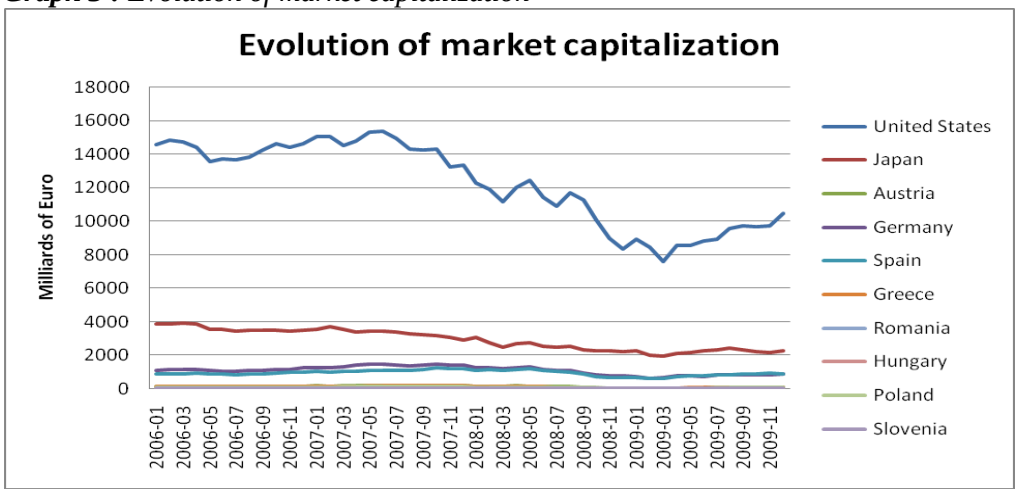
Table 3 : *Annual average value of the stock market capitalization million Euros*

State/Year	2006	2007	2008	2009
United States	14287.994	14561.49	11054.907	9087.917
Japan	3645.950	3362.485	2543.021	2224.548

Austria	126.067	159.008	111.366	67.257
Germany	1133.429	1392.623	1091.350	794.906
Spain	905.970	1125.020	983.854	787.919
Greece	140.795	170.470	117.054	77.300
Romania	19.212	25.283	24.477	14.251
Hungary	27.934	33.137	23.555	15.936
Poland	93.938	142.038	108.890	74.875
Slovenia	8.390	16.848	13.675	8.710

Concerning the European markets the evolution of market capitalization had also a descendent trend but the percentage of the decrease registered in 2009 was bigger than the one registered in 2008 for both developed and emerging markets. The decrease registered in 2008 for developed countries was 21.38% while for the emerging ones was 21.12% while for 2009 the decrease of market capitalization was 28.89% and 35.12% respectively

Graph 3 : *Evolution of market capitalization*



Empirical Evidence

The econometric method of Granger causality is used in order to test the relationship between the evolution of the share price index from US and the rest nine indices from the countries included in the sample. Testing causality, in the Granger sense, involves using F-tests to test whether lagged information on a variable Y provides any statistically significant information about a variable X in the presence of lagged X. If not, then "Y does not Granger-cause X."

In other words, a variable Y is said not to Granger-cause a variable X if the distribution of X, conditional on past values of X alone, equals the distribution of X, conditional on past realizations of both X and Y. If this equality does not hold, Y

is said to Granger-cause X. If Y can predict future X, over and above what lags of X itself can, then Y Granger causes X. Granger causality tests are widely used in applied economics as a way to determine if a variable has been a leading indicator of another over the past.

