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The signals of the financial crisis

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ABSTRACT

The relationship is complex between the economic crisis, which signifies a slowing-down of economic activity (recession or depression) and affects all economic actors (households, consumers, firms, administrations, savers, banks and investors), on one side. And the financial crisis, which refers to the destabilization of the banking and financial system of one or more economies and which affects the currencies, the stock market, the households and the banks or the States in the event of over-indebtedness on the other side. This relationship depends on the scale of the crisis in the affected market and the fettering of risks involved in combination with other markets. However, the history of the crises converges on the ascertainment that over liquidity weakens the economic and financial system by accelerating credit, thus creating a gap between prices and their fundamental values. Nevertheless, no academic consensus was reached on the premises of the crisis, notwithstanding, the values of indicators such as the GDP, the economic growth, the Dow Jones index, the VIX and the interest rates or others that precede the crisis conferring a signification to the advent of the crisis. Thus, fiscal and monetary policies aimed to control aggregate demand and which interlock with the conditions and the causes of crises, for this reason can be identified by signals described as weak, medium or strong.

Keywords: Economic crisis, financial crisis, crash, financial bull.

INTRODUCTION

The capitalism is an economic system based on private property and free markets, which generate speculative bubbles and waves of prosperity that are followed by recessions, economic and financial crises intertwined and supported by the economic cycles. Using the notion of crisis in the context of economics can be assimilated to the definition, then proposed by Kitchin, Juglar [1] and Kondratiev, who considers that the crisis is founded on the cyclical nature of economic growth impacted by the decline of production.

The financial sphere has developed, as well as the economy, in order to allow the better allocation of resources [2]. It has been able to enhance the growth cycles through capital holders, who lend, and capital claimants, who invest. And according to Bencivenga, the financial market permits to make savings, investments through more profitable and stable investments, within the potential to diversify the portfolio as per to Greenwood, & al [3] and Saint-Paul [4].

A triggering factor will mark the beginning of the panic that is the beginning of a financial crisis as reported by Kindleberger and Aliber [5]: « the specific signal that marks the beginning of the crisis, perhaps the bankruptcy of a bank or company, falling into the credit trap (…).The competition has begun. Prices are falling. Bankruptcies are multiplying. Sometimes the

liquidations are done in the right order, but most often they turn into a panic when it is realized that there is not enough money in circulation to permit everyone to realize the expected capital gains». Thus, the financial crisis is defined as a sudden increase of the demand for money for precautionary purposes [6].

And in historical terms, the first two thirds of the 19th century were marked by a crisis around every ten years, but their frequency slowed during the last third. The 20th century was marked by two minor crises before the Great Depression of 1929-1933 and a few others for this period. The causes of financial crises are very varied, either by the institutions or the markets they affect and which concern: currency crises, banking crises, housing crises, bond crises, sovereign debt crises, commodity crises and stock market crises. Many authors have carried through studies from the 1800s onwards, such as Bordo & al. [7] and Boucher [8] for illustrative guidance.

The stock market (financial) crisis that began in the United States in March 2000 was among the most severe in the history of financial crises. The fall in the United States' prices stood at 42.5% after a period of 26 months, which ranks it in the same order as the most severe crises (1916, 1937, 1973), with the exception of the 1929 crisis, which up to now has not been comparable to any other by the gravity of its impact. The history of the crises is also marked by the 2007 crisis, on which, on the first day of September 2007, the Dow Jones was down by nearly 14% over the first eight months of the year. On 17 September of the same year, this index fell again 4.06%. But at the end of 2008, the Dow Jones lost 33.8% of its capitalization. The 2008 banking and financial crisis is the second phase of the 2007 financial crisis, implying a global economic crisis from 2007-2009. It should be noted that the 2000-2001 stock market crisis has the specific attribute of being a slow one, without however being the slowest compared to those of 1912, 1919, 1939 and 1968.

