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The Origin of Stock-Market Crashes: Proposal for A Mimetic Model Using Behavioral Assumptions and An Analysis of Legal Mimicry

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ABSTRACT

A number of phenomena are responsible for market crashes, but an analysis of investor behavior will tell us more than the valuation of securities on their fundamentals. In this regard, the interpretation of information seems to play a central role in these exceptional events. One specific type of mimetic behavior, called informational mimicry[1], sheds light on the kind of sudden, precipitous price plunges seen in 1929, 1987, and 2000.

The current financial crisis certainly exhibits these mechanisms, but one of its novelties is related to a new form of herd behavior arising from the international legislative alignment of financial accounting data. In fact, the new IAS-IFRS standards have produced certain pernicious, globalized effects that may be described as "legal mimicry".

Among the items most commonly blamed for this "Panurgic"[2] behavior, Fair Market Valuation and the valuation of financial instruments appear to have been the major mechanisms involved in spreading the crisis. Indeed, they lent support to one of the causes of the current crash, via securitization.

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I. INTRODUCTION

A crash is a precipitous collapse of listed assets. It must be violent and spectacular, and must cause serious collateral damage.

Its suddenness arises from a recurrent process: an upturn in the economy attracts investors of every sort, and this inrush of capital feeds the further expansion of the market. The process then becomes uncontrollable if investors borrow money to invest in the market. The value of the securities thus becomes detached from the value of the listed companies, as determined according to the basic criteria employed by market analysts.

This discrepancy in valuation feeds an over-valuation of the market, called a speculative bubble. In this case investors decide both to quit the market and abandon any possible remaining speculative profits, or to stay in while nevertheless awaiting any data, news, information, or even rumors that might deliver "the signal" that will burst the bubble and bring down the markets.

A number of phenomena are responsible for crashes, but the mimetic aspects of investor behavior and standards outweigh the valuation of securities on their fundamentals. The dynamics of crashes thus appear to be behavioral in nature.[3] Daniel Khaneman received the 2002 Nobel Prize in Economics for his work on decision-making under uncertainty. His work gave birth to behavioral finance[4], one of the two themes of this article, which seeks to explain the current financial crisis[5]. Traditional finance has evidently become incapable of explaining our successive crashes. On the one hand, the various explanations put forward for these phenomena are inadequate (for example, explanations for the 1987 crash are unsatisfactory in that they ignore the interpretational aspect of data, news, information, and rumors, which is a central feature of this type of event). On the other hand, the assumption that they are caused by rational actions is very much open to question, being unable to explain why bubbles appear, and still less what causes them to burst.

The first part of the article proposes a model that incorporates behaviors that are more "realistic" and familiar to market actors, so as to provide answers concerning the mechanisms that bring about crashes. This model is derived from the theory of informational cascades (Bikhchandani, Hirshleifer, and Welch, 1992), which we have adapted for application to financial markets. The constraint of rationality will thus be removed and behaviors involving over- and under-confidence will be introduced. Overconfidence is one of the behavioral biases most frequently discussed in the academic literature, and for some authors (De Bondt and Thaler, 1995) the fact that individuals may be overconfident is perhaps the most robust finding in the field of the psychology of judgment. Overconfidence is defined in its classic form[6] as the over-estimation by individuals of the relevance of their private information. Underconfident behavior, often observed simultaneously (Kirchler and Maciejowsky 2002) will in contrast be defined as the over-estimation by individuals of any public information. Modeling of these behavioral theories sheds light on the origin of crashes, since underconfident behavior does indeed lead to mimicry and to speculative bubbles.

The second theme of this article relates to the development of new, worldwide accounting standards whose use and interpretation have accompanied - and perhaps contributed to - this same crash.

II. PROPOSAL FOR A MIMETIC MODEL WITH BEHAVIORAL ASSUMPTIONS

Since the end of the 1980s and up to the present day, a stock-market crash, and especially the one in 1987 or the internet crash in 2000, has been seen as the bursting of a speculative bubble (Miller, 1991). We therefore say (Garber, 1990) that a speculative bubble is simply a rapid rise in "basic value".

But this goes against what most researchers recognize, namely that bubbles are an essential feature of markets simply because technology evolves, and retires sections of economic activity that were formerly dominant. Change is therefore structural and only then quantitative (Miller, 1991).

