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**The Spreading of Financial Crisis: Effect of Investor Behavior or of
Economic Channels**

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Abstract: Objectives It is very important to quantify the influence of various factors in the development of financial crisis. Once these factors can be determined we can attempt to stop this phenomenon or at least minimize its effects. **Prior Work** Previous studies have shown that the phenomenon of globalization makes extremely disturbing phenomena quickly transmitted from one market to another, provided that these markets will be connected. But what is the explanation when countries not linked in any way react in same way at the appearance of disturbances in one of the country? **Approach** We study the phenomenon of contagion by comparing the economy and financial market evolution, in Romania, during the last global financial crisis. **Results** We can conclude that the Romanian market actually reacts to the behavior of investors while the in the real economy effects are felt much later and/or have a weaker intensity. **Implications** For investors it's important to follow their expectations of the market evolution much more than the current economic conditions. **Value** Knowing the influence of various factors in the evolution of financial markets we will know what steps must be taken so that these crises will not be felt in the real economy or their impact will be reduced.

Keywords: financial crisis; investor behavior; linkages

1. Introduction

Tolstoy observed that "Every family is happy just the same. But each unhappy family is unhappy in its own way." Paraphrasing we could say that "Every financial crisis is different and involves its own distinctive features." There are however some elements that are common to many emerging markets' financial crises.

An international financial crisis is a substantial worsening of the international situation, an impairment that should not occur in a closed economy. By this definition, is not underestimating the major role that weak internal features can play in triggering a crisis.

The diffusion of international investments and cross-border capital movements marked the financial markets' evolution and changed the correlations' profile between assets denominated in various

currencies that are trade in markets separated geographically. The volatility of the single market reacts to innovations in other markets as a result of financial integration, which raise the question whether these markets react to crises.

The incidence of financial crises in recent decades has made the research of financial crisis' spreading across borders a top issue and also a very important one, with a focus mainly on the contagion behavior. In order to model contagion developed methodologies showed that normal interdependencies between markets that must be taken into account before the crisis spread through the channels of contagion can be determined.

Links, becoming a channel for the crisis, are in fact fundamental links between countries, such as:

- financial links: arise between financial markets of two economies are closely linked (or forming part of the financial system);
- real links: marked by fundamental economic relations between the two economies, i.e. a similar evolution of macroeconomic indicators and macroeconomic policies of the same type;
- political links: given the political relations between countries or their membership of a regional political group. Usually this type of links appears in geographically defined regions (European Union, NAFTA, ASEAN, etc.).

Changes in the same direction and of the same size that occurs in quiet periods reflect the economic and financial interdependence, such as trade links, systematic capital flows and linkages between banking systems, and this changes are transmitted in both directions. Contagion on the other hand is a component that can not be explained and is unexpected. This view is consistent with some of the research in the field including Masson (1999), where interdependence is equivalent to what he calls "monsoon" and "spillover" with the residual being contagion, Calvo and Reinhart (1996) and Kaminsky and Reinhart (2000) arguing that there is a difference between contagion based on "fundamentals" (interdependence) and pure contagion, and Mody and Taylor (2003) article which states that vulnerabilities is interdependence and contagion is given by unexpected links.

We might also add that the spread of financial crises can be determined by the behavior of investors and especially as the effect of "herd behavior" (copying the actions of other investors), the asymmetry of information or "cascades" of financial information.

2. The Economic Crises

The crisis that began in the summer of 2007 came as a surprise to many people. However, for others it was not a surprise. John Paulson, a hedge fund manager, has correctly predicted the subprime market debacle and earned 3.7 billion U.S. dollars in 2007, as a result.¹ The vulnerabilities of the global financial system have been discussed in Bank of England Financial Stability Report.² The effects of that this crisis had on financial institutions and markets have not been estimated. Particularly, what was perhaps most surprising is the role played by liquidity in the current crisis.

To examine how the international financial crisis has spread, we chose to pay attention to Romania, namely the conduct of its financial market starting with the financial crisis outburst.

The synthetic indicator which shows the situation in Romania in 2008, the year that followed the outbreak of the crisis, is the Gross Domestic Product, which was 503,958.7 million, expressed in

¹ Financial Times, 15 January, 2008 și 18 June, 2008.

