

Animal Spirits and Trading Volume in International Financial Markets between 2002 and 2011

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ABSTRACT

The change in trading volume and returns and the dysfunction of the economy and more specifically of financial markets has been increasingly attracting attention of researchers, analysts, practitioners, institutions as well as government organizations. This paper investigates the factors that are able to explain how financial markets work. Testing the rational expectation hypothesis and different components of animal spirits including investors' beliefs and their behavioral biases, results show that economy is driven by animal spirits and not by rational behavior. Considering the classification of the sample by periods of stability and periods of excessive volatility, results incite to think that financial markets work in terms of economic cycles.

JEL Codes: G02, G11, G12, G14, G17.

KEYWORDS

Investors' Beliefs, Animal Spirits, Economy Dysfunction, Volatility, Rational Expectation.

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Introduction

Financial markets have witnessed an excessive change in trading volume and returns which causes abnormal losses and tremendous financial recessions and scandals affecting the financial and economic world during about the last thirty years (July 1990 to March 1991, March to November 2001 and the recession that began in December 2007 in the case of the U.S., the recession of the 1990s for the Japan, Indonesia after 1998, Argentina after 2001, European Union during 2000 and 2001, East Asia during 1997,...). In the real economic world, these recessions and scandals have not been known only in recent decades, they have been observed since more than one hundred years. The best known are, however, as an indication and not limitation, those of the crash of October 1929 and the oil crisis of 1973.

Although the importance of investigations they made, economists have failed to understand how the economy really works (Posner, 2009). In this sense, different explanations are theoretically considered to explain the excessive crises and scandals affecting largely the financial and economic spheres, especially, spanning about the last five decades. In financial markets, the authors analyze the efficiency of markets and the rationality of investors and attribute the dysfunction of financial markets to informational bias. However, in spite of the importance of its implications the rational expectation hypothesis, largely based on the efficient market hypothesis, fails to explain the excessive change in trading and returns in the major financial markets in developed and emerging countries (*see*, Lavoie, 2010). Numerous other authors attribute the excessive change in returns and trading volume in the major international markets to behavioral biases and investors' belief such as overconfidence (Daniel, Hirshleifer and Subrahmanyam, 1998), optimism (Haruvy, Stahl and Wilson, 1999; Weinstein, 1989; Otten, 1989) or pessimism (De Bondt and Thaler, 1987; Barberis Shleifer and Vishny, 1998). More recently, Akerlof and Shiller (2009) come back to reconsider the Keynesian *General Theory* recommendation and introduce what they call, such as used for the first time by Keynes (1936), the “*animal spirits*” in order to explain how the economy really works.

However, in spite of the importance of prior investigations, the causes of financial and economic crises and recessions remain disputable and the results remain non-conclusive. This leads to investigate the dysfunction of financial markets introducing variables other than that referred to the rational expectation considering, among others, investors' beliefs and behaviors. The aim of this paper is, consequently, to examine the causes of crises and scandals in the financial and economic world and

to understand how the economy really works. In order to do, we investigate together the hypothesis of rational expectation as well as the behavioral biases. These latter are expressed in terms of animal spirits including optimism, pessimism, overconfidence and spontaneous reaction. This investigation gives answers to our main question, which is the following:

What are the factors influencing the way how financial and economic spheres work?

Considering the trading volume and the stock market index as a financial proxy for the economy work, results, using data for 12 International Capital Markets over the period spanning August 2002 to mid-November 2011, remain non conclusive. Classification of the analysis by periods of stability and periods of excessive volatility indicates same impacts of explanatory variables on the trading volume for different periods and for about all markets. However, in the global vision, economy is largely driven by animal spirits. The rational expectation hypothesis loses of significance and fails to explain how the economy works.

The remainder of this paper is organized as follows: section 2 presents a theoretical overview of the factors which are likely able to explain how the economy works. Section 3 describes the methodology and the data framework of this study and specifies the model to estimate. In section 4, we present and discuss the main results. Section 5 is spared to the conclusion.

Literature Review

Economists consider that economic and financial recessions and crises are mainly caused by factors excluding changing in thought patterns. They attribute the dysfunction of economies and more specifically of financial markets to the failure of investors to expect rationally the future incomes and the evolution of stock returns. Beliefs and sentiments are largely excluded from theoretical and empirical models. Behavioral finance, however, introduces the beliefs and sentiments such as optimism, pessimism, overconfidence... to explain the excessive volatility in prices and trading volumes. Akerlof and Shiller (2009, p. 4) argue in the specific framework of

behavior explanation that “*the current crisis bears witness to the role of such changes in thinking. It was caused precisely by our changing confidence, temptations, envy, resentment, and illusions*”. These thinking components compose according to Akerlof and Shiller what they call the “*Animal Spirits*”. In this specific framework, they consider that Human psychology drives the economy and matters for global capitalism. This behavior argument (i.e. *animal spirits*) has appeared since about more than seventy years ago when Keynes (1936) has noted, in his *General Theory*, that about most of what we do in our life and especially in economic life are mainly due to behavioral biases such as animal spirits and not as a simple result of rational reaction toward acts and events. In this specific area, he argues that “*most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as the results of animal spirits [...] and not at the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities*” (Keynes, 1932, p. 168). This point of view is supported more recently by Akerlof and Shiller (2009, p. 168) who insist on an explicit manner on the importance of the behavioral components of which the animal spirits in the economic life. They argue, “*It is necessary to incorporate animal spirits into macroeconomic theory in order to know how the economy really works. In this respect the macroeconomics of the past thirty years has gone in the wrong direction. In their attempts to clean up macroeconomics and make it more scientific, the standard macroeconomists have imposed research structure and discipline by focusing on how the economy would behave if people had only economic motives and if they were also fully rational.*”. Here, the authors challenge in an explicit manner the rational expectation hypothesis. We note, accordingly, that the authors insist on the incorporation of psychological components to explain the evolution of markets and economies. Thus, a non surprising sentence shown on the cover page of their book is “*How Human Psychology Drives the Economy and Why it Matters for Global Capitalism*”. This incites to new thinking in the framework of the evolution of the financial economic world.

