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Behavior of financial market during the crisis of subprime

SAMOUT Ammar

Finance and Comptabilité.University of Sfax, Tunisia

ammarbanq@yahoo.fr

ABSTRACT

The objective of this research is to highlight the nature of the relations that exist between a few stock markets (France, Great Britain, Germany, Utats-Unis). It was tried to analyze the behavior of these markets in the face has the subprime crisis which took place in USA in August 2007. Empirically, to provide replies to these questions, we analyze first the correlation test. The result of this test shows well the significant increase of the coefficient of correlation between stock markets: American, French, Germany and Britain during the period of the crisis. We interpret this increase as a proof of contagion. In the second place, it is based on the theory of cointegration. The results of the cointegration tests show the existence of three cointegrating relationships to the more between the stock markets. The existence of cointegration relationship represents a proof of contagion and integration of stock markets. In the third place, it has tried to apply the test of causality between the stock indices. The result of this test shows well the existence of several causality between these indices which confirms the importance of contagion during the crisis.

Key words:

Financial market, integration, contagion, causes crisis.

INTRODUCTION

Over the past decades, the financial crises have been many and multiple causes. Most of these crises have occurred in developing countries which usually suffering of serious problems for structural policies, financial markets little or poorly developed and regulated, and a lack of skills and know-how on the part of the authorities. However, this does not immune to the industrialized countries that have them same Also known their batch of crises. Among these crises, we may cite the Asian crisis which has affected the Thailand in the first place and then it has contaminated the Philipine, Malaysia, Indonesia and the corrée of south. Then the Russian financial crisis in 1998 which is propagated to the markets of Latin America. Finally, the crisis in Argentina in 2001, regarded as isolated at the departure, is propagated to the Brazil and Uruguay.

The year 2007 brings up the crisis of subprime which has been generalized on all sectors of the American economy and it is propagated on all international markets: it is the contagion effect.

This crisis is considered by economists as the financial crisis more serious and if it was not transferred to the other countries of the world it would be more difficult in the United States to get out and exceeded their adverse effects.

The expansion of the problems of the stock markets during the period of the crisis of subprime has caused a growing interest in the study of the behavior of these markets during the crisis via the effects of contagion. The questions that we ask in this work are the following:

At what point in the stock markets are integrated and what is the impact of the crisis of subprime on the degree of integration of these markets.

This work focuses on the study of degree of interdependence and integration of stock markets during the period of the crisis of subprime as well as the behaviors of these markets represent by the stock indices before and after the crisis.

This work is broken down into two parties; a theoretical part or we are going to be interested in the main debates associated with the subprime crisis (development of subprime, triggering of crisis of subprime, the factors at the origin of the crisis).

Empririquement, we will study the impact da the crisis of subprime on stock markets or in a way more precise the behavior of stock markets during the crisis of subprime using the test of cointegration, the correlation test and the test of causation.

1. GENERALITY ON THE CRISIS OF SUBPRIME

The unbridled race to the profitability, initiated by the shareholders and by the dérigeants, leads to a take excessive risk in the purpose of valuing the better the company. This type of activity away from the traditional activity of praetor constitutes the source of profits not negligible but increases correlatively risk exposures (Stiglitz 1998). As well is the case of the crisis of subprime which has started on the U.S. real estate market, and then spread to the market of credit risk to achieve the stock markets and the monetary market with a liquidity crisis.

1.1. The subprime credit

According to the literature, the credit subprime is consented to households, often at low income, who have had delays of payments (or even of faults of payment) by the past. It is more risky for the lender: the probability of default higher of borrowers implies a greater risk of loss of the bet.

In consideration of the criteria of powers more flexible than the conventional loans, the interest rate is higher, while being variable in time (the rate is indexed on the rate Director of the U.S. central bank, after a promotional rates very low initial), which makes this type of loan more profitable for the investor. .

In 2004, the interest rate has increased: it is past 1% in 2004 to more than 5% in 2007. This rate increase has resulted in an increase of the amounts of refunds, and some households have begun to no longer be able to cope with their debts.

Then, from 2006, the US real estate market is entered in a crisis, bringing down the price of housing. In this context, in case of failure of the borrower, the lender is therefore more to recover all of its debt by reselling the property. Has the personal bankruptcy of borrowers is therefore added a series of serious financial difficulties for the lenders and some of their bankers.

The increase in the rate of interest and the increase of the amount of refund has led, in the summer of 2007, to an international financial crisis, the subprime crisis, resulting in a decline of the indices of the major stock exchanges in the world. Indeed, the profitability of this type of loan has led many organizations of ready to propose. At the same time, the representative titles of these subprimes is traded on the market for mortgage loans.

The crisis experienced by the lenders is therefore passed on the financial markets, due to the explosion of doubtful debts revealed by the organizations lenders, leading them to harden their conditions of credits in the other sectors, including the financing of private equity.

1.2. The subprime crisis

According to the literature, a financial crisis is regarded by economists as a crisis that affects the stock markets, and the markets of the appropriations of one country or a group of countries ... If this financial crisis does in a first time that the financial markets, its aggravation will lead to adverse effects on the real economy, resulting in an economic crisis, or even a recession ... This is the case of the crisis of subprime which represents a financial crisis that struck the United States and then propagates to the other countries of the world . According to IMF(2008), the financial crisis that has developed since the summer of 2007 in the United States is linked to the fluctuations of financial variables such as the volume of issuance of bonds and shares, their courses on the stock exchange, the stock of outstanding credits, the bank deposits and the exchange rate. This crisis has been caused by the excess of indebtedness of households in the United States, the deceleration, and then the fall of the prices real estate. In effect, the U.S. households to low income had difficulties to repay the appropriations that had been granted for the purchase of their housing.