It is interesting to note that the very violent decline of prices was qualified as a crash and, which was observed in 1873 and 1929. The 1929 crisis was marked by the Dow Jones index losing 23.05% in two days (Monday 28 and Tuesday 29 October) and nearly 90% over the 30 months from October 1929 to July 1932 with periods of relative rebound or stabilization in the meantime. Then in 1937, the Dow Jones Index lost 49% between March 1937 and March 1938, almost returning to the lowest level reached between 1932 and 1933. The level of the Dow Jones index before the 1929 crash was not recovered until 1954. The 1987 New York Stock Exchange crash was marked by the fall of the Dow Jones Index in one day on October 19, 1987 by 22.6%. But the index rebounded and returned to its pre-crash level in 1989. Since the crash of Internet stocks in 2000 represented by the NASDAQ index (created in New York in 1971), it was observed a decline of 27% during the first two weeks of April and 39.3% during the year 2000. The NASDAQ has not yet regained the level it was before the crash. As a result of the subprime crisis, the Dow Jones index decline by 54% from August 2007 to February 2009 can be observed.

FROM THE NORMALITY TO THE BUBBLE, TO THE CRASH AND BACK TO THE INITIAL CONDITION

The interveners offer assets with promises of results and, when they are overvalued (bubble), their prices fall from their usual values, a sudden return to the initial situation will always occur in the end (crash). Therefore, those who bought at the high price will have to sell at the low price. As a reminder, capitalism is an unstable system, with a natural tendency to cycles and crises. Indeed, with the financialization of the economy, the crises of financial origin have multiplied with a frequency of each decade.

Minsky [9] considered that the major force of the capitalist system is also its main weakness through the encouragement of risk-taking, which generates financial innovations that insures unlimited risks. These risky positions contribute to increasing fundamental uncertainty. It is not easy to define the return on a risky project since there may be various outcomes. And regarding the attitude towards the risk, we distinguish three kinds of behaviors: neutrality with regard to the risk (indifferent between projects with the same return whatever their risk), aversion to the risk (the least risky project, i.e. one that provides the least loss) and taste for risk (preference for a project that can be won or lost a lot).

Thus, the choice of individuals, therefore depends mainly on their degree of risk aversion. Two dominant and alternative approaches are used to represent the choice of individuals in an uncertain universe. The approach of Markowitz [10] explains how the individuals arbitrate directly between mathematical expectation and variance. The approach of Neumann and Morgenstern [11] shows that if the probabilities of the different states of nature were known, then their behavior in an uncertain universe could be described by an expected utility function. In this context, from a utility function, the individuals evaluate the possibilities of losses or wins. The possibilities of gains being multiple, the possibilities of utilities are also multiple. Individuals calculate an expected utility of wealth by weighting each utility by its probability of occurrence. This expected utility function allows individuals to classify random wealth. In this situation, risk behavior is directly integrated into the utility function.

Minsky [12] includes the intuitions of Kalecki [13] on the formation of profits. He distinguishes among financial units, three types of behavior, the prudent (hedge), the speculators and a fraud named a Boston Ponzi crook. The prudent has the strategy of having total anticipated revenues almost constantly higher than its expenditure flows. The speculative behavior remains typical for banks and other financial institutions in the short term through engagements higher than their income, which is not the case in the long term. As for Ponzi emulators in the short and long term, their engagements exceed their incomes [14].

For Minsky, the stability of a financial system depends on the relative weight of prudent units in the total financial structure.

THE DEVIATIONS AND DYSFUNCTIONS THAT ARE THE ORIGINS OF THE CRISES

At this party, we use the hypothesis that market relationships and institutions are generally stable, in the sense of a normal level.

The most basic crisis detection techniques involve observing asset prices established in a financial market so as to signal disruptions specific to the sector as identified by the FMI [15]. They can be corresponding for Dehove [16] sudden breaks in trends, economic reversals, exceeding limits ….etc.

Boyer, & al [17] revealed a series of indicators that serve as precursors to detect the crisis, which represented by asset prices established in financial markets or exchange rates, stock market indices, property prices, bond rates, sovereign debt levels, precious metals and raw materials prices, etc..

Sectoral or micro-economic dysfunction

Dean Baker anticipated the housing bubble as early as 2002, Baker wrote: «If housing prices return to the general price level, as they have always happened in the past, $2 trillion will go up in flames, intensifying the recession even more severely. The collapse of the housing bubble

will also jeopardize the survival of Fannie Mae and Freddie Mac and many other financial institutions » [18] .