Considering both the definition given by Keynes (1936) and that of Akerlof and Shiller (2009) to the concept of “*animal spirits*”, we can investigate the impact of several psychological factors on the evolution of the two components of financial markets namely stock prices and trading volume. However, before these investigations, we try to define the concept of “*animal spirits*” according to these authors. Keynes (1936, p.161) defines the “*animal spirits*” as “*a spontaneous urge to action rather than inaction*”. From this definition, Keynes excludes all rational components from investors’ behavior. Akerlof and Shiller (2009) continue in the same line of idea and enlarge this

definition to insert other behavioral components such as Antisocial behavior or Social limits of profits, Monetary illusion, Changes in economic equity, Fairness, Legends instead facts and figures, Corruption, History, Exuberance and overconfidence (*see* Akerlof and Shiller (2009, p. 5-6) and Guldberg (2010) for more details). In this framework, Keynes (1936) as well as Akerlof and Shiller (2009) challenge the rational expectation hypothesis and incite to introduce human psychology as the crucial factor driving investors' decisions and, therefore, markets and economies.

Keynes challenges, especially, the rational expectation hypothesis since it is based on a quantitative model neglecting human aspects. He considers, however, that Human aspects matter more than rational expectation in making decision. In this line, he argues explicitly that about the majority of our decisions depends only on these behavioral components.

Several empirical studies have confirmed the behavior based explanations of the economy works in the major international markets in developed and emerging countries. In a recent work, Dhaoui, Farhani and Garfatta. (2012) attribute the changes in trading volume in the Japanese market to the aggressive reaction of overconfident investors. Dhaoui (2011) introduce several behavioral components to explain the economy works in the case of five developed countries: Japan, U.S., Switzerland, U.K. and France. He developed an empirical model in order to investigate the impact of rational expectation as well as investors' beliefs such as Overconfidence, Pessimism, Optimism and Spontaneous reaction on trading volume. The results of the study show that the rational expectation hypothesis fails to explain the evolution of the trading volume as one of the financial components of a stock market. The impact of the behavioral factors varies, however, from one market to the other depending on the specificity and the characteristics of the population. The changes of the trading volume in the context of the Japanese is explained by the aggressive reaction of more overconfident investors. Oppositely, the change of trading in the French Market is due, especially, to the excessive pessimism in the investors' beliefs. The excessive change in trading in the U.S., the Swiss and the U.K. markets are due, however, to more than one psychological factor. The reactions of optimistic, pessimistic or overconfident investors as well as that of those with spontaneous reaction drive these markets and influence largely the evolution of trading.

The investors' beliefs as components of animal spirits are also considered in several other studies (Daniel, Hirshleifer and Subrahmanyam, 1998; Haruvy, Stahl and Wilson, 1999; Weinstein, 1989; Otten, 1989; De Bondt and Thaler, 1987; Barberis

Shleifer and Vishny, 1998; Ciccone, 2003; Piroscă, 2011). A point of view commonly shared by the major of authors is that investors' beliefs impact significantly the economy works and explain in a major part the economy dysfunction.

Taken together, these empirical and theoretical arguments give explanations to the financial distress. The financial recessions can be interpreted as a consequence of an interruption of normal functioning of markets. In these lines, Hakkio and Keeton (2009, p. 6) argue theoretically that "*financial stress can be thought of as an interruption to the normal functioning of financial markets*". The interruption in markets functioning implies the reject of the hypotheses according to which financial markets react following fundamental prediction. Anomalies and behavioral biases play therefore a pivotal role in the decision-making process. The investors' beliefs are, hence, the most important factors driving the economy works. In this sense, Hakkio and Keeton (2009, p. 6) consider that "*one common sign of financial stress is increased uncertainty among lenders and investors about the fundamental values of financial assets*". This uncertainty can be explained as a consequence of the non-rational reaction of investors. The behavioral based reaction induces a distorted prevision of the price evolution given the uncertainty in investors' beliefs and sentiments. This influences significantly the evolution of the two components of financial markets namely returns and trading volumes. Accordingly, the abnormal changes in trading volumes and the low returns largely observed in the major international markets can be explained among others by the reaction of non-rational investors. In this same vein, Dhaoui (2011) among others found that the rational expectation hypothesis loses of significance in the major international markets and that economies are driven by behavioral biases such Overconfidence and Optimism for the specific case of the Japanese Stock Market, Pessimism and "Spontaneous urge to action rather than inaction" for the case of French Stock Exchange and all factors comprising the "Animal Spirits" behavioral bias, including Overconfidence, Spontaneous Reaction, Opromism and Pessimism, for the cases of the U.S. the U.K. and the Swiss Stock Markets.

Data and Methodology

This section presents a description of the sample and the period of analysis. It illustrates also the measurement of each dependent and independent variable that is used and specifies the model to estimate.