According to IMF(2008), in 70% of loans granted in the USA Today, a third person makes the intermediate, a "mortgage broker", which works not for the borrower but for the bank and it is in its interest to convince the customer to take a loan which will benefit more from the bank to itself. For example, if a customer is eligible for a loan classic, but that it is more profitable for the bank to grant him a loan subprime, the broker will convince him, even if it is not profitable and it will affect a kind of bribe called "premium". As long as the house is worth more than the debt, it ready. It is the case of 2/3 of the African Americans who have contracted a loan subprime. The brokers provide loans to customers, knowing very well that they will be unable to repay.

As well, in 2006, the appropriations subprimes represented 24% of the real estate credits granted to the United States. At the end of this same year, their outstanding reached almost 13% of the total mortgage credits in the United States (10,200 billion), against 8.5% in 2001.

According to the IMF ((2008 a), p. 50), this crisis would have already caused 945 billion dollars of losses in the global financial sector, and it considers the total amount of potential financial loss to approximately 2.200 billion. Other implications of the crisis have been the depreciation of real estate assets, the bankruptcy of Financial Institutions, the loss of thousands (IMF, (2009 b)).

2. BEHAVIOR OF STOCK MARKETS DURING THE CRISIS OF SUBPRIME

The contagion between fellowships may designate the co-movements and the independence of the main international scholarships. It is, in effect, a reality of all days, since the stock markets are more and more independent. This interdependence can be due to human behavior, since an investor can act and to position itself as a function of fluctuations in the local market as well as according to the opportunities related to the action on other international markets, but their interdependence can also be associated with the degree of the correlation between their fundamental.

Indeed, This interdependence can testify to an integration between the stock markets and a dependency between national scholarships and the reference exchange world which is that of New York, probably due to the channels for the transmission of information, to the behavior of stakeholders on the markets and to the movements of capital flows.

In addition, this interdependence is reflected by a strong correlation between the stock indices often more explicit in the period of the stock market crisis, to the extent that any shock affecting a reference exchange can affect the other stock indices.

In another registry of analysis, the stock markets have been known since the end of the years 80 an unprecedented boom. The Dow Jones has increased in 1987 by 250% compared to its level in 1982 and he crossed the bar of 11700 at the beginning of the year 2000. The awards for French and German have at least more than doubled between 1994 and 1999, indicating that this efflorescence has been common for several awards. What is more, these similarities between the stock dynamics are the most remarkable during the periods marked by strong turbulence. For example, in October 1987, the Dow Jones has lost 22.6% in one night, exchanges the most important are the followed. More recently, the French stock exchange has suffered the effects of spectacular waterfalls in Asia in 1997 and the United States in 2000 and the CAC40 has thus lost 15% in four months.
The ACC40 has also lost 21.97% in 2001 and 31.75% in 2002 in the wake of the terrorist attacks in New York and fall of the markets of new technologies.
This crisis induces an upheaval within financial institutions Americans doing a fear of a systemic crisis in the world. The Dow Jones, who had recorded a historic record of 14021,95 points the Tuesday, 17 July, has bissé of a little more than 6% on 17 August. The New York Stock Exchange has not been the most affected by this stock market correction, since ACC40, which had culminated in early July at more than 6100 points, fell to a low of 5217,70 points on 17 August 2007, registering a decline of approximately 12%. The Nikkei has also been strongly affected by this stock market correction since it was spent between 17 July 2007 and 17 August 2007 to 18217,27 points to 15273,68 points, thus registering a decline of 16 ,15%.
We call these interdependencies and transmissions of crises from one country to the other of contagion.

3. RESEARCH METHODOLOGY AND THE PRESENTATION OF THE RESULTS

For Forbers and Rigobon (2001): "The contagion is the significant increase in the linkages between the markets after the completion of a shock on a country or group of countries". From an empirical point of view, this definition will allow us to explain the contagion in a significant increase in co-movements before and after the crisis.

To do this, we proceed via two tests. The first is to test the significant increase of the correlations between the quiet period and the period of crisis. However that the second test concerns the cointegration which is developed by Johansen (1991.1995), from this test we will try to know the degree of integration of markets fellow in period of the crisis of subprime.

Our study therefore is based on the determination of the behavior of stock markets during the period of the crisis of subprime via the phenomenon of integration and the contagion, the variable used in this study is none other than the stock index. To this effect, the data that will serve as the basis for the analysis are of stock exchange data on daily and which are extracted from the Web site datastream.

The stock indices that are the subject of our empirical analysis are: Dow Jones, CAC40, Dax30, FTSE, Nasdaq and the NYSE. . The choice of these indices are used to verify the hypothesis of contagion between the main squares fellows. It must however be noted that the period of our study spans from 01/12/2005 to10/09/2007, for the period of crisis, we opting for a period which begins the 10/09/2007 to 20/02/2009.