G-causality is normally tested in the context of linear regression models. For illustration, consider a bivariate linear autoregressive model of two variables X_1 and X_2:

$$X_1(t) = \sum_{j=1}^{p} A_{11,j} X_1(t-j) + \sum_{j=1}^{p} A_{12,j} X_2(t-j) + E_1(t)$$

$$X_2(t) = \sum_{j=1}^{p} A_{21,j} X_1(t-j) + \sum_{j=1}^{p} A_{22,j} X_2(t-j) + E_2(t)$$

where p is the maximum number of lagged observations included in the model (the model order), the matrix A contains the coefficients of the model (i.e., the contributions of each lagged observation to the predicted values of $X_1(t)$ and $X_2(t)$, and E_1 and E_2 are residuals (prediction errors) for each time series. If the variance of E_1 (or E_2) is reduced by the inclusion of the X_2 (or X_1) terms in the first (or second) equation, then it is said that X_2 (or X_1) Granger-(G)-causes X_1 (or X_2). In other words, X_2 G-causes X_1 if the coefficients in A_{12} are jointly significantly different from zero. This can be tested by performing an F-test of the null hypothesis that $A_{12} = 0$, given assumptions of covariance stationarity on X_1 and X_2. The magnitude of a G-causality interaction can be estimated by the logarithm of the corresponding F-statistic (Geweke 1982).

As mentioned above, G-causality can be readily extended to the n variable case, where $n > 2$, by estimating an n variable autoregressive model. In this case, X_2 G-causes X_1 if lagged observations of X_2 help predict X_1 when lagged observations of all other variables $X_3 \dots X_N$ are also taken into account.

An empirical test was done on the causal relationship between DJIND and indices from Japan, Germany, Austria, Spain, Greece, Romania, Poland, Slovenia and Hungary. We employed monthly observations for share price indices. The analysis covers the period 2006-2009 and comprises a total of 480 monthly observations.

Results reported in Appendix 1 confirm the existence of causal relationship from US share price index to indices from the others countries included in the sample. In other words, the decrease in share price indices both in developed and emerging markets is due to the evolution of the US index.

Now we tested the existence of a casual relationship between the share price indices and the market capitalization of each capital market.

Pairwise Granger Causality Tests
Sample: 2006M01 2009M12
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
MK_US does not Granger Cause DJIND	46	1.58900	0.21644
DJIND does not Granger Cause MK_US		2.73945	0.07644

For the US capital market the result confirm the existence of the casual relationship mentioned above. The causality mentioned above it is illustrated in **Appendix 2.** Taking into consideration the analysis above we can conclude that both emerging and developed countries from our sample display signs of contagion.

Conclusions

Emerging economies of Eastern Europe were hit more hard by the economic crisis than most countries and need help recovering. After several years of accelerated growth, these countries were forced to borrow billions of euros from international institutions to survive the crisis. Even countries that had suffered less strongly felt the effects of recession, such as the collapse of exports, decreased stock exchanges and limited lending.

One of the biggest problems is a huge budget deficit of countries in the region. In countries that already appealed to a cutting budget spending the crisis affected consumption and the standard of living. Besides the deficit, most Eastern European countries have more problems, the most important is the fact that natural resources is dependent on imports, imbalance of exports, small capital markets and inefficient production and use of energy.

Regarding the banking system, the fact that, through international cooperation, an agreement was reached against withdrawal from emerging markets in South East Europe is seen as a crucial step in keeping the crisis under control.

The other major difference compared to previous crises is that foreign investment in the region proved to be of long duration, instead of being of short duration hedge. Entrepreneurs have come to a look at Eastern Europe as a larger domestic market and have long-term strategy. This has brought much needed stability.

On the other hand, limiting lending and foreign loans are a real burden on the budgets. Because of the crisis, public institutions have realized the enormous importance of correct capitalization. For several years now, the private financial

sector will be concerned about the consequences of the crisis. As a result, investors appreciate more than ever a public partner.

The financial crisis that has pushed some emerging economies to the brink, has revealed dangerous inequality between countries in Eastern Europe, two decades after the fall of communism. European Union countries, together with the southern Balkans have entered into recession because of credit crisis and lost foreign investment.

What is striking about Europe is how differently countries fared during the recent crisis. Well developed countries were hit by the decline in trade and capital flows were determined by the openness of the economy and by the quality of policies and institutions rather than by the East-West geographical location of the counrty. These different points of departure will also make a multispeed unequal recovery, so European countries will recover from the recent economic crisis at varying speeds during the next period, with labor markets picking up gradually.