Sample Period and Stock Markets Investigated

The sample covers the period spanning from 01 August 2002 to 17 November 2011. The analyses include different markets that have been affected by at least one crisis during this period. We include here different stock markets in order to investigate the impact of investors' behavior during the periods of stability and those of excessive volatility on trading volume. The stock markets investigated are those of U.S (Nasdaq), Japan (Nikkei225), U.K. (FTSE100), France (CAC40), Switzerland (SSMI), Malaysia (MLSE), New Zealand (NZSE), Seoul (KS11), Shanghai (SCE composite), Hong Kong (HIS), Bombay (BSE) and Australia (All ordinaries). Data is available online on the yahoo Finance pages and on the website of each Stock Market.

Proxy for Used Variables

The investors' beliefs change following the evolution of gains and losses across the unit of time. Ciccone (2003) uses annual earnings forecast to determine optimism. Optimism is present when the mean annual earnings forecast exceeds the corresponding actual earnings. By extension, pessimism is present when the mean annual earnings forecast is lower than the corresponding actual earnings. In our case, we consider that optimism (respectively pessimism) is present when returns exceed (decrease under) a target level. Accordingly, investors act in optimistic way when they realize gains that exceed a desired level. Let $(\bar{R} + \sigma_{(R)})$ the level starting from which the investor can be considered optimistic, with \bar{R} the average return and $\sigma_{(R)}$ the standard deviation of returns. In this sense, the investor is considered optimistic when he realized returns higher than $(\bar{R} + \sigma_{(R)})$ at the time $(t-1)$. the investors act as optimistic when prior returns are higher than this level and in the normal way if not. Accordingly, the indicator of optimistic sentiments of the investor takes the value $R_{(t-1)}$ when $R_{(t-1)} \geq (\bar{R} + \sigma_{(R)})$ and 0 otherwise. This measure was used in Dhaoui (2011).

Oppositely, pessimistic belief occurs when losses decrease below the level $(\bar{R} - \sigma_{(R)})$. Considering the same structure, investors are pessimistic when $R_{(t-1)} \leq (\bar{R} - \sigma_{(R)})$ and

then the indicator of pessimism takes the value $R_{(t-1)}$, and takes the value 0 if not. This measure was used in Dhaoui (2011).

When returns are included in the interval $\left[(\bar{R} - \sigma_{(R)}), (\bar{R} + \sigma_{(R)}) \right]$ investors react in a spontaneous manner. The spontaneous reaction variable takes, thus, the value $R_{(t-1)}$ when $R_{(t-1)} \in \left[(\bar{R} - \sigma_{(R)}), (\bar{R} + \sigma_{(R)}) \right]$ and 0 otherwise.

Overconfidence occurs when an investor realizes gains in previous date. Overconfidence is more pronounced once investor realizes at the time “t” a gain higher than that in time (t-1). Considering investor who will make a decision at the time “t”, he reacts in overconfidence manner if his gains in (t-1) exceed his gains in time (t-2). Oppositely when gains at time (t-1) decrease below their level in (t-2) the investor loses of confidence. The variable overconfidence will be investigated considering the impact of observed return at the time (t-1) (i.e. $R_{(t-1)}$) on the trading volume at the time “t” (i.e. V_t). This measure was used in Boynton, Oppenheimer and Reid (2009), Ulussever, Guranyumusak and Kar (2011) and Dhaoui et al. (2012).

Rational expectation supposes that investors anticipate future evolution of returns considering the realized return at the current time and adjust their anticipations by the error of anticipation of the returns for the current time. Considering the time interval $\left[(t-1), t \right]$, the rational expectation for the time “t” follows this relation : $R_t^{Exp} = R_{(t-1)} + E_{(t-1)}$, with R_t^{Exp} represents the expected return at the time “t”, and $E_{(t-1)}$ represents the error of expectation at the time (t-1) that is equal to the difference between realized return and expected return at the time (t-1) : $E_{(t-1)} = R_{(t-1)} - R_{(t-1)}^{Exp}$.

The Model

To investigate the contribution of investors’ beliefs and behaviors to the explanation of the evolution of trading volume across the time we develop the following model:

$$V_t = \alpha + \beta_1 RatExp_t + \beta_2 OverConf_t + \beta_3 Spont React_t + \beta_4 Optimism_t + \beta_5 Pessimism_t + \varepsilon_t \quad (1)$$

With V_t represents the natural logarithm of trading volume and ε_t is an error term.

Results of estimation will take into account the periods of excessive volatility of returns and that of stability. Excessive volatility gives an idea on the dysfunction of financial markets or more specifically financial crises and recessions.

Results and Discussions

To investigate the causes of financial recessions we investigate the effect of the investors' beliefs on the variability of trading volume in periods of stability and in periods of high volatility of returns. The periods of high volatility are determined approximately following dates of crashes and recessions indicated by international financial and economic organizations (World Bank, IMF, WTO...) and the classification relies on the results of graphical analyses. Hereafter we present graphs of the evolution of returns spanning the whole period from August 2002 to November 2011 by stock market.

Graph 1. 1st panel : Countries with one single period of Volatility

Figure 1: Mlaysia (KLSE), 2287 obs.

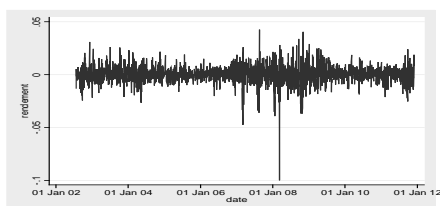


Figure 2: Japan (Nikkei225), 2328 obs.