Our work is located in the same line of the work of the economists who we already quoted, in the objective of responding to the question, has to know the behavior of the stock market during the period of the crisis and limiting only has the crisis of subprime, we offer an analysis of the contagion and the integration of stock markets during the crisis by using the correlation test since the correlation represents a measure of the contagion in the taking into account of the two periods, a period of tranquillity and another of turbulence. And then we are going to be interested in the model of cointegration as well as the model of the VECM and finally we will analyze the test of causality between the stock indices of a few European countries.

3.1. Determination of the period of the crisis by the graphical method

Before proceeding with the analysis of the correlation between the stock indices we will seek to determine the specific period of crisis of subprime. In this case, we chose to use the graphical method which enables us to limit the period of crisis in noting the different common dates of drop specific to each stock index.

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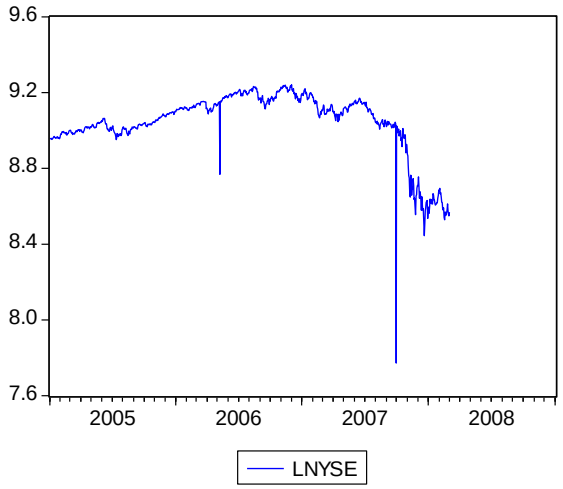

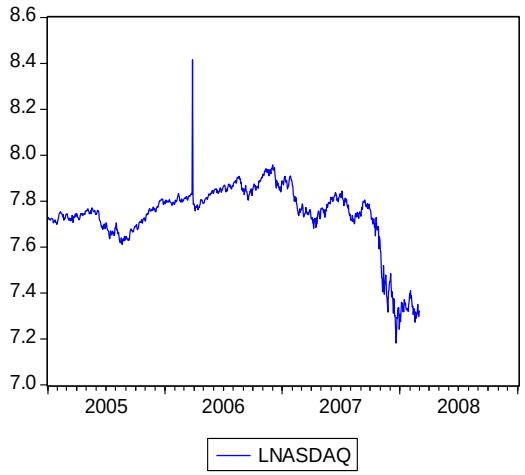

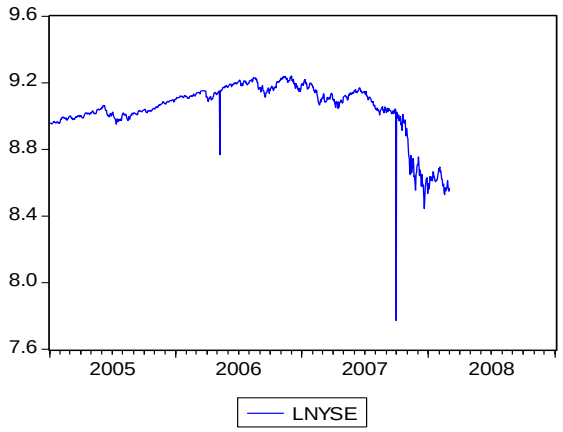

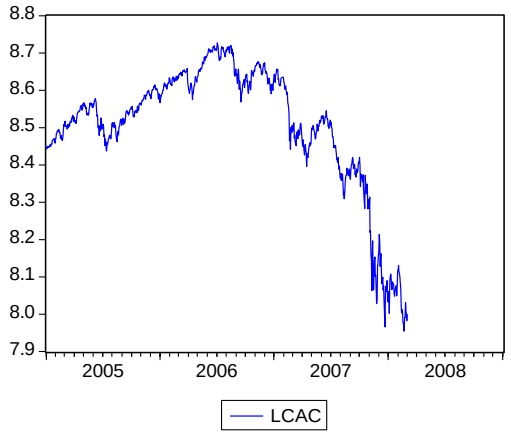

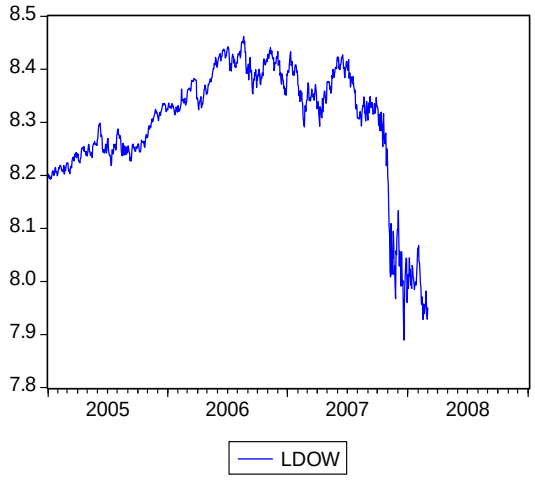

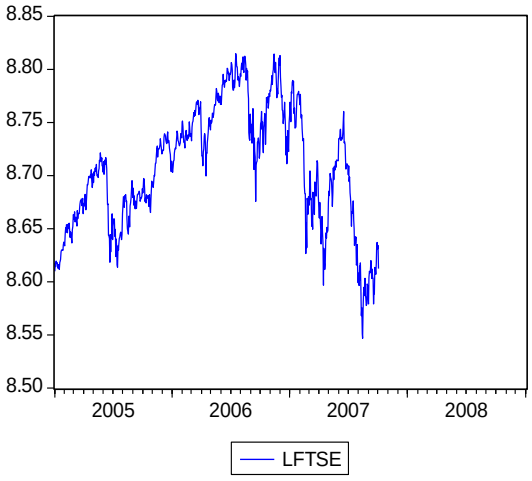

According to the graphics, we note that the month of August was characterized by a fall affecting all stock indices. Of this fact, we can qualify the period of the month of July (to take account of passage of stability toward the non stability) until the December 2007 (the last date for our base) as the period which can illustrate the crisis of subprime.