Just like Jane D'Arista [19], in his work on capital movements: « the bursting of the mortgage bubble could cause major financial upheavals, with much deeper macroeconomic consequences than those caused by the Savings and Loan crisis of the 1980s ». Nevertheless, the lessons of this crisis were not sufficiently understood at that time and for this reason the following crises will be so strong [20].

These forecasts were confirmed to be exact and that were based on a simple method that consists to identify the value of some indicators or the correlation between two factors that suddenly deviate from their historical levels, in an unstable and temporary manner.

The drop in house prices as reflected in the evolution of the Case-Shiller index 20, negative from 2007, followed in July of the same year by a loss of 2 million Americans' property of their house as a result of the housing market situation that shakes the financial sector through a series of bankruptcies. At this level, the date of 18 June 2007 can be used to indicate the beginning of the financial crisis.

The forecasting or anticipation of a financial crisis can also be extended through the observation of the differences identified by the US Large Companies Index [21] such as the index of S&P 500 adjusted by inflation, Dow Jones or any other indicators such as the quotient between the share price as measured by a representative sample of companies and their net profit ("Price Earnings Ratio": "PER"), the ratio measuring the change in house prices as a proportion both of inflation and rent for the property market and the rate of vacant houses. This ratio remained stable during the 2000 crisis, whereas it had reached a level of 29.05 at the bottom of the crisis. For the authors Campbell and Shiller, this level is twice its mean value of 14.72 in 1871, which some observers consider as an equilibrium value [22]. It is clear that the high PER levels for all quoted assets reflect an overestimation of prices, when they reach a maximum peak, it leads to market depression.

This yield argument insinuates that the financial crises of the 20th century affected equity and bond markets in different ways. As underlined by Siegel and Thaler, on the contrary, the history of the main European markets shows that the financial crises which have affected the stock markets have wiped out the bond markets [23]. Thus, Eyati & al. confirm that bond markets are the first markets to collapse in times of stress [24].

It is important to mention that the effects of the contagion of the crisis, can affect a market while maintaining its fundamentals. The authors Cailleteau & al. [25] define the term of contagion by « the fact that a crisis or speculative attack in a given market increases significantly the probability of tensions in other markets, which may lead to a succession of crises in different markets».

Macroeconomic dysfunction

The notion of Gross National Product defined by total expenditure is the sum of its component expenditures and admits the existence of a compensatory relationship between budget deficits and private savings. This means the private sector balance (the excess of national savings on national investments), which must always be equal to the sum of the budget deficit and net export surpluses. Thus, with an unchanged trade balance, that accelerates the widening in public deficits translates and an increase in private savings. And inversely, an increase in private savings increases the budget deficit.

Inspired by this notion, Godley [26] and al. warned against the disturbing evolution of the current account balance and, in particular, against the deterioration of the private sector balance. They showed that the budget surpluses at the end of the 1990s (and the modest deficits in the early years of the following decade) corresponded to an increase in private debt (investment taking the lead after savings). They argued that, in order to finance these debts, families would sooner or later be forced to reduce their spending, which in turn would lead to a slowdown of activity, a collapse of the price of the corresponding assets, and a decline in tax revenues.

Minsky conceives the link between liquidity behavior in an uncertain economy and debt dynamics. The author also makes the link between the economic cycle, debt and investment and argues that agents have a tendency to react in accordance with beliefs and has developed the paradox of tranquility that has its origin in growth periods, when the memory of past recessions disappears, and when economic actors become overly optimistic and invest over abundantly. This increasing trend leads to repetitive cyclical fluctuations. The major depressions occur as a consequence of the accumulation of private debt. The portion of the desired investment that is higher than private savings that is funded by bank borrowing, credit contributes to money creation and global demand. During periods of optimism, companies use more debt to boost their investment capacity than Minsky has termed the lever effect. This context contributes to the prosperity of the economy in contrast to a crisis that is beginning to incubate.

Banks share this economic optimism and are therefore beginning to accept debt structures that they would not have previously accepted. Many companies take on debt to take advantage of the growing leveraged effect and finance projects with much greater uncertainty in terms of future profitability. This expansion also raises the interest rate on the money market, reducing the viability of investments. And this was until the moment that many companies became unable to repay their debts and became bankrupt. As a result, stock market participants will sell the shares in reaction to asset valuations considered excessive, precipitating the market collapse.