² Bank of England (2006) & (2007).

current prices, an increase of only 7.1% over the previous year. However this increase was the largest increase recorded by a member of the European Union, the Community average being of only 0.9%. The analysis will be clearer if we follow the evolution of GDP in first and second quarters of 2009, a period deeply affected by the economic and financial crisis with a decrease of -4.6% the previous quarter. Thus GDP for the first quarter of 2009 was EUR 22,998.8 million, with less of 6.2% than the previous year, and the GDP for the second quarter of 2009 was 27272.2 million, with less of 8.7% than the corresponding period of last year.

Macroeconomic indicators have registered a downward trend starting with the till the end of 2009. Thus, GDP registered a reduction in five successive quarters, the unemployment rate crossed the threshold of 7.5%, foreign direct investment fell dramatically to 9.024 million euro, the external debt increased, the domestic debt increased, the balance of payments recorded a huge deficit, the households income trend decreased as the average gross earnings reached 2.023 lei, with 9% more than the previous year, and the average monthly pension reached 593 lei, the national economy different domains registered declines or stagnation, the general government budget has become volatile due to uncertain low incomes etc.

The foreign trade deficit (FOB exports / CIF imports) was 22,708.9 million representing 13.4% of GDP, the highest recorded by our economy so far, although exports registered a growth that outrun imports, respectively 113.8% compared to 109.8%.

We must take into account in our analysis of Romania in 2008 the actual situation our country recorded, so there were various negative factors such as net exports, i.e. the difference between exports and imports had a negative effect over GDP, -1.8% of GDP. The GDP evolution until July 2009 followed the same trend since the early months of 2009 were all 2008 effects. Thus, GDP decreased with 7.6% compared with the same period of 2008, all economic domains had more negative contributions which showed the beginning of a deeper crisis.

2.1. Romanian Economy

The Romanian capital market, being an open market, a market where investors have free access, can be influenced by external events, that is, by definition, can be contagious. Although in the real economy contagion effects occur after a certain time and thus would require a waiting period to assess the degree of contagion, and the effect of a shock in one country is transmitted through several intermediaries that will distort the initial shock, the effects over the capital market are felt immediately on the second capital market as a effect of rapid transmission of information. To measure the contagious influence on Romania during the current financial crisis, we should nevertheless consider classical financial crises' channels of transmission, namely: commercial links, or macroeconomic policies that if Romanian financial market reacted at a turbulence in one of those countries with strong links toward Romania, it does not show the phenomenon of contagion but only shows the interdependence between Romania and those states.

So set the GDP as our benchmark, we can see from the chart below that the evolution of this indicator across the European Union and in Romania is not similar, a normal situation as Romania has a growing economy and most of the European Union countries are countries with mature economies.

Following the inflation trend (Figure 2) we can see that the trend of this macroeconomic indicator for Romania and the European Union is not the same. Thus while the inflation rate in Romania is declining, inflation in the European Union registered a slight increase, ranging from 1.7% in 1997 to

3.7% in 2008. This upward trend is probably due to the waves of accession of new members in 2004 and 2007. However due to Romania's desire to enter the euro zone, its rate of inflation is declining, this being one of the condition of convergence. We can therefore infer that the inflation rate in Romania is approaching in the long term the European Union's as a whole, leading to such a macroeconomic link given by this indicator.

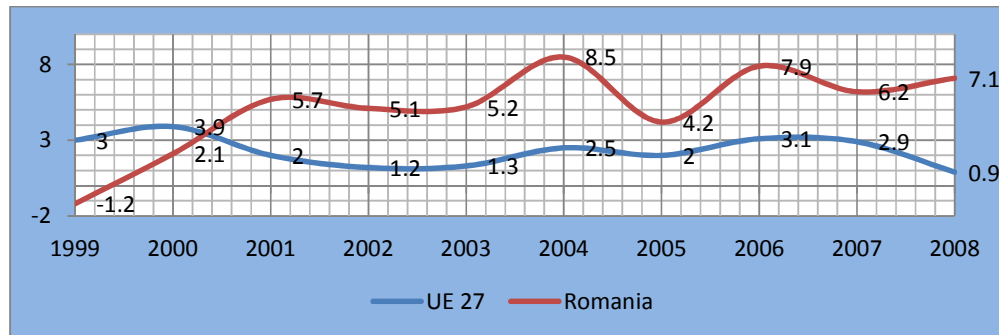


Figure 1 The rate of real GDP growth between 1999-2008 for the EU-27 and Romania ¹