3.2. The correlation as a measure of contagion

Table 1. Correlation Table: Stability Period

	LOG(DOW)	LOG(FTSE)	LOG(CAC)	LOG(NYSE)	LOG(NASDAK)	LOG(DAX)
LOG(DOW)	1	0.65	0.57	0.57	0.7	0.88
LOG(FTSE)		1	0.72	0.44	0.66	0.75
LOG(CAC)			1	0.58	0.45	0.68
LOG(NYSE)				1	0.72	0.61
LOG(NAS)					1	0.86
LOG(DAX)						1

Table 2. Correlation: subprime crisis period

	LOG(DOW)	LOG(FTSE)	LOG(CAC)	LOG(NYSE)	LOG(NASDAK)	LOG(DAX)
LOG(DOW)	1	0.92	0.94	0.64	0.7	0.88
LOG(FTSE)		1	0.90	0.44	0.66	0.75
LOG(CAC)			1	0.58	0.89	0.68
LOG(NYSE)				1	0.72	0.8
LOG(NAS)					1	0.86
LOG(DAX)						1

According to these two tables, we show the significant increase of the coefficient of correlation between stock markets: American, French and German and English especially after the crisis of subprime. We interpret this increase as a proof of contagion.

3.3. The Cointegration as a measure of contagion

3.3.1. Unit root test of the series: ADF test

Stationarity of the series level

Here we test the hypotheses:

H0: the series is not stationary level

H1: the series is stationary level

The application of the test of unit root test series in level allows us to draw the table below:

Table 3. Table of stationarity of series level

	Log(DOW)	Log(FTSE)	Log(CAC)	Log(NYSE)	Log(NAS)	Log(DAX)
model	with a trend and a constant	with a trend and a constant	with a trend and a constant	with a trend and a constant	Without constant and without trend	with a trend and a constant
Probability	0,3580	0,2329	0,9806	0,9579	0.3352	0.9729
Stationary (yes or no)	no	no	no	no	no	no

Stationary differentiated series:

We test the hypothesis:

H0: the first difference series is non-stationary

H1: the first difference is stationary in series

The application of the test of unit root test of differentiated series allows us to draw the table below:

Table 4. Table of stationarity differentiated series

	Log(DOW)	Log(FTSE)	Log(CAC)	Log(NYSE)	Log(NAS)	Log(DAX)
model	with a trend and a constant	without trend and constant	with a trend and a constant	with a trend and a constant	Without constant and without trend	with a trend and a constant
Probability	0,0000*	0,0000*	0,0000*	0,0000*	0.0000*	0.0000*
Stationary	yes	yes	yes	yes	yes	yes

* The coefficient is significant at the 5% level.

The test application of ADF shows that the series are all non-stationary in level and that they are stationary in first difference I (1).

3.3.2. The VECM model

The first step has allowed to test for the presence of a unit root while in the second it is necessary to determine the number of optimal delay to integrate using the model vector autoregressive (VAR) in order to apply the test of cointegration. We have found that this number equal to 2.

3.3.3. Calculation of the number of delay: VAR model

This model is valid if and only if the coefficients are all significant and all of the forces of the recall are negative.

The application of the model VECM allows us to draw the table below:

Table 5. Table of VECM model

Condition	DOW	FTSE	CAC	NYSE	NASDAQ	DAX
significance	-0.0017 *	-0.003589*	-0.00087*	-0.014062	-0.03311 *	-0.0017*
Restoring force (<0)	negative	negative	negative	negative	negative	negative

* The coefficient is significant at the 5% level.

According to this table, we show that all the coefficients are significant at the 5% threshold. In addition, the force of the recall is always negative. This writing VECM is validated. What corroborates the existence of this relationship of interdependence in the long term between the different markets.

3.3.4. Johansen test

Test assumptions are:

H0: Presence of at least one cointegration relationship

H1: Lack of cointegration relationship between the series

The application of the test of Johansen allows us to draw the table below:

Table 6. Table test johansen

Number of Cointegration relationship	Own value	Trace statistic	Critical Value 5%
Aucune *	0,061924	131,7573	103,8473
Au plus 1	0,040538	86,05158	76,97277
Au plus 2	0,037183	56,46271	54 ,07904
Au plus 3	0,021826	29,37035	35,19275

* Indicates we must reject H and go to the second iteration.

We show that there are more than three cointegrating relationships, the presence of this relationship may indicate the existence of permanent channels in the transmission of shocks between these countries, in other words, it is the evidence of a contagion.

The disadvantage of this model is that it does not allow us to detect the direction of causality between the countries. For this, we introduce a test of causality in the Granger sense.