In models based on an anticipation of rationality[7], it has been shown (Blanchard, 1979; Blanchard and Watson, 1982) that it was rational to have speculative bubbles. But these models totally fail to explain why the bubbles appear and what causes them to burst (Lardic and Mignon, 2006)[8].

Certain authors (Tirole, 1982) have shown that for a fixed time period or a finite number of individuals, bubbles are not consistent with rational behavior by the actors. This difficulty in reconciling bubbles and rational behavior has led some authors (Shiller, 1984; De Long et al., 1990) to develop an asset-valuation model based on irrational behavior. However, the problem with this type of model is that once again, in the event that a bubble appears, they fail to explain what causes it. An alternative approach to the models cited above consists of looking at bubbles as the result of gregarious behavior on the part of investors. The standard model for this approach is Bikhchandani, Hirshleifer, and Welch (1992) (BHW hereafter). It proposes a formalization of mimetic behavior based on the differential handling by individuals of various categories of data, news, information, and rumors, both public and private.

Although it is not confined to the financial market, this model provides a way of looking at financial crises and speculative bubbles, which some authors (Orlean, 1990, Chari and Kehoe, 2004; Gillet and Lavoie, 1999) consider to be particularly characterized by mimetic behaviors.

Informational mimicry is mainly understood via the theory of "information cascades" developed by BHW. Since this ground-breaking article, many workers have attempted to apply this theory in a number of areas such as politics, zoology, and the cinema (De Vany and Lee, 2001).

In finance, the theory of "informational cascades" has attracted keen interest (Devenow and Welch, 1996). Some authors, for example Artus and Kaabi (1993), have taken the BHW model and applied it directly to interest-rate structures (Orléan, 1995) or have reworked the principles of the models (Artus, 1993)[9] by extending them so as to specifically involve the interactions between the various market participants.

However, if we are to apply the theory of "informational cascades" to the market for shares, some of the model's assumptions must be abandoned.

A. Cascade Theory as Applied to Financial Markets

For this purpose we are developing a model based on the original one (BHV 1992) to illustrate the impact of over- and under-confidence on informational mimicry in the context of share markets.

We assume a sequential model in which the actors are faced with the decision to invest either in an asset A or in an asset B, knowing that - to simplify the model - the options of not investing or of delaying the decision are not available. One of the two assets yields an amount V, the other yields nothing. The sequential order is determined, as in the BHW (1992) model, in a random, exogenous fashion. In order to make their decision, the actors are provided with two types of information:

- Private information "**s**" taking the values "**a**" or "**b**", which they alone know. This information is associated with a probability $p > 1/2$. In this case, each investor will receive a signal (private information) that will be correlated with the asset's value V (see table below). If the investors receive the private signal "a", it means that the profitable asset, i.e., the one that repays 1 at the end of the sequence, is asset A, with a probability $p > 1/2$. Thus the greater the value of p, i.e., the nearer to 1, the more informative is the signal. Conversely, the closer the signal p is to 1/2 the noisier is the signal.

Table 1
Probabilities of private signal

	P[a/V]	**P[b/V]**
V = 1	p	1-p
V = 0	1-p	p

To summarize, if the winning asset is asset A, our investors will have a greater chance of seeing the private signal **s = a**.

- Public information, therefore well-known and published. The investors may know the choices made by their predecessors in the sequence. Thus investors acting at time t + 1 in the sequence may see the decision history "Ht" of the investors who preceded them.
- When an investor appears indifferent as between following its private signal or following its predecessor's lead[10], we assume that it will elect to follow its private signal.

We will now introduce into the model a stock-market price mechanism, in order to apply the "informational cascades" theory. There have not been many attempts to apply the theory of "informational cascades" to market finance. We will adopt the most discussed one (Avery and Zemsky, 1998; Cipriani and Guarino, 2002). However, in order to simplify, we will use the flexible-price mechanism (Avery and Zemsky, 1998, Section I, p. 725) in which the prices are fixed by a market maker, who incorporates into the price all the available published information. However, each investor will have the option of choosing between two assets, A and B (Cipriani and Guarino, 2002). Let **pt** be the price of Asset A in position t. We then have: $pt = P(A/Ht)$

The price of Asset B can be obtained from this directly. In fact, since $P(A/Ht) = 1 - P(B/Ht)$, the price of B must then be $10 - pt$.