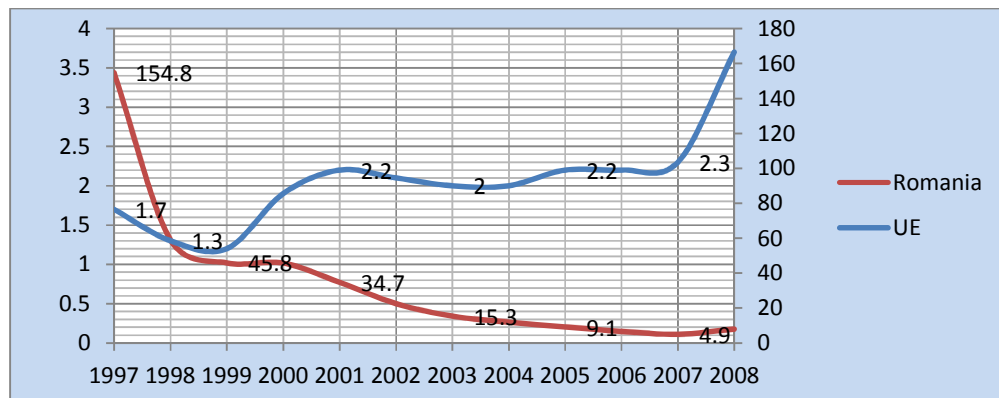


Figure 2 Average evolution of annual inflation rate between 1997-2008 for Romania and EU ²

To see if any contagious influence reached Romania during the crisis, we have chosen to compare changes in prices of securities traded on the stock market. For this we used BET and Euronext-100 indexes. BET index is reflecting the evolution of the Bucharest Stock Exchange in terms of the evolution of the ten “biggest” actions by capitalization, and Euronext-100 index which add up most important and liquid shares. In this study we considered to be the Euronext the one that represents all the influences of EU capital markets, the 100 companies in the Euronext 100 holding over 80% of its market capitalization. To achieve better comparability of data we referred to BET in Euros, and to make graphs easier to interpret we moved it's chart below (by dividing BET values with 10).

The data collection period is of 2 years, from 21 February 2007, 19 February 2009. We used this period to include both a pre-crisis period and a period after the last fall of the capital markets, i.e. 15 October 2008.

We divided the total period of data collection in three sub-periods from February 21st 2007 to August 1st, 2007, a period that does not include major events, from August 1st 2007 to June 1st 2008 the

¹ Processed data, based on available statistics on www.europa.eu.

² Idem 3.

beginning of the crisis period that shows the repercussions on other markets, from June 1st 2008 to February 19th, 2009, a period that includes last fall down in equity markets worldwide.

We can see from Figure 3 that although the general trend of the two indices is the same, namely an upward trend, the two indices do not evolve in the same way. There are common points only to sudden price drops, and the last part of BET's is growing higher than Euronext's. This is consistent with our theory, namely that the two markets are interdependent and that interdependence becomes stronger only when there has been a shock, a sudden drop on one of the markets. Calculating the correlation coefficient between the two indices in this period we obtain a value of 0.56, the value characteristic for normal time.

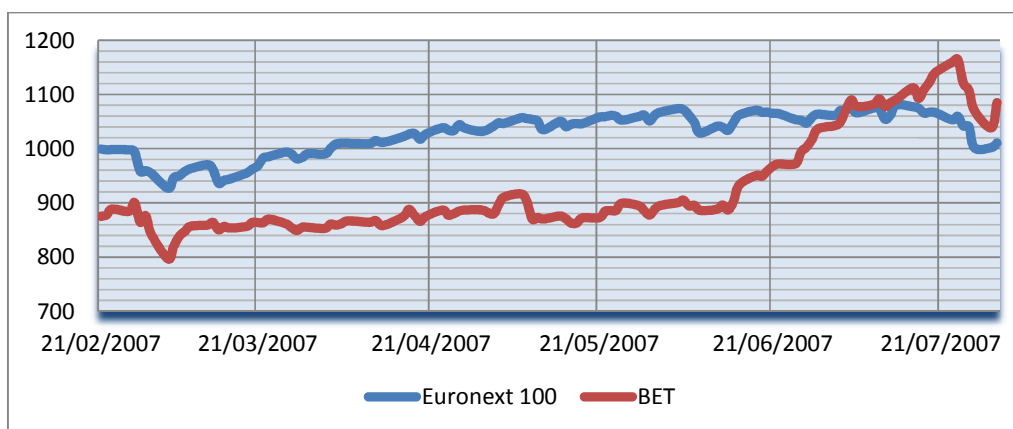


Figure 3 Evolution of the two indices between 21/02/2007 and 01/08/2007¹

Following the evolution of BET, note that the Romanian market depreciation of assets is more intense. This is normal because the Romanian capital market is a growing market and can not cope with shocks as well as Euronext, a developed capital market, a very strong one. It is also possible that an important role in these impairments on the Romanian market to have investors who may react to investors' actions on the European stock market, but the different characteristics of the two exchange markets leading to different results.