3.4. Causality as a measure of contagion

Test assumptions are:

H0: X index does not cause the other index Y

H1: X index because another index Y

There is through the table above that if the probabilities are all less than 5%, it rejects then H_0 'there is a causality in the Granger sense between the indices and if the probabilities are greater than 5%, then accepts H_1 and in this case there is no causal relationship between the stock indices. The results obtained following the application of the causality tests that the degree of integration between the stock markets is fort saw the relations of causality between the stock indices for example the causality between ACC and Dax or between Dow and FTSE or even between NASDAK and NYSE. It should be noted that often there are according to the table several relations of causality which we allows us to conclude the presence of concept of the integration and the contagion between the stock markets during the crisis of subprime.

Table 7. Table causality test

Direction of causality	probability	Causal decision
LDAX ==> LCAC	2.2E-08	Yes
LCAC ==>LDAX	0.00012	Yes
LDOW ==>LCAC	2.8E-45	Yes
LCAC ==>LDOW	0.00489	Yes
LFTSE ==>LCAC	0.02025	yes
LCAC ==>LFTSE	1.1E-18	Yes
LNASDAK ==>LCAC	3.8E-13	Yes
LCAC ==>LNASDAK	5.2E-05	Yes
LNYSE ==>LCAC	0.35743	No
LCAC ==>LNYSE	5.0E-16	Yes
LDOW ==>LDAX	6.0E-26	Yes
LDAX ==>LDOW	0.77564	No
LFTSE ==>LDAX	0.747470	No
LDAX ==>LFTSE	1.2E-14	Yes
LNASDAK ==>LDAX	3.2E-09	Yes
LDAX ==>LNASDAK	0.00263	Yes
LNYSE ==>LDAX	0.06623	Yes
LDAX ==>LNYSE	1.6E-11	Yes
LFTSE ==>LDOW	0.59054	No
LDOW ==>LFTSE	6.7E-23	Yes
LNASDAK ==>LDOW	0.27499	No
LDOW ==>LNASDAK	1.6E-08	Yes
LNYSE ==>LDOW	0.16336	No
LDOW ==>LNYSE	1.2E-25	Yes
LNASDAK ==>LFTSE	0.01822	Yes
LFTSE ==>LNASDAK	0.00029	Yes
LNYSE ==>LFTSE	0.29987	Yes
LFTSE ==>LNYSE	1.1E-15	Yes
LNYSE ==>LNASADK	1.8E-15	Yes
LNASDAK==>LNYSE	4.6E-23	Yes

CONCLUSION

Since then and until then, the analysis of the economic crises in particular the financial crises has always concerned not badly of economists. The developed countries, as well as the emerging countries, or in development have always been the victims of these crises one after the other but of a unequal intensity .following the current of thought, the theorists try each to analyze the basis of their analysis as to the nature, causes and measures for the Prevention of each crisis. The contagion during the crisis now remains a subject of great debate on the academic plan. Several works have been presented, the objective of which is to search for the causes and the failures at the origin of this phenomenon.

Following the occurrence of the crisis of "subprime" which took birth in the United States in July 2007, the goal of our research was to analyze the behavior of stock markets in Europe during this crisis and to show the impact da the crisis of subprime on the stock markets while interesting on the contagion.

We have preferred in a first time to review a deep analysis on the crisis of subprime. Then we proceeded to analyze the foundations of stock markets as well as the impact of the crisis of subprime on the stock market and test theoretically the behavior of this crisis on these markets of a few European countries. Finally, we have put in empirical evidence this phenomenon of contagion by testing their existence through econometric methodologies parsimonious.

We found that this crisis is mainly a crisis of bank capital or there is a lack increased interbank liquidity outcome of the non-application of the prudential regulation rigid in the banks at the time of the use of new financial products including the securitization of receivables.

Our empirical study shows the existence of the contagion and integration between the stock markets of a few European countries during the American crisis. For lead, we proceeded to the study of the correlation between the market in crisis (American) and the other markets during the period of crisis and the period of non-crisis. We have noticed a significant increase of the correlation coefficients between the different markets. This has allowed us to conclude that the periods of strong correlation are associated with periods of high volatility. However, an increase in the correlation between the markets of different countries is not sufficient to prove the existence of contagion as demonstrated in Forbes and Rigobon (2002). If the markets are historically related and inter correlated, a significant change in a market will naturally induce changes on the other markets and the correlations during crises can increase significantly.

For this reason, we have adopted a new procedure which is to test the non-linearity of the mechanisms of spread of estimated shocks through a model of interdependence in the long term VECM based on the test of cointegration (Test Of Johenson). We have shown the existence of the cointegrating relationship between the series, justified after by a model VECM validated.

Then, in order to know the country originating in crisis, we have used the test of causation in the Granger sense at the end to justify the presence of this kind of causality between the countries of our study. It can be reported that, during the period of crisis, the United States cause and the other countries including Germany, France and the United Kingdom.

An extension of our work would be to examine the transmission on average and variance in normal period and in a period of crisis of subprime in the middle of the modeling of type E-GARCH in order to show the presence of contagion in the average and variance between the stock markets.

BIBLIOGRAPHY

[1] AGLIETTA, M., (2008), « La Crise, Pourquoi en est-on arrivé là? Comment en Sortir? », Editions Michalon, Paris, PP. 21-58.

[2] ARVAI, Zsofia et János VINCZE, Janos (2000). « Financial crises in transition countries: models and facts » *MNB Working Papeer*, (2000).