Some authors argue that the crisis can be generated by the dynamics of income distribution. During boom periods, unemployment falls and production of raw materials and energy increases, exerting upward pressure on factor prices. These increases, combined with debt service, have resulted in at some point in profits that are not congruent in accordance with expectations. Investment declines and expansion becomes contraction. The real interest rates (bank rate minus inflation rate) start to rise, even if the nominal rates fall, global demand falls, leading to a stagnation of wages and a decrease in commodity costs, and part of the debt accumulated during the expansion phase is being reimbursed or is in difficulty or in defaults. The profit rate then returns to its pre-expansion level and the same process can be repeated, but this cycle starts again with an unpaid private debt residue and in addition to that, a lower wage portion. Another cycle thus begins, and so on, until the date when the financial claims on the economy exceed the expenses. The demand is no more boosted by credits or optimistic effects in the future and starts to decrease until it collapses, and a crisis ensues.

For other authors, inequalities in income distribution have the consequence that they result in a crisis. In this regard, Kumhof et Winant [27] reflects the sharp change in the distribution that occurred in the United States both before the 2007-2008 crisis and before the 1929 depression. In the United States, the highest proportion of income was 22% in 1983, and reached 34% just before the crisis. These authors develop a model of a dynamic stochastic general equilibrium in which an endogenous crisis occurs as a result as inequalities grow.

Thus, distribution is therefore a key factor in aggregate fluctuations. High-income individuals are expected to maintain their financial assets. As a result, as their income part increases, they save a larger proportion of it in the form of financial assets, which can then be lent to the rest of households. Initially, low-income households compensate for the loss of purchasing power that should result from the reduction in the proportion of total income received by increasing their borrowing, which creates financial fragility, which subsequently leads them to make a rational choice to default on their debt. The crisis, therefore occurs, at that moment, in an endogenous form. But the default generates a financial crisis and a collapse of real production, precipitating a period of recession.

In this context, inequalities are also responsible for the failure of a rapid rebound. As the decline in production mainly affects low-income workers, the medium-term effects of their default as regards their debt-to-income ratio is small, and if income inequalities are not redressed, their debt accumulates again, and the economy remains fragile. In other terms, the authors reiterate the well-established tradition that considers leverage as a fundamental source of fluctuations but in a way that reproduces the changes in different income groups. The resulting analysis suggests that shocks increasing income inequality are both the cause of the recession and a brake on a rapid economic rebound [28].

It is interesting to note the specificity of developing countries that have been affected by crises, often resulting from balance of payments pressures that appear on the exchange rate that can serve as a contagion to their own financial markets, which are undermining other markets on a planetary scale. This context was replaced by Ennajar and Laurent: «Developing countries are often defined as nations that are structurally looking for world savings. This characteristic is naturally accompanied by a massive recourse to external financing, which has been measured in recent years in its role during the financial crises» [29].

The massive influx of extremely volatile funds that followed the financial deregulation is considered by Giannetti to be at the origin of the crisis that has affected these economies [30]. In addition, the markets of developing countries have the characteristic of being first to collapse in periods of tension and crisis [31].

Financial dysfunction

For Minsky [32], stability generates instability, the capitalism is based on the intrinsic disequilibrium (instability arises from within, without the external causes or "shocks" that are necessary). Minsky's analysis illustrates that the financial instability of capitalism is inevitable, because there is no equilibrium growth that can be sustained indefinitely.

In a period of growth, the investors, in order to increase the profitability of their investments, are beginning to take more risks, which jeopardize the stability of the system. Financial positions that were viable until then, in view of past cash flows, are then being replaced by others, to which and in the longer term, these must be refinanced. Speculative positions are transformed to positions that can only be refinanced by new and increasingly important loans. This situation is known as the Minsky moment when investors are over-indebted and will be constrained to sell their assets en masse to satisfy their need for liquidity. And in these conditions, they cause a downward spiral in asset prices. This reflection finds an extension in Peter's and Albin [33] and Barkley Rosser [34] academic work. And other authors such as Kahneman and Riepe showed that financial actors deviate from the standard decision-making process according to some criteria, for example their risk appetite [35].