The price of Asset A in position t thus represents the probability of A knowing the history of decisions up to t. Our objective here is to understand the impact that

might be made by over- and/or under-confident behaviors on the mimetism of investors and on price spreads.

We consider three types of investor:

- Rational ones who make optimal decisions (in the Bayesian sense of the term) based on the private and public information at their disposal;
- Investors who are overconfident, who also make their decisions based on private and public information but who place more importance on their private information than rational investors do. This overconfidence, due to placing too much weight on private information, represents the first kind of overconfidence. It is also particularly well represented among market operators (Bensimhon, 2006).
- Lastly the underconfident, who always makes their decisions on the basis of private and public information, but, in contrast with the above, they tend to attach more importance to the public information than to the private information that they receive.

We therefore offer two models: the first considers interactions between rational investors only, while the second examines the consequences of adding over- and under-confident investors to the rational investors. The addition of this latter assumption is justified by the simultaneous occurrence of over- and under-confident behaviors that is often observed (Erev, Wallsten, and Budescu, 1994; Kirchler and Maciejowsky, 2002)

The purpose of this modeling is to determine the impact of the various types of investors, who differ in how they handle the private and public information they possess (1) on whether or not information cascades appear, and thus on mimetic behavior, and (2) on stock market prices.

B. The Assumption of Rationality and the Impossibility of Cascades

Model 1: Informational Cascades and Rational Investors

We consider a model composed only of rational investors and we show their impact on mimetic behavior and on market prices.

Decision rule for rational investors: Knowing that pt, the price of Asset A in position t, is defined as follows: $pt = P(A / Ht)$, the decision rule for rational investors is a simple one, and they will choose Asset A only if $P(A / Ht, s) - pt > 0$ whatever the value of t, the position at which it acts.

Thus, if the difference between the probability that Asset A is a winner (considering the history of decisions and the private information available) and the price of Asset A at t is strictly > 0, the best possible choice for the investor will then be Asset A.

Consequence for mimetic behavior: The impact of introducing a price mechanism into "informational cascade" models with rational investors only has already been shown (Avery and Zemsky, 1998). The presence of a price mechanism has the effect of making "informational cascades" impossible. In fact, a rational investor will choose Asset A only if $P(A / Ht, s) - pt > 0$.

But this condition is fulfilled only if s = a**.** In fact, if s = a, then obviously $P(A / Ht, a) - pt > 0$. Moreover, if s = b we have:

$$P(A / Ht, b) - \alpha = [\alpha(1-p)] / [\alpha(1-p) + (1-\alpha)p] - \alpha$$
$$= \alpha[2p(\alpha - 1) + 1 - \alpha] / [\alpha(1-p) + (1-\alpha)p]$$

where $\alpha = P(A/Ht)$. But $\alpha[2p(\alpha-1)+1-\alpha]/[\alpha(1-p)+(1-\alpha)p]$ is positive if and only if: $2p(\alpha-1)+1-\alpha > 0$ i.e., if and only if $p < 1/2$ which is impossible, hence if s = b: $P(A/Ht,b) - pt < 0$. The only possibility of having $P(A/Ht,s) - pt > 0$ is that s = a.

Consequently, it will be optimal for all investors to make the decision that is indicated to them by their private signals. “Informational cascades" thus become impossible by definition[11].

Consequence for prices: Since all individuals follow their private signals, this implies that any available information (both public and private) will then be incorporated into market prices. The market will then be an efficient one from an informational viewpoint[12]. The process of asset pricing is thus a martingale, i.e., E[pt+1/Ht] = pt whatever the value of t, and no investor can then take advantage of the price history to improve its gains. The presence of bubbles is therefore impossible.

The results of a survey of institutional investors (Bensimhon, 2006) showed the simultaneous presence of over- and under-confidence in share markets. In our modeling we also include underconfident investors.

C. Modeling under Conditions of Over- And Under- Confidence

In the BHW model (1992), individuals are assumed to be rational. This is an assumption that Kariv (2002) has decided to abandon. In fact, in his model of “informational cascades", along with rational individuals Kariv introduced individuals who exhibited overconfidence.