[3] BOYER, Robert, DEHOVE, Mario et PLIHON, Dominique (2004). « Les crises financières », *Conseil d'Analyse Économique,* 50, (2OO4).

[4] CALVO, Guillermo (1999). « Contagion in Emerging Markets: When wall street is a Carrier», *University of Maryland,* (1999).

[5] CARTAPANIS, André (2004). « Le déclenchement des crises de change: qu'avons-nous appris depuis dix ans? », Economie International, 97, (2004), 43p.

[6] DEHOVE, Mario (2003). « Crises financières deux ou trois choses que nous savons d'elles », *Document de travail, Conseil d'Analyse Economique*, (2003).

[7] DORNBUSH, Rudiger et CHUL PARK Yung et CLAESSENS Stijn (2000). «Contagion: how it spreads and how lit can be stopped», *Forthcoming World Bank Research Observer*, (2000).

[8] FLOOD, Robert et GARBER, Peter (1984) « Collapsing Exchange Rate Regimes: Some Linear Example», *Journal of International Economics*, 17, (1984), 13p.

[9] ·FMI, (2008 a), « Global Financial Stability Report, Containing Systemic Risks and Restoring Financial Soundness », *IMF Multimedia Services Division*, April.

[10] FMI, (2008 b) « The global crisis and sub-saharan Africa », African department.

[11] FMI, (2008 c), « Perspectives de l'économie mondiale: Turbulences financières, ralentissements et redressements », Novembre.

[12] FMI, (2009 a) « Perspectives de l'économie mondiale: Mise à jour des principales projections », Janvier.

[13] FMI, (2009 b), « Rapport sur la stabilité financière dans le monde-Actualité des Marchés », janvier.

[14] FORBES, Kristin et RIGOBON, Roberto (2002). «No contagion, only interdependence: Measuring Stock Market Co-Movement», *the journal of Finance*, 57, (2002), 5 p.

[15] FORBES, Kristin et RIGOBON, Roberto (2000). «Contagion in Latin America: Definitions, measurements and policy implications », NBER Working Paper, (2000).

[16] GLICK, Reuven et ROSE, Andrew (1999). «Contagion and trade: Why are currency crises regional? », *Jounal of international Money and Finance*,18, (1999), 14 p.

[17] Harold Rose (2003) ; « la titrisation : un concept porteur de valeur », les Echos - l'art de la finance

[18] IRWIN, Gregor. Et VINES David(1999). «A Krugman - Dooley - Sachs third generation model of the Asian financial crisis », Economic and Social Research Council (ESRC) - *Global Economic Institutions, Working Paper Series*, 46, (1999).

[19] KAMINSKY, Graciela et REINHART, Carmen (1999). «The Twin crises: The causes of banking and balance of payments problems», *American Economic Review*, 89, (1999), 3 p.

[20] KODRES, Laura et PRITSKER, Matthew. «A Rational Expectations Model of

[21] KRUGMAN, Paul. «A Model of Balance of Payments Crises », *Journal of Money, Credit and Banking*, 11, (1979), 14p.

[22] LANDIER, Augustin et COHEN, Elie (2007). « Crise des subprimes: le point de vue de deux économistes », Le Monde, (2007).

[23] MASSON, Paul (1999). «Contagion: macroeconomic models with multiple equilibria», *Journal of International Money and Finance, 1*8, (1999), 4 p.

[24] RADELET, Steven et SACHS, Jeffery (1998). «The East Asian Financial Crisis: Diagnosis, Remedies, Prospects», *Brookings Papers on Economic Activity*, 1, (1998), 73p.

[25] TOBIAS, Adrien (2008). « Liquidité et contagion », Revue de la stabilité financière, Banque de France, 11, (2008).

[26] VAN RIJCKEGHEM, Caroline et WEDER, Beatrice (2000). « Financial contagion: Spillovers through Banking Centers », the contagion conference, (2000).

[27] ZOUARI, Samir (2005). «Modèles des crises financières, indicateurs de vulnérabilité et implication du secteur bancaire dans la crise asiatique de 1997 - 1998», *thèse de doctorat en Sciences Economiques, Université Paris II Assas*, (2005).

[28] Conseil d'Analyse Economique : Crises de la dette, prévention et résolution (par DANIEL COHEN et RICHARD PORTES) [2003]

[29] Instabilité du Système Financier International (par OLLIVIER DAVANNE), La documentation française [1997]

[30] OCDE : Les marchés des titres de la dette publique dans le pays de l'OCDE, Tendances et changements structurels récents [2002]

[31] Rapport annuel du FMI : 1998, 2000, 2002, 2003

[32] Rapport annuel de la Banque mondiale : 2005, 2006,2007

[33] Centre tricontinental : Les tigres du Sud, Crise d'un modèle ou contradiction de l'économie capitaliste [2001]

[34] Les Echos, Le 19/07/2007

[35] Les Echos, Le 10 janvier 2008

[36] Les Échos, le 3 septembre 2007

[37] Les Echos, Le 13 novembre 2007, « Subprime, l'addition pourrait approcher 400 milliards de dollars », page 33

[38] Le Figaro, Le 22 août 2007

NOTES

Table 1: ADF test"D (LCAC)"

Null Hypothesis: D(LCAC) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 4 (Automatic based on SIC, MAXLAG=20)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-14.36816	0.0000
Test critical values:	1% level	-3.969282	
	5% level	-3.415305	
	10% level	-3.129865	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dépendent Variable: D(LCAC,2)