Minsky's financial crisis is characterized by the breakdown of expectations and refinancing possibilities on the formal market.... And for Dymski, there is however a second type of crisis,

where this breakdown also happens in the informal market.... This does not mean that the people concerned will disappear or stop borrowings; they will have no choice but to plunge more and more into indebtedness. When the value of the assets has been eroded and there is no possibility of any further adjustment of the debt, their lives will eventually be confused with the financial crisis [36].

And for Harry Johnson, in the presence of any destabilizing speculator, another one serves a stabilizing role: « for any participant who follows the herd and buys a part of the bubble, there is a counterpart that sells and thus limits the increase of the price» [37].

Monetary dysfunction

The answer to market dysfunction also resides in the potentially destabilizing effects of inappropriate monetary policies. The purpose of monetary policy is to expand or contract the money supply to stimulate or decelerate the economy. For example, it is generally accepted that the 1929 crash turned into a depression in large part because the Fed (the American central bank) responded by reducing the money supply [38].

George Selgin [39] maintains that the housing bubble was expanded by the increase in the U.S. money supply from 2000 to 2003, which caused real interest rates to fall as low as 1 % in 2003. Ludwig Von Mises and Friedrich Hayek consider the arbitrary increase in money supply to be the main cause of severe recessions. According to these authors, an economic boom sustained by the creation of money leads to a crash [40].

Banking regulatory dysfunction

For some authors, the markets that unleash the crisis are those characterized by strong government intervention. For a reminder, the Community Reinvestment Act (CRA) in 1977 was followed by a series of laws and regulations that require US financial institutions to moderate mortgage credit conditions in order to combat discrimination. During the 1990s, banks were constrained to maintain a good rating in view of the CRA in the event that the federal government failed to pursue them. The Boston Fed releases a guidance document on CRA mortgages for cultural minority customers that contain a warning: « a financial institution that does not respect the Equal Credit Opportunity Act or Rule B may be exposed on a civil responsibility and may incur damages that are current or punished as a result of lawsuits or class actions [41]».

Some writings report that deregulation to abolish the term of Glass-Steagall Act of 1932, enabling American banks to operate securities brokerage houses or freely open offices through the Federal Deposit Insurance Corporation (FDIC) Improvement Act of 1991 and the Federal Deposit Reform Act of 2002 which increased the authority of the FDIC were the main causes in the 1995 banking crisis. And as a reminder, before the 2008 crisis, banks in the United States of America had to comply with more than 80 laws and regulations [42].

John Taylor concluded in his empirical analysis that government actions and interventions have simultaneously caused, prolonged and aggravated the financial crisis [43]. And according to Pierre Lemieux, it is clearly a State failure rather than a market failure and he distinguishes two kinds of failures: the first is the failure of an intermediary and the second is the failure of the same majority. The logic of the majority does not satisfy the preferences of all individuals [44].

The process for measuring objectively the evolution of the net regulatory burden of the banking and financial industry can be established on the basis of the evolution of the budgets

of regulatory authorities [45]. From these budgets, it results in a threshold or a gap that triggers the crisis.

And in the context of regulation, Westbrookl [46] and Knaepen [47] noted the uncontested absence of regulations on the part of the SEC, which favored the assignment of ratings that did not reflect the real risk. In addition to this condition, the rating agencies (Fitch, Standard & Poor's and Moodys) being remunerated in accordance with the assets they have been valued, so the agencies are in a conflict of interest situation and are perceived as in an oligopolistic position.

Problem with the credit market mechanism

The relation between the credit boom, bubble and financial crash holds an important place in Charles Kindleberger's global history of financial speculation in his reference book on crises.

British economist John Mills claims that speculation and credit bubbles are first and foremost a psychological question, founded on the willingness of financiers to believe that they are all living in different times, that they are the privileged witnesses of the development of a "new economy" whose innovations are sources of high and infinite profits. This is a hazardous time when « Credit and speculation interact as mutual stimulants. By pushing prices and profits upwards, credit inflation encourages speculation; and the speculation can only continue by increasing the use of credit instruments» [48].

Lescure maintains a vast ensemble of economic reflections on what he has termed "credits of convenience" or "credit abuse [49].

Ludwig Von Mises and Friedrich Hayek indicate that they are not in agreement with either the notion of the end of cycles or the advent of a new economy with endless profit perspectives. The crisis is still threatening following a strong desire for profits, private bankers tend to give more and more credit; they overwhelm the economy with financing and reduce interest rates below the level that would ensure the safe financing of the economy, opening of speculative credit. Similarly, American economists Eichengreen and Michener described the 1929 crisis as a credit boom that has turned badly [50]. Therefore, for these authors, any financial bubble is first and foremost a credit bubble.