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Appendix 1 :

Pairwise Granger Causality Tests
Sample: 2006M01 2009M12
Lags: 4

Null Hypothesis:	Obs	F-Statistic	Probability
DJIND does not Granger Cause ASEGNL	**44**	**1.26539**	**0.30206**
ASEGNL does not Granger Cause DJIND		2.45486	0.06380
DJIND does not Granger Cause ATX	**44**	**0.16047**	**0.95688**
ATX does not Granger Cause DJIND		0.75012	0.56466
DJIND does not Granger Cause BETC	**44**	**0.06693**	**0.99142**
BETC does not Granger Cause DJIND		1.75804	0.15946
DJIND does not Granger Cause BUX	**44**	**0.64968**	**0.63091**
BUX does not Granger Cause DJIND		0.62475	0.64797
DJIND does not Granger Cause DAX30	**44**	**0.74140**	**0.57024**

DAX30 does not Granger Cause DJIND		1.03259	0.40422
IBEX35 does not Granger Cause DJIND	44	1.64306	0.18539
DJIND does not Granger Cause IBEX35		**0.56788**	**0.68760**
SBI does not Granger Cause DJIND	44	1.61841	0.19146
DJIND does not Granger Cause SBI		**0.52015**	**0.72146**
NIKKEY225 does not Granger Cause DJIND	44	0.90478	0.47179
DJIND does not Granger Cause NIKKEY225		**0.62535**	**0.64755**
WIG does not Granger Cause DJIND	44	1.38797	0.25820
DJIND does not Granger Cause WIG		**0.94027**	**0.45218**

Appendix 2 :

Pairwise Granger Causality Tests
Date: 02/17/10 Time: 20:49
Sample: 2006M01 2009M12
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
MK_GR does not Granger Cause ASEGNL	46	24.4750	1.0E-07
ASEGNL does not Granger Cause MK_GR		0.57979	0.56454

Pairwise Granger Causality Tests
Date: 02/17/10 Time: 20:51
Sample: 2006M01 2009M12
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
MK_AU does not Granger Cause ATX	46	12.1964	7.0E-05
ATX does not Granger Cause MK_AU		0.06785	0.93451

Pairwise Granger Causality Tests
Date: 02/17/10 Time: 20:52
Sample: 2006M01 2009M12
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
MK_RO does not Granger Cause BETC	46	4.77593	0.01366
BETC does not Granger Cause MK_RO		1.38550	0.26166

Pairwise Granger Causality Tests
Date: 02/17/10 Time: 20:52
Sample: 2006M01 2009M12
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
MK_HU does not Granger Cause BUX	46	8.32954	0.00092
BUX does not Granger Cause MK_HU		1.84525	0.17087

Pairwise Granger Causality Tests
Date: 02/17/10 Time: 20:53
Sample: 2006M01 2009M12
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
MK_GE does not Granger Cause DAX30	46	18.4087	2.0E-06
DAX30 does not Granger Cause MK_GE		0.62403	0.54079

Pairwise Granger Causality Tests
Date: 02/17/10 Time: 20:55
Sample: 2006M01 2009M12
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
MK_JP does not Granger Cause NIKKEY225	46	4.60554	0.01569
NIKKEY225 does not Granger Cause MK_JP		0.41337	0.66414

Pairwise Granger Causality Tests
Date: 02/17/10 Time: 20:56
Sample: 2006M01 2009M12
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
MK_SL does not Granger Cause SBI	46	3.16871	0.05253
SBI does not Granger Cause MK_SL		4.81476	0.01324

Pairwise Granger Causality Tests
Date: 02/17/10 Time: 20:56
Sample: 2006M01 2009M12
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
MK_PL does not Granger Cause WIG	46	12.0807	7.5E-05
WIG does not Granger Cause MK_PL		6.37593	0.00388