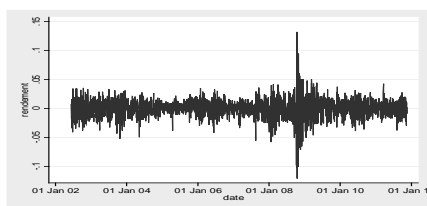


Figure 3: New Zealand (NZSE50), 1757 obs.

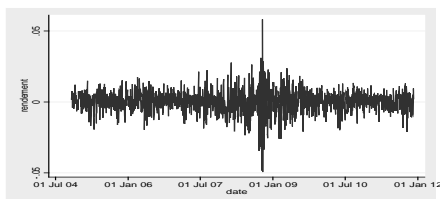


Figure 4: Shanghai (SSE Composite Index), 1493 obs.

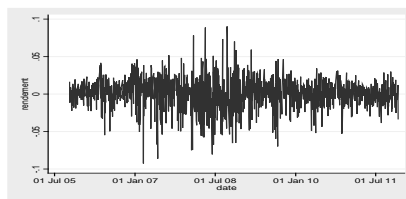
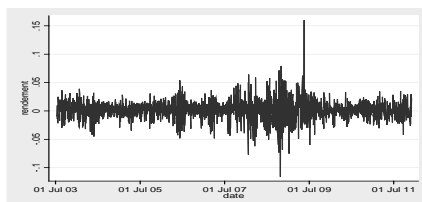


Figure 5: Bombay Stock Exchange (BSE), 2072 obs.



Graph 2. 2nd panel : Countries with two periods of Volatility

Figure 6. Hong Kong (HIS), 2281 obs.

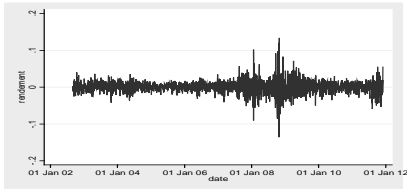


Figure 7. Australian Securities Exchanges (AORD All Ordinaries), 2214 obs.

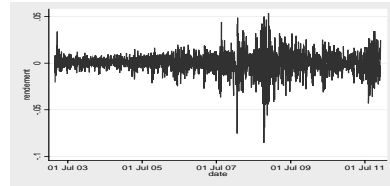
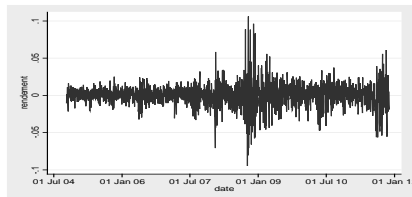


Figure 8. France (CAC40), 2310 obs.



Graph 3. 3rd panel : Countries with three periods of Volatility

Figure 9. Switzerland (Swiss Market SSMI), 2255 obs.

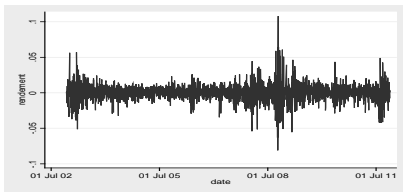


Figure 10. U.K. (FTSE 100), 2263 obs.

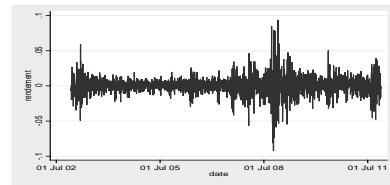


Figure 11. U.S. (Nasdaq 100), 2318 obs.

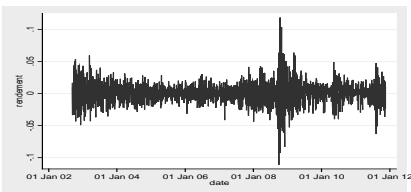
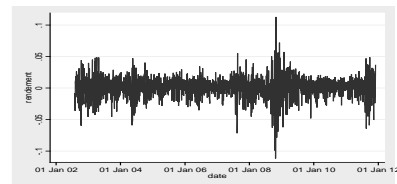


Figure 12. Seoul Composite (KS11), 2318 obs.



Graphical analyses give an idea about the classification of the countries by periods of stability and of the high volatility of their markets. Table 1 summarizes this classification by periods of stability and high volatility.

Table 1. Classification of stable vs volatile period by stock markets

	Markets	August 2002 to March 2003	April 2003 to Jun 2007	July 2007 to September 2009	October 2009 to July 2011	After August 2011
1 st Panel	Japan	Stability	Volatility	Stability	Volatility	Stability
	Bombay Stock Exchange	Stability	Volatility	Stability	Volatility	Stability
	New Zealand	Stability	Volatility	Stability	Volatility	Stability
	Shanghai	Stability	Volatility	Stability	Volatility	Stability
	Malaysia	Stability	Volatility	Stability	Volatility	Stability
2 nd Panel	Hong Kong	Stability	Volatility	Stability	Volatility	Stability
	France	Stability	Volatility	Stability	Volatility	Stability
	Australian Securities Exchange	Stability	Volatility	Stability	Volatility	Stability
3 rd Panel	Switzerland	Volatility	Stability	Volatility	Stability	Volatility
	U.K.	Volatility	Stability	Volatility	Stability	Volatility
	U.S.	Volatility	Stability	Volatility	Stability	Volatility
	Seoul Composite	Volatility	Stability	Volatility	Stability	Volatility

According to table 1, we can classify the countries composing our sample in three panels. The first contains the Japan, Bombay, Shanghai, New Zealand and Malaysia. These countries have known a high volatility in their markets starting July 2007 to September 2009.