Method: Least Squares

Date: 05/21/09 Time: 17:00

Sample (adjusted): 1/11/2005 3/03/2008

Included observations: 820 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LCAC (-1))	-1.300632	0.090522	-14.36816	0.0000
D(LCAC (-1) ,2)	0.192047	0.080745	2.378444	0.0176
D (LCAC (-2) ,2)	0.095533	0.067222	1.421161	0.1557
D (LCAC (-3) ,2)	0.008602	0.052366	0.164275	0.8696
D (LCAC (-4) ,2)	0.096678	0.035090	2.755161	0.0060
C	0.001996	0.001163	1.715756	0.0866
@TREND (1/03/2005)	-6.53E-06	2.46E-06	-2.656449	0.0081

R-squared	0.569607	Mean dependent var	1.91E-05
Adjusted R-squared	0.566431	S.D. dependent var	0.024862
S.E. of regression	0.016371	Akaike info criterion	-5.378159
Sum squared resid	0.217881	Schwarz criterion	-5.337957
Log likelihood	2212.045	F-statistic	179.3285
Durbin-Watson stat	2.008370	Prob (F-statistic)	0.000000

Table 2: ADF test "D (LDOW)"

Null Hypothesis: D(LDOW) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic based on SIC, MAXLAG=20)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-25.50061	0.0000
Test critical values:	1% level	-3.969240	
	5% level	-3.415285	
	10% level	-3.129853	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dépendent Variable: D(LDOW,2)

Method: Least Squares

Date: 05/21/09 Time: 17:05

Sample (adjusted): 1/06/2005 3/03/2008

Included observations: 823 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LDOW(-1))	-1.314843	0.051561	-25.50061	0.0000
D(LDOW(-1),2)	0.173806	0.034461	5.043515	0.0000
C	0.001774	0.001036	1.712255	0.0872
@TREND (1/03/2005)	-5.25E-06	2.18E-06	-2.412518	0.0161

R-squared	0.572687	Mean dependent var	3.34E-05
Adjusted R-squared	0.571121	S.D. dependent var	0.022535
S.E. of regression	0.014758	Akaike info criterion	-5.589262
Sum squared resid	0.178369	Schwarz criterion	-5.566355
Log likelihood	2303.981	F-statistic	365.8753
Durbin-Watson stat	1.971993	Prob(F-statistic)	0.000000

Table 3: ADF test "D (LFTSE)"

Null Hypothesis: D(LFTSE) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=19)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-31.71826	0.0000
Test critical values:	1% level	-3.439255	
	5% level	-2.865360	
	10% level	-2.568861	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dépendent Variable: D(LFTSE,2)

Method: Least Squares

Date: 05/21/09 Time: 17:08

Sample (adjusted): 1/05/2005 10/03/2007

Included observations: 716 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFTSE(-1))	-1.172281	0.036959	-31.71826	0.0000
C	-1.36E-06	0.000399	-0.003413	0.9973

R-squared	0.584895	Mean dependent var	-4.10E-05
Adjusted R-squared	0.584314	S.D. dependent var	0.016555
S.E. of regression	0.010674	Akaike info criterion	-6.239304
Sum squared resid	0.081342	Schwarz criterion	-6.226529
Log likelihood	2235.671	F-statistic	1006.048
Durbin-Watson stat	1.982215	Prob(F-statistic)	0.000000

Table 4: ADF test "D (LNASDAQ)"

Null Hypothesis: D(LNASDAQ) has a unit root

Exogenous: None

Lag Length: 2 (Automatic based on SIC, MAXLAG=20)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-22.77264	0.0000
Test critical values:	1% level	-2.567778	
	5% level	-1.941209	
	10% level	-1.616440	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dépendent Variable: D(LNASDAQ,2)

Method: Least Squares

Date: 05/21/09 Time: 17:40

Sample (adjusted): 1/07/2005 3/03/2008

Included observations: 822 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNASDAQ(-1))	-1.851315	0.081296	-22.77264	0.0000
D(LNASDAQ(-1),2)	0.366643	0.061146	5.996190	0.0000
D(LNASDAQ(-2),2)	0.097743	0.034789	2.809590	0.0051

R-squared	0.707417	Mean dependent var	1.60E-05
Adjusted R-squared	0.706702	S.D. dependent var	0.055743
S.E. of regression	0.030189	Akaike info criterion	-4.159065
Sum squared resid	0.746395	Schwarz criterion	-4.141869
Log likelihood	1712.376	Durbin-Watson stat	2.009617

Table 5: ADF test"D (LNYSE)"

Null Hypothesis: D(LNYSE) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 5 (Automatic based on SIC, MAXLAG=20)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-17.96001	0.0000
Test critical values:	1% level	-3.969295	
	5% level	-3.415312	
	10% level	-3.129869	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dépendent Variable: D(LNYSE,2)

Method: Least Squares

Date: 05/21/09 Time: 17:42

Sample (adjusted): 1/12/2005 3/03/2008

Included observations: 819 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNYSE(-1))	-3.312362	0.184430	-17.96001	0.0000
D(LNYSE(-1),2)	1.557766	0.166789	9.339732	0.0000
D(LNYSE(-2),2)	0.973760	0.139495	6.980585	0.0000
D(LNYSE(-3),2)	0.560558	0.106250	5.275825	0.0000
D(LNYSE(-4),2)	0.278249	0.070207	3.963276	0.0001
D(LNYSE(-5),2)	0.091836	0.034986	2.624947	0.0088
C	0.005375	0.003808	1.411412	0.1585
@TREND(1/03/2005)	-1.67E-05	7.99E-06	-2.090475	0.0369