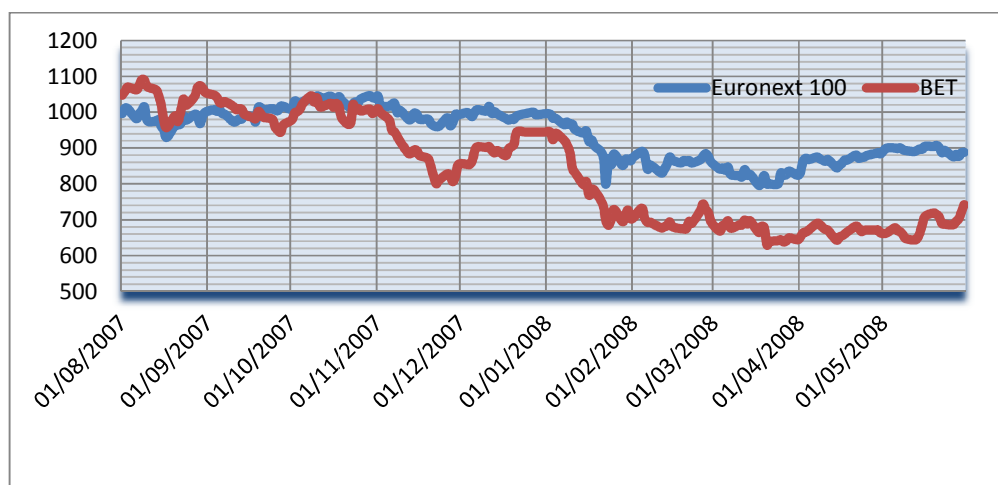


Figure 4 Evolution of the two indices between 01/08/2007 and 06/01/2008¹

¹ Statistic data on www.bvb.ro and www.euronext.com.

Figure 4 shows that after the outbreak of the crisis on sub-prime market in the U.S. (first fall down of the chart), changes in the two indices are much more similar than in the pre-crisis period, and in the second period (early 2008), when the financial crisis began in Europe, changes in the two indices are almost identical.

This clearly demonstrates the Romanian market contagion (the reverse is probably impossible because the financial power difference is too big) since the economic or financial crisis was not felt in our economy. In addition the correlation coefficient between the two indices for this period became 0.91.

In the first part of Figure 4 we see that the Romanian stock market index has not the same trend, probably because the Romanian market has no direct links with the U.S. market or that such ties are not strong enough. Given this, initial shock has passed from the American market to Euronext, which were the strong linked, and after a couple of days the shock was transmitted by the European stock market to the Bucharest Stock Exchange.

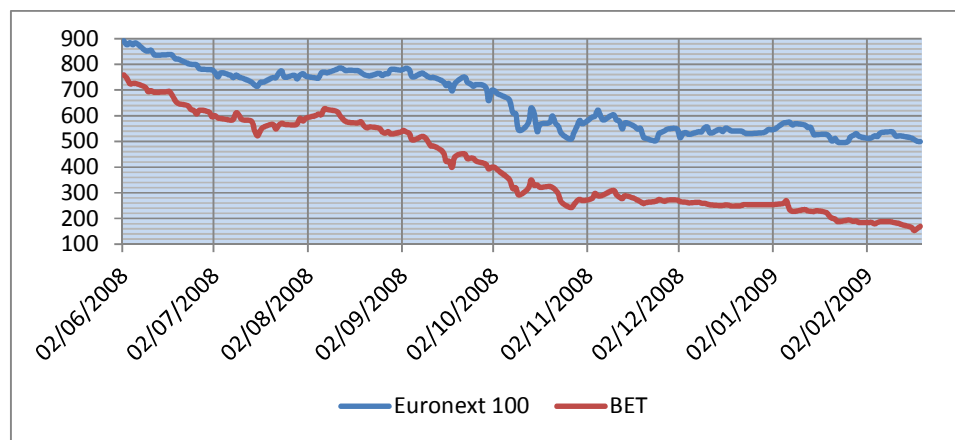


Figure 5. Evolution of the two indices between 01/06/2008 and 02/19/2009 ²

As shown by Figure 5, starting with awareness of the financial crisis in Europe, and until the collapse of stock markets around the globe and then on September 17 and October 15 2008, points that are very visible on our chart, the two indices had similar patterns, but after October 15 2008, the Romanian market continued its decline while Euronext has managed to maintain. Besides the correlation coefficient for this period amounted to 0.98, showing a clear contagion of the Romanian market.