The second panel includes three countries having two volatile periods namely Hong Kong, France and Australia. The first volatile period starts in July 2007 and finishes in September 2009. The second period of volatility starts in August 2011. And, finally, the last panel contains four countries namely Switzerland, U.K., U.S. and Seoul. These countries have known three periods of volatility. The first starts in August 2002 and finishes in March 2003. The second period of volatility plains for all the period between July 2007 and September 2009. The third period starts in August 2011. For all panels, starting and final dates are determined approximately using results in the graphics above.

Considering these characteristics of international Markets we adopt the same classification and analyze the evolution of investors' behavior across the periods of stability and those of high volatility. This allows to determine the factors influencing the investors' reaction.

Tables 2 to 6 present results for the first panel including markets with a single volatile period covering July 2007 to September 2009.

Table 2. Results for Malaysian Stock Exchange

Countries	Variables	01/08/2002 to 30/06/2007 (Stability)	01/07/2007 to 30/09/2009 (High volatility)	01/10/2009 to 17/01/2011 (Stability)
Malaysia	Rational expectation	-0,0018671 (-0,02)	0,029306 (0,22)	-0,000863 (-0,06)
	Optimism	3,952122 *** (10,12)	2,457814 *** (5,21)	2,027082 *** (4,02)
	Pessimism	-2,966418 *** (-8,85)	-2,085144 *** (-4,20)	-2,630279 *** (-6,38)
	Spontaneous Reaction	1,772425 *** (4,39)	1,639592 ** (2,02)	6,02156 * (1,73)
	Overconfidence	5,415741 *** (2,56)	5,529746 * (1,86)	-0,900518 (-0,66)
	Cons_	18,21633 *** (16,15)	19,02779 *** (10,34)	18,4898 *** (12,92)
	R-Square	0,1163	0,1356	0,1994
	Adj R-Square	0,1133	0,1214	0,1918
N. obs.	1456	309	532	

***: Significant at the level 1%, **: Significant at the level 5%, *: Significant at the level 10%.

Table 3. Results for Japanese Stock Exchange

Countries	Variables	01/08/2002 to 30/06/2007 (Stability)	01/07/2007 to 30/09/2009 (High volatility)	01/10/2009 to 17/01/2011 (Stability)
Japan	Rational expectation	-0,0146175 (-0,18)	-0,00048082 (-0,61)	0,0017469 (0,16)
	Optimism	5,496744 (4,19)***	3,987197 (5,96)***	6,365698 (4,64)***
	Pessimism	-6,383355 (-5,41)***	-3,651358 (-6,36)***	-4,947251 (-3,80)***
	Spontaneous Reaction	-3,443485 *** (-2,75)	1,487952 (1,11)	0,5675622 (0,43)
	Overconfidence	1,781031 *** (-2,56)	-0,18953 (-0,49)	0,4319584 (0,59)
	Cons_	12,52128 (13,15)***	11,80451 (11,29)***	11,80701 (11,17)
	R-Square	0,2457	0,1119	0,1602
	Adj R-Square	0,2427	0,1038	0,1519
N. obs.	1245	549	514	

***: Significant at the level 1%, **: Significant at the level 5%, *: Significant at the level 10%.

Table 4. Results for New Ealand Stock Exchange

Countries	Variables	01/08/2002 to 30/06/2007 (Stability)	01/07/2007 to 30/09/2009 (High volatility)	01/10/2009 to 17/01/2011 (Stability)
New Zealand	Rational expectation	-0,0648184 (-0,706)	0,0371711 (0,74)	0,0073104 (0,22)
	Optimism	9,17813 ** (2,02)	10,88856 *** (4,35)	9,682107 *** (4,69)
	Pessimism	-12,42906 *** (-2,68)	-3,853524 * (-1,71)	-5,591399 *** (-3,00)
	Spontaneous Reaction	0,3652308 (0,08)	1,419302 (0,29)	0,5953874 (0,22)
	Overconfidence	-0,3954135 (-0,15)	-1,033097 (-0,72)	-1,184377 (-1,01)
	Cons_	17,06697 (10,31)	17,17036 (9,21)	17,15519 *** (16,78)
	R-Square	0,2164	0,3571	0,1677
	Adj R-Square	0,2103	0,3514	0,1653
N. obs.	652	566	1757	

***: Significant at the level 1%, **: Significant at the level 5%, *: Significant at the level 10%.

Table 5. Results for Shanghai Stock Exchange

Countries	Variables	01/08/2002 to 30/06/2007 (Stability)	01/07/2007 to 30/09/2009 (High volatility)	01/10/2009 to 17/011/2011 (Stability)
Shanghai	Rational expectation	0,1174147 (0,079)	0,0000294 (0,02)	0,0000666 (0,96)
	Optimism	10,9254 *** (5,19)	0,3974354 *** (2,70)	0,0021573 (0,24)
	Pessimism	-6,389313 *** (-3,6)	-0,1794908 (-1,38)	-0,0021634 (-0,33)
	Spontaneous Reaction	7,528852 *** (2,87)	0,5108541 ** (2,02)	0,0055034 (0,81)
	Overconfidence	-1,677286 (-0,83)	0,3199599 *** (3,88)	0,0007502 (0,18)
	Cons_	21,8397 *** (70,35)	22,1649 (89,75)	22,18064 (3,8)
	R-Square	0,4959	0,4359	0,3618
Adj R-Square	0,4898	0,4307	0,3556	
N. obs.	416	549	523	