Eichengreen and Hausmann observe that the crisis stems from the inability of domestic economic agents to incur external debt in their own currency, and this is due to the scarcity of trust in the conduct of economic policy or to the insufficient depth of the market [51]. The distribution of credits allows the development of investments that are conducive to economic dynamism. But when credit becomes excessive in comparison with the needs of the real economy, it leads to economic overheating and thus to a financial crisis.

The International Monetary Fund [52] or some authors such as Kaminsky and Reinhart [53] in which they introduced risk measurement as an intermediate indicator for alerts to financial fragility, by including as potential crisis factors the amount of bank loans compared to GDP or the banks' external engagements.

Charles Kindleberger [54] in the explanation given in the credit-supported market, notes that transactions are often conducted in a well-ordered manner and turns into panic when market participants realize that there is not enough money to allow everyone to realize the expected capital gains or simply to reimburse the loans obligated for speculating. Panic intensifies on its own until one of the following three phenomena occurs, he explains:

- Prices fall so low that we find buyers;
- Transactions are interrupted by setting a limit on price reductions;
- A creditor of last resort succeeds in convincing the market that there will be enough money to satisfy the demand for liquidity (role of central banks, guarantee funds for depositors, etc.)

Dysfunction caused by the weight of the national private debt

According to Keen [55], once an economy attains a high level of private debt in proportion to GDP and this ratio grows faster than GDP can cause a severe recession, even if the ratio is stabilized. For the author, qualifying the credit as an economic inhibitor using the term "zombification" and attributing to these indebted economies three main characteristics:

- Pre-crisis private debt levels above 150% of GDP;
- Before the crisis, high levels of demand boosted by credit;
- And a still high debt ratio after the crisis, but a low or negative credit demand.

Keen considers that the economies already “zombified” are Japan, Denmark, Ireland, Netherlands, New Zealand, Portugal, Spain, United States of America, and the United Kingdom which do not present any danger. It is those about to be “zombified” that we should fear. Growth is still supported by credit and private debt is growing faster than nominal GDP. These are Ireland, Hong Kong, China, Australia, Belgium, Canada, South Korea, Norway and Sweden. The border countries, i.e. those with one of the two characteristics, are the Netherlands, Switzerland, Finland, France, New Zealand, Malaysia, Singapore and Thailand.

Keen explains that all debt zombies have a dilemma: the only alternative to avoiding a fall in global demand and a recession by relying solely on the private sector is to let private debt continue to grow faster than GDP. But at some point, the total cost of servicing debt will exceed the disposable income available to ensure its payment, which will cause a major debacle.

And he predicts that the inevitable crash that is looming is liable to occur in the next twelve to thirty-six months, assuring that it would not come from the United States or China. In the United States, the level of private debt is still 150% of GDP. But credit, at 6% of GDP, is low compared to pre-crisis levels. We can therefore expect periods of recurrent stagnation, such as in Japan after 1990. In China, in 2010, the government ordered banks to lend massively to local housing developers, resulting now in the largest credit bubble in history. It can only explode, due to state intervention despite the fact that debt has reached more than 200% of GDP and has become unsustainable. But in this controlled economy, the government will be able to intervene and spend.

Enough authors attribute the crisis to the increase in the heterogeneity of the debt/income ratio, which is the main cause of a twin financial and economic crisis. For some, it is household and enterprise debt and for others, it is sovereign government debt (bonds).

Dysfunction caused by irrational decisions

Many authors such as Arrondel and Masson [56] assert that the decisions made by agents who justify their behavior which depend on their preferences, available resources and expectations. On the other hand Lakonishok [57], Shleifer [58], Vishny [59] and Haugen [60] which give a behavioral explanation that relates that investors react in an irrational and exaggerated manner in relation to firms' performance.

This situation is due to the excessive optimism of investors compared to companies that have performed well in the past, and overly pessimistic in the opposite case. Consequently,

investors' over-reaction to the firm's performance would result in an underestimation of the price of small-cap value stocks and an overestimation of the price of growth and large-cap stocks. However, this over-reaction corrects over time so that everything returns to normal.