Since other elements of the interdependence equation have probably remained the same, the sharp decrease registered on the Romanian stock exchange can only occur due to the phenomenon of contagion. Probably the contagion's effect is the action of investors which either wanted to cover losses on other markets or chose to withdraw its investments on the Romanian market, the Romanian market being less developed than Euronext. Euronext hadn't the same trend as it is a highly developed market, and investors know they can trust this market. They had to cover their losses and then it is reasonable to assume that they decided to withdraw from those markets that are too volatile (such as the Romanian market) to be able to provide more secure profits in other markets, such as Euronext. A massive withdrawal of these investors has led to sharp falls in asset prices traded on the Bucharest Stock Exchange, thus leading to the paradoxical situation in which assets are traded on the market at a certain value, smaller then their economic value.

¹ Idem 5.

² Idem 5

2.2 Investors Behaviour

2.2.1 Ambiguity Adversity

Intolerance to ambiguity could cause investors to demand higher risk premium, especially when investors are presented with new financial opportunities, for the economic environment and the uncertainty of revenues.

If the financial crisis, intolerance to ambiguity is demonstrated by rapid transactions made by those who wish to sell shares that have massive losses, without waiting for the situation to clarify. This phenomenon can be observed only when the capital market is declining.

So, in order to support the above stated, we monitor reaction of Romanian capital market investors (Bucharest Stock Exchange - BVB) - during the U.S. subprime market collapse. Preceding the crises, in July 2007, the market situation shows that the only ones that traded and by doing it lost were resident institutional investors with a total loss of RON 135,448,730.06. But the Romanian market totaled a net gain of RON 105,075,202.12. In August 2007, when the crisis began, the only ones who have won were resident individual investors with a total of 86,789,243.70 lei. In August, market losses totaled RON 86,089,428.64. Thus, the situation of this fast transactions, made the Romanian market to decapitalise as a result of this investors' behavior.

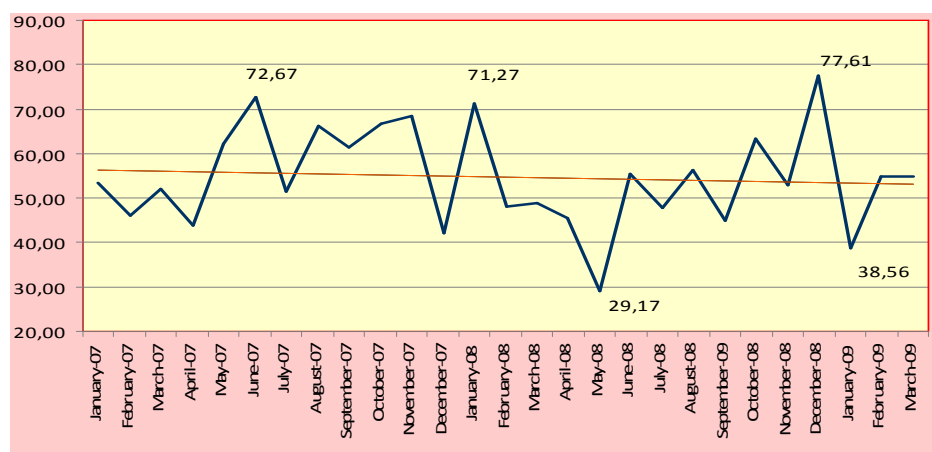


Figure 6 Percentage of institutional sales belonging to non-resident companies

For this period, residents companies had an average 54.67% of the total sales transactions made by companies participating in transactions on the Romanian market. In the figure above, we also see the trend, and these non-resident companies are moving somewhere between 60 and 50%. Calculating the standard deviation we obtain 11.35, this means that most of the values will have a deviation of ± 3.37 percentage points from the average. In the chart above is easy to see the highest and lowest value, i.e. 77.61% in December 2008 and 29.17% in 2008, making it seem that our standard deviation too high.