***: Significant at the level 1%, **: Significant at the level 5%, *: Significant at the level 10%.

Table 6. Results for Bombay Stock Exchange

Countries	Variables	01/08/2002 to 30/06/2007 (Stability)	01/07/2007 to 30/09/2009 (High volatility)	01/10/2009 to 17/011/2011 (Stability)
Bombay	Rational expectation	0,0001376 (0,01)	-0,0232592 (-0,51)	0,0063136 (0,32)
	Optimism	5,975804 (2,60)***	2,754436 (1,96)**	10,53096 (5,59)***
	Pessimism	-6,315796 (-2,78)***	-7,391564 (-5,12)***	-11,76311 (-6,89)***
	Spontaneous Reaction	1,315978 (0,73)	-1,754886 (-0,56)	-1,575617 (-0,91)
	Overconfidence	-0,2895931 (-0,024)	0,221533 (0,26)	0,1298517 (0,14)
	Cons_	9,65496 *** (65,42)	10,12245 *** (37,98)	9,843536 *** (66,67)
	R-Square	0,2642	0,4983	0,7266
Adj R-Square	0,2573	0,4937	0,7252	
N. obs.	538	550	983	

***: Significant at the level 1%, **: Significant at the level 5%, *: Significant at the level 10%.

Results in tables 2 to 6 indicate that the hypothesis of rational expectation loses of significance to explain the variability of trading volume in both: periods of stability and the period of high volatility in the five stock markets composing this sub-sample. Oppositely, the animal spirits behavior of investors explains about the whole the variability of trading volume in the same way in periods of stability and in the period of excessive volatile trading in the case of Malaysian, Bombay and Japanese Markets. In fact, the reaction of the optimistic investors influences positively the trading volume. Oppositely, the reaction of the pessimistic investors impacts negatively the trading volume.

Except the case of the Market of Shanghai, for all the other markets (Japan, Malaysia, Bombay and New Zealand) all the components of animal spirits variable impact in about a similar way the trading volume even in periods of stability or in that of high volatility. Thus, in the case of these stock markets we cannot attribute the high variability of trading volume in the period of non-stability to the decisions made by investors with the animal spirits reaction.

Tables 7 to 9 give results for countries having known two periods of high volatility. The first takes place spanning from July 2007 to September 2009 and the second starts in August 2011.

Table 7. Results for Hong Kong Stock Exchange

Countries	Variables	01/08/2002 to 30/06/2007 (Stability)	01/07/2007 to 30/09/2009 (High volatility)	01/10/2009 to 31/07/2011 (Stability)	01/08/2011 to 17/01/2011 (High volatility)
Hong Kong	Rational expectation	0,0094716 (0,38)	-0,0086295 (-0,32)	-0,110444 (-1,27)	0,0569733 (0,48)
	Optimism	9,727746 (2,76)***	8,921321 (11,49)***	9,428507 (3,79)***	7,884296 (2,62)***
	Pessimism	-1,411207 (-3,96)***	-8,101631 (-10,51)***	-13,29175 (-6,22)***	-6,516842 (-2,52)***
	Spontaneous Reaction	7,963819 (3,07)***	4,095233 (2,07)**	0,6893569 (0,37)	-0,3024628 (-0,06)
	Overconfidence	4,144081 (2,33)**	1,599998 (3,38)***	-0,4723748 (-0,40)	0,529921 (0,31)
	Cons_	19,67071 (10,57)***	21,42976 (13,60)***	21,10563 (14,04)***	21,36374 (43,87)***
	R-Square	0,2956	0,2573	0,1101	0,1165
	Adj R-Square	0,2926	0,2505	0,1000	0,0613
N. obs.	1192	555	447	86	

***: Significant at the level 1%, **: Significant at the level 5%, *: Significant at the level 10%.

Table 8. Results for Australian Stock Exchange

Countries	Variables	01/08/2002 to 30/06/2007 (Stability)	01/07/2007 to 30/09/2009 (High volatility)	01/10/2009 to 31/07/2011 (Stability)	01/08/2011 to 17/01/2011 (High volatility)
Australia	Rational expectation	-0,0733917** (-1,98)	-0,0141237 (-0,41)	-0,008164 (-0,53)	0,0058698 (0,18)
	Optimism	12,60348*** (3,52)	3,956039* (1,90)	7,341521*** (2,66)	3,530575 (1,05)
	Pessimism	-12,88308*** (-4,03)	-1,486838 (-0,82)	-10,31233*** (-4,24)	-4,137054 (-1,30)
	Spontaneous Reaction	1,081162 (0,47)	4,417508 (1,04)	1,79318 (0,64)	1,420481** (2,00)
	Overconfidence	-1,995823 (-1,21)	-0,6302036 (-0,54)	-1,346957 (-0,92)	-1,872936 (-0,98)
	Cons_	20,17996*** (18,17)	20,6959*** (84,77)	20,89099 (13,52)	20,83000*** (50,92)
	R-Square	0,3181	0,3295	0,5447	0,6179
	Adj R-Square	0,315	0,3236	0,2396	0,5949
N. obs.	1094	572	456	89	