A return to a new equilibrium becomes possible when at least one of the three conditions is satisfied: asset prices have become so low that new investors are willing to buy them out, transactions can be stopped by closing the market, a lender of last resort provides its guarantee in order to restore confidence.

Surveys carried out in OECD and non-OECD countries [61] show that not only the mediocrity of consumer financial culture, which leaves the field open to making effective and informed financial decisions, but also that they often overestimate their competence and their knowledge. Arrondel et al. Recalled the crucial role of household financial behavior in maintaining financial equilibrium and in financial crises because savers are deprived of financial knowledge and culture [62]. Similarly, the same applies to King and Leape [63] raise the question about the insufficient knowledge of available investment opportunities. Calvet and al. have shown that household financial culture has a positive impact on portfolio sophistication [64]. In the absence of financial knowledge, households place their trust in the recommendations of advisors, who also have a strong influence on their investment decisions. The increasing complexity of financial products offered to households and complex financial innovations increase their vulnerability and inability to assume responsibility for financial decisions made by them.

De Bondt and Thaler note that individuals overreacting to unexpected and dramatic events cause low inefficiencies in the securities market [65]. Thus, De Bondt and others attributed the 1987 stock market crash, Japan's financial bubble in the 1980s, the Asian crisis in 1997 and the financial crisis in 2008 to this type of investor as partly irrational [66].

Kahneman and Tversky illustrated that actors do not make decisions in a rational sense, but in a hazardous manner by following particular models. An overview in line with the theory of efficiency, which considers that crises are temporary accidents and the product of temporary irrationality. And according to Malkiel, bubbles are the exception that confirms the rule [67].

CONCLUSION

In the search for common elements to the cause of crises, we retain the work of Kendall and Hill [68], Mandelbrot [69] and Fama [70] on the distribution of profitability through asymmetry and the “deptokurticity” (skewness et de kurtosis) in stock market returns, which have been exposed to the fact that they are part of the behavior common to most markets. Cont [71] in a similar detailed study, he mentions among others:

- Thicker distribution lines than expected in a Gaussian environment, which leads to an underestimation of the probability of extreme profitability and more particularly of significant declines;
- The asymmetric distribution on the left with a greater frequency of extreme negative returns;
- Better compliance with the normal law when returns are calculated over a longer period of time;
- Non-correlation of profitability, except for high frequency data;
- Volatility clustering (areas of high volatility followed by periods of low volatility).

In this work Frugier [72] evidenced some dates when the skewness or kurtosis was on an extreme level:

- September 1982: significant increase in financial markets and trading volumes in August and September 1982 despite the recession;
- December 1984: no particular news;
- September 1986: monetary problems
- December 1987 and March 1988: October 1987 crash;
- December 1989: Strong decline in October 1989, caused by the failure of the acquisition of the carrier United Airlines and the crisis on the American Junk bond risk;
- December 1991: no particular news;
- March 1994: market downturn in line with the rise in bond yields;
- December 1997: Financial crisis in Asia;
- June 2002: decline in the stock markets following the breakup of the Internet bubble;
- March 2007: no particular news.

From the aforementioned, the calculations of skewness or kurtosis levels should lead us to propose the indicators as alert signals for financial crises according to the following three degrees:

1) Strong signals: debt to GDP, VIX, housing credit rates, mortgage rates, housing prices (case Shiler 20), Price Earnings Ratio/Dividend Yield and bank failure (systemic);
2) Average signals: liquidity (money supply), medium- and long-term credit rate (interest), Dow Jones and S&P indices, exchange rates, US bond rates (Treasury Bills, Treasury Notes, TIPS, Bonds) and vacant housing rates;
3) Weak signals: the price index (inflation); the rate of economic growth, consumption, savings and investment rates, household and corporate debt levels, and changes in oil and gold prices.

So, a signal can be treated in order to determine its dimensionality either by doing statistical operations to extract information that is significant from the basic signal or by taking a mathematical representation of a variable and a number of parameters on which a signal can be varied.

Also, the signal can be quantified in the manner that it is represented a vector. And the components of this vector are therefore the successive values of the signal which decomposed on basic vectors. This frequential decomposition of a signal is also the result of a scalar product.

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