So we can draw some conclusions from this chart:

- Non-resident companies do not follow a long term strategy, they follow a short term one (hence the large oscillations that appear in the chart);
- Non-resident companies are intolerant to ambiguity, as the largest percentage of sales they have is in November 2008 when the Romanian capital market, like others,

was affected by stock markets crash and the Romanian economic and political climate has proven to be unstable.

2.2.2 Sentiments and mood swings

Aversion to risk, suffering or loss may reflect a calculated avoidance of unpleasant future feelings. However, moods and emotions felt by people today affect their perception of the tomorrow's risk election. In general, tempered people are optimist about their options and their decisions, compared with bad-tempered ones. Decision-making may also be affected by sensory and cognitive senses experience.

Affective states contain information that can be used to draw conclusion about our surroundings. For example, it is possible that a person in a better state to be patient, to make better decisions when the market is falling, knowing that changing the content of the portfolio should be made when the market is growing.

Again we can illustrate with the Romanian market evolution. If in the charter below we observe that monthly net transactions in that year (2008) of individual investors, whether residents or nonresidents, will have ended with losses in 11 oh the 12 months.

If we take brief look at figures 7 and 8 we conclude that resident individuals traded based on moods and feelings. Why? Because the range of purchasing values is between 87.29% and 97.04% of total individuals, but the range of values of sales is between 91.38% and 97.63% in all individuals.

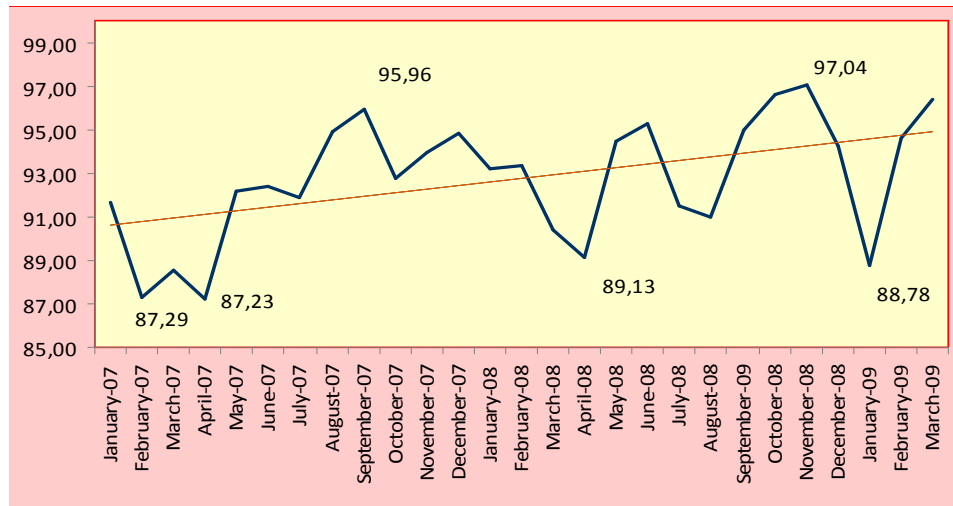


Figure 7 The percentage of purchase transactions of individuals resident in all purchases transactions of individuals

We can see that large purchases of one month were followed by massive sales, such as we see in September and October 2007, showing that Romanian investors were 95.96% of individuals buying in September and October when the crisis began to propagate and were mostly the ones which soled or the entire period of analysis.

Considering the above, we can draw an important conclusion about the international capital market, namely investors' behavior has an important influence on the evolution of this market and more so in times of crisis, when certain types of behavior are extremely emphasized. This can only mean one

thing: it must be examined more closely the investors' behavior, we should consider their behavior in addition to other factors affecting global financial markets. If we identify each type of investor behavior and how it influences market development, we can say that we have half of the solution for the present crises. The next step would be to know how we can limit this type of behavior or the way of predicting it.

3 Conclusions

Even if we can be sure that there is an influence of the investors' behavior in financial crisis spread and sometimes even starting them would be very interesting to quantify their exact influence so that we may prevent contagion. Since financial markets are increasingly integrated, the contagion phenomenon that occurs during the outbreak of a crisis or even of simple shocks is very natural. Capital markets fully demonstrate this, and the fact that shocks propagate from one market to another makes us believe that those responsible for the immediate dissemination are often the investors. The hard part is the anticipation of decisions that they will take. However it is noted in the analysis of existing correlations before the crisis and those that influence their behavior during the crisis that is not very high (about 10%), but it can make the difference between loss and gain.

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