***: Significant at the level 1%, **: Significant at the level 5%, *: Significant at the level 10%.

Table 9. Results for French Stock Exchange

Countries	Variables	01/08/2002 to 30/06/2007 (Stability)	01/07/2007 to 30/09/2009 (High volatility)	01/10/2009 to 31/07/2011 (Stability)	01/08/2011 to 17/01/2011 (High volatility)
France	Rational expectation	0,0021435 (0,02)	0,0009854 (0,09)	-0,0084168 (-0,83)	-0,0144636 (-0,378)
	Optimism	1,382417*** (3,78)	7,443982*** (7,27)	6,406972*** (2,75)	5,60802*** (2,49)
	Pessimism	-2,007958*** (-6,00)	-8,564161*** (-8,79)	-13,11779 (-6,52)	-7,076897*** (-3,64)
	Spontaneous Reaction	-1,344369 (-0,66)	-0,6155619 (-0,31)	-1,952723 (-0,86)	-6,716509 (-1,32)
	Overconfidence	-1,794604 (-1,14)	-0,7888018 (-1,26)	-2,153704* (-1,83)	-3,137049*** (-2,56)
	Cons_	18,43785*** (13,92)	18,77479*** (12,72)	18,64237*** (10,73)	18,93855*** (44,66)
	R-Square	0,4708	0,1748	0,1058	0,2636
	Adj R-Square	0,467	0,1675	0,0961	0,2132
N. obs.	698	574	468	79	

***: Significant at the level 1%, **: Significant at the level 5%, *: Significant at the level 10%.

Results in tables 7 to 9 indicate for the three countries (France, Hong Kong and Australia) that optimism and pessimism hypotheses as components of animal spirits bias explain the economy works in both: periods of stability and periods of high volatility. For the specific case of Hong Kong, results show also that the reactions of overconfident investors and those with spontaneous reaction impact in their turn the economy works. The hypothesis of rational expectation remain non-significant for the three countries even the period is of stability or of high volatility.

Results for countries with three volatile periods are given in tables 10 to 13.

Table 10. Results for Swiss Stock Exchange

Countries	Variables	01/08/2002 to 31/03/2003 (High volatility)	01/04/2003 to 30/06/2007 (Stability)	01/07/2007 to 30/09/2009 (High volatility)	01/10/2009 to 31/07/2011 (Stability)	01/08/2011 to 17/11/2011 (High volatility)
Switzerland	Rational expectation	-0,1111289 (-0,55)	-0,0126377 (-0,51)	0,0073701 (0,71)	0,0127327 (1,56)	-0,0034019 (-0,19)
	Optimism	8,386031*** (2,44)	6,39788** (2,25)	8,499868*** (6,87)	6,928711** (2,09)	9,748404*** (2,91)
	Pessimism	-1,886762 (-0,59)	-6,534211*** (-6,04)	-9,597526*** (-8,05)	-8,147291*** (-6,57)	-11,218586*** (-3,76)
	Spontaneous Reaction	4,607594 (0,61)	0,7302884 (0,34)	-3,699637 (-1,42)	-1,872912 (-0,72)	2,218586 (0,31)
	Overconfidence	1,456902 (0,67)	-1,798946 -1,26	-1,260576* (-1,67)	-3,097999* (-1,90)	-4,712409*** (-2,48)
	Cons_	17,69276 (35,37)	17,80328*** (14,19)	18,17439*** (11,68)	17,77902*** (11,37)	17,8621*** (38,28)
	R-Square	0,1164	0,3831	0,1629	0,1134	0,2936
Adj R-Square	0,0559	0,3802	0,1554	0,1037	0,2446	
N. obs.	79	1071	564	463	78	

***: Significant at the level 1%, **: Significant at the level 5%, *: Significant at the level 10%.

Table 11. Results for UK Stock Exchange

Countries	Variables	01/08/2002 to 31/03/2003 (High volatility)	01/04/2003 to 30/06/2007 (Stability)	01/07/2007 to 30/09/2009 (High volatility)	01/10/2009 to 31/07/2011 (Stability)	01/08/2011 to 17/11/2011 (High volatility)
UK	Rational expectation	0,0019037 (0,02)	0,0065213 (0,39)	-0,0014575 (-0,07)	0,0027181 (0,12)	-0,138409 (-0,14)
	Optimism	2,977028 (0,59)	3,993008* (1,69)	3,729751*** (3,15)	6,913669*** (2,62)	6,150827*** (2,34)
	Pessimism	-4,354747 (-0,84)	-8,801088*** (-3,89)	-5,386519*** (-4,85)	-4,992221*** (-5,84)	-8,58405*** (-3,60)
	Spontaneous Reaction	-11,50274 (-1,09)	-1,253282 (-0,85)	-2,563612 (-1,06)	-2,953955 (-1,08)	4,72253 (0,88)
	Overconfidence	-3,349596 (-1,02)	-1,881756* (-1,73)	-1,403448** (-1,96)	-4,08298*** (-2,76)	-3,493217*** (-2,42)
	Cons_	21,07296 (30,97)	21,17952*** (25,71)	20,94948*** (13,09)	20,59363*** (12,03)	20,57805** (56,537)
	R-Square	0,4505	0,196	0,361	0,1016	0,2585
	Adj R-Square	0,4143	0,1922	0,3553	0,0917	0,207
N. obs.	82	1073	570	460	78	