R-squared	0.784506	Mean dependent var	2.07E-05
Adjusted R-squared	0.782646	S.D. dependent var	0.115163
S.E. of regression	0.053690	Akaike info criterion	-3.001444
Sum squared resid	2.337839	Schwarz criterion	-2.955456
Log likelihood	1237.091	F-statistic	421.7785
Durbin-Watson stat	2.013794	Prob(F-statistic)	0.000000

Table 6: ADF test"D (LDAX)"

Null Hypothesis: D(LDAX) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic based on SIC, MAXLAG=20)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-30.06084	0.0000
Test critical values:	1% level	-3.969227	
	5% level	-3.415278	
	10% level	-3.129849	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dépendent Variable: D(LDAX,2)

Method: Least Squares

Date: 05/21/09 Time: 17:03

Sample (adjusted): 1/05/2005 3/03/2008

Included observations: 824 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LDAX(-1))	-1.049560	0.034915	-30.06084	0.0000
C	0.001889	0.001096	1.723032	0.0853
@TREND(1/03/2005)	-5.17E-06	2.30E-06	-2.245054	0.0250

R-squared	0.523967	Mean dependent var	1.97E-05
Adjusted R-squared	0.522807	S.D. dependent var	0.022671
S.E. of regression	0.015661	Akaike info criterion	-5.471617
Sum squared resid	0.201371	Schwarz criterion	-5.454454
Log likelihood	2257.306	F-statistic	451.8348
Durbin-Watson stat	2.001438	Prob(F-statistic)	0.000000

Table 7: Johansen test

Date: 05/20/09 Time: 18:05

Sample (adjusted): 1/06/2005 10/03/2007

Included observations: 715 after adjustments

Trend assumption: No deterministic trend (restricted constant)

Series: LCAC LDAX LDOW LFTSE LNASDAQ LNYSE

Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.061924	131.7573	103.8473	0.0002
At most 1 *	0.040538	86.05158	76.97277	0.0086
At most 2 *	0.037183	56.46271	54.07904	0.0302
At most 3	0.021826	29.37035	35.19275	0.1853
At most 4	0.011310	13.59202	20.26184	0.3185
At most 5	0.007607	5.459599	9.164546	0.2368

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.061924	45.70569	40.95680	0.0136
At most 1	0.040538	29.58887	34.80587	0.1840
At most 2	0.037183	27.09236	28.58808	0.0766
At most 3	0.021826	15.77833	22.29962	0.3143
At most 4	0.011310	8.132419	15.89210	0.5320
At most 5	0.007607	5.459599	9.164546	0.2368

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Tableau 8: causality test

Pairwise Granger Causality Tests
Date: 05/20/09 Time: 17:28
Sample: 1/03/2005 1/02/2009
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
LDAX does not Granger Cause LCAC	824	18.0119	2.2E-08
LCAC does not Granger Cause LDAX		9.13273	0.00012
LDOW does not Granger Cause LCAC	824	116.598	2.8E-45
LCAC does not Granger Cause LDOW		5.35476	0.00489
LFTSE does not Granger Cause LCAC	716	3.92107	0.02025
LCAC does not Granger Cause LFTSE		43.8992	1.1E-18
LNASDAQ does not Granger Cause LCAC	824	29.6328	3.8E-13
LCAC does not Granger Cause LNASDAQ		9.98280	5.2E-05
LNYSE does not Granger Cause LCAC	824	1.03010	0.35743
LCAC does not Granger Cause LNYSE		36.8010	5.0E-16
LDOW does not Granger Cause LDAX	824	62.4026	6.0E-26
LDAX does not Granger Cause LDOW		0.25415	0.77564
LFTSE does not Granger Cause LDAX	716	0.29127	0.74740
LDAX does not Granger Cause LFTSE		33.5062	1.2E-14
LNASDAQ does not Granger Cause LDAX	824	20.0299	3.2E-09
LDAX does not Granger Cause LNASDAQ		5.98232	0.00263
LNYSE does not Granger Cause LDAX	824	2.72365	0.06623
LDAX does not Granger Cause LNYSE		25.6341	1.6E-11
LFTSE does not Granger Cause LDOW	716	0.52710	0.59054
LDOW does not Granger Cause LFTSE		54.9063	6.7E-23
LNASDAQ does not Granger Cause LDOW	824	1.54004	0.21499
LDOW does not Granger Cause LNASDAQ		18.3544	1.6E-08
LNYSE does not Granger Cause LDOW	824	1.81582	0.16336
LDOW does not Granger Cause LNYSE		61.6161	1.2E-25
LNASDAQ does not Granger Cause LFTSE	716	4.02813	0.01822
LFTSE does not Granger Cause LNASDAQ		8.24304	0.00029
LNYSE does not Granger Cause LFTSE	716	1.20646	0.29987
LFTSE does not Granger Cause LNYSE		36.1245	1.1E-15
LNYSE does not Granger Cause LNASDAQ	824	13.4430	1.8E-06
LNASDAQ does not Granger Cause LNYSE		54.8098	4.6E-23