***: Significant at the level 1%, **: Significant at the level 5%, *: Significant at the level 10%.

Table 12. Results for US Stock Exchange

Countries	Variables	01/08/2002 to 31/03/2003 (High volatility)	01/04/2003 to 30/06/2007 (Stability)	01/07/2007 to 30/09/2009 (High volatility)	01/10/2009 to 31/07/2011 (Stability)	01/08/2011 to 17/11/2011 (High volatility)
US	Rational expectation	-0,0013339 (-0,05)	0,0060562 (0,34)	0,0027018 (0,19)	-0,0149435 (-0,30)	0,023649 (0,91)
	Optimism	4,77477*** (4,30)	2,655937** (1,96)	2,548728*** (3,82)	1,6657 (0,67)	4,279347*** (2,29)
	Pessimism	-1,711587 (-1,31)	-3,733872*** (-2,6)	-2,644234*** (-4,23)	-8,066696*** (-3,72)	-7,355007*** (-4,85)
	Spontaneous Reaction	9,967913*** (3,62)	-1,079388 (-0,90)	-0,2475651 (-0,18)	-5,27086** (-2,25)	2,132501 (0,65)
	Overconfidence	0,4343431 (0,61)	-0,4189386 (-0,56)	-0,9743913*** (-2,42)	-3,109979*** (-2,38)	-2,874493*** (-2,93)
	Cons_	21,06314 (97,67)	21,28201*** (23,93)	21,46282*** (21,67)	21,44617*** (13,21)	21,38062*** (76,58)
	R-Square	0,1862	0,2117	0,4599	0,3575	0,3421
	Adj R-Square	0,1561	0,2078	0,4554	0,3504	0,2965
N. obs.	141	1027	611	461	78	

***: Significant at the level 1%, **: Significant at the level 5%, *: Significant at the level 10%.

Table 13. Results for Seoul Stock Exchange

Countries	Variables	01/08/2002 to 31/03/2003 (High volatility)	01/04/2003 to 30/06/2007 (Stability)	01/07/2007 to 30/09/2009 (High volatility)	01/10/2009 to 31/07/2011 (Stability)	01/08/2011 to 17/11/2011 (High volatility)
Seoul	Rational expectation	-0,0500564 (-0,35)	0,006156 (0,50)	-0,0014951 (-0,12)	0,0019769 (0,34)	0,000056 (0,09)
	Optimism	6,323745*** (2,55)	5,3764027*** (2,78)	4,455644*** (2,51)	0,2132635 (0,10)	0,1409836 (0,09)
	Pessimism	3,448822 (1,54)	-2,934043 (-1,51)	-0,0555116 (-0,04)	-2,642974* (-1,66)	-2,506756* (-1,80)
	Spontaneous Reaction	-2,143304 (-0,52)	3,009507 (1,36)	2,603327 (0,82)	-0,3265051 (-0,24)	-0,9799284 (-0,31)
	Overconfidence	3,455121*** (2,40)	2,152928* (1,88)	2,143484** (2,11)	0,348115 (0,38)	-0,6763232 (-0,76)
	Cons_	13,54845*** (39,96)	12,80747*** (78,72)	12,90968*** (52,13)	12,75659*** (12,68)	12,82902*** (48,73)
	R-Square	0,3976	0,2213	0,1874	0,1636	0,1653
Adj R-Square	0,3787	0,2176	0,1801	0,1542	0,1125	
N. obs.	165	1054	559	453	85	

***: Significant at the level 1%, **: Significant at the level 5%, *: Significant at the level 10%.

Results in tables 10 to 13 indicate even for countries having three periods of volatility that the hypothesis of rational expectations loses of significance and fails to explain the evolution of trading volume. Sentiments and beliefs drive, however, the economy. In fact, optimism affects significantly and positively the trading volumes whereas pessimism presents significant and negative influences. The weight of impacts is similar even the period is of stability or characterized by a high volatility.

Taken together results for the whole sample including countries with one single volatile period, those with two periods and those with three volatile periods tend toward the same conclusions. The rationality fails to explain how the economy really works; sentiments, beliefs and animal spirits drive, however, the economy. These results are consistent with the prediction of Keynes (1936) who argues that all decisions to do something constitutes most probably a consequence of only animal spirits reaction of the decision-makers and not a result of rational thinking based on statics and models. The results confirm and spur the prediction of Akerlof and Shiller (2009) who plead in favor of the fact that “*Human Psychology Drives the Economy*”.

Considering these results we cannot conclude moreover that *Human Psychology* constitutes the only factor which causes definitely the dysfunction of the economy. We

can conclude, however, that sentiments, beliefs or animal spirits can be considered among the main causes of crises once there is no institutional and governmental control. Markets trade ordinary and the accumulation of biases caused by the reaction of non-rational investors induces across the time abnormal losses or abnormal gains. Non-rational investors (those with animal spirits reaction) continue their trading even when markets are not healthy and this behavior lunches the first signs of dysfunction of the financial markets. When institutions and government organizations delay their intervention the impact on the trading can be exacerbated.

Conclusion

The causes of financial recessions and economy dysfunction has come to the forefront of attention of academics, analysts, practitioners, investors, government and all who are interested in financial markets and this probably because of the problems which have been revealed in the economic sphere.

Non-rational expectation, investor sentiments, behavioral biases, animal spirits are all factors considered to explain the dysfunction of the economy once the hypothesis of rationality loses of power to explain the excessive volatility and the abnormal gains and losses in the financial markets.

Using a sample of 12 international markets over a period of analysis spanning August 2002 to the mid-September 2011, results shown that economy works is explained in terms of animal spirits and that the hypothesis of rational expectation loses of significance and this for all the markets.

After classification of the analysis by periods of stability and volatility, results indicate that beliefs and animal spirits drive the economies whatever the period is of stability or of high volatility.

Results cannot serve, however, to conclude what factor affects the variety of trading across the periods of high volatility opposite to that during the periods of stability. They allow, however, to understand only what factors can explain how the economy works. Financial markets trade in non-rational way. Investors' belief and their behavioral bias conduct their decision-making process and induce therefore a cumulative dysfunction on financial markets taking the form of repeated cycles.

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