Overconfidence is one of the most-discussed behavioral biases in the behavioral literature. In their review of the “microfoundations” of behavioral finance, some authors (De Bondt and Thaler, 1995) even state that the fact that individuals are overconfident may be the most important conclusion in the field of the psychology of judgment.

Kariv studied the possible consequences of overconfidence on observational learning. The author explains that even when overconfident individuals have very little information, by making it public they set off a non-informative cascade (otherwise impossible). The reason is that the over-abundance of information revealed by the actions of overconfident agents can lead to a massive informational cascade. This is possible because when individuals overestimate their private information (which is what happens with overconfident individuals), they tend to reveal more information about their private signals and may consequently promote a certain kind of information cascade of tsunami type, and Kariv has shown that these have the distinctive feature of being uncontainable.

Some authors (Bernardo and Welch, 2001) have also included, along with rational investors (normal individuals), investors who are overconfident (entrepreneurs).[13] These authors have shown that the presence of overconfident investors persists because this would improve the “aggregation” of public information. They then examined the optimal proportion of “entrepreneurs” in their population. They showed that this proportion depended on various factors such as the size of the group, the quality of the information, and the degree of overconfidence. Thus, a group containing (1) too few “entrepreneurs” easily falls into an incorrect “informational cascade” (implying bad decisions); and (2) too many “entrepreneurs” is not optimal either, since these individu-

als then make too many mistakes by favoring their private information (Bernardo and Welch, 2001).

Finally, some authors (Nöth and Weber, 2002) have conducted experiments on "informational cascades" of a certain type (Anderson and Holt, 1997). Their experiments incorporated two different qualities of information rather than just one. Nöth and Weber found fewer cascades, which might suggest a Bayesian distribution. According to them, the only explanation - not demonstrated - for this discrepancy would come from overconfident individuals.

In what follows we will therefore assume, in the context of a cascade model applied to the financial markets that along with rational investors there are both over- and under-confident individuals, who over- or under-estimate the relevance of the information they receive (but whose proportion is also unknown to any of them).

Finally, in order to simplify and unlike Lee (1998), we do not assume the presence of transaction costs in the modeling.

Model 2: Informational Cascades, Rational Investors, and Over- and Under-Confident Investors

Along with the rational investors, we will now incorporate investors who are overconfident and underconfident. This is the innovative feature of our model, and we continue to assume that their numbers as well as their presence are unknown to the other investors.

Decision rule for overconfident investors: When making their decisions, overconfident investors also rely on the public information provided by the decisions of their predecessors, as well as on the private information that they receive. However, as shown above[14], we will assume that the overconfident investors overestimate the accuracy of their private information.

We will now introduce a new probability p' such that: $p' > p > 1/2$. The decision rule for an overconfident investor can then be expressed simply. An overconfident investor will choose Asset A if $\mathrm{Pec}(A/Ht,s) - pt > 0$, where

$$\mathrm{Pec}(A/Ht,s) = [P(A/Ht) * p'] / [P(A/Ht) * p' + (1 - P(A/Ht)) * (1-p)].$$

Decision rule for underconfident investors: In making their decisions, underconfident investors also rely on public information provided by the decisions of their predecessors and on the private information that they receive. However, unlike the overconfident investors, such investors will have a tendency to overestimate the relevance of their public information in comparison to their private information (or, conversely, to underestimate the relevance of their private information in comparison to their public information). We introduce a new probability p'' such that $p > 1/2 > p''$.

An underconfident investor's decision can then be simply expressed. In fact, this type of investor will choose Asset A if $\mathrm{Pmc}(A/Ht,s) - pt > 0$, where $\mathrm{Pmc}(A/Ht,s) = [p'' * P(A/Ht)] / [p'' * P(A/Ht) + (1-p'') * (1 - P(A/Ht))]$.

The probability p" expresses the fact that underconfident investors will underestimate their private information and assign more weight in their decision-processes to the public information incorporated in the price. In addition, and because of how they are developed, we also assume that the biases towards over- and under-confidence are

stable over time. Note that here, and given our assumptions, the degree of complexity that the individuals must deal with remains the same throughout a sequence.

In fact, at each position, investors must make their decisions in the light of visible public information and of private information whose level of occurrence remains constant (the probability p). The assumption of the stability of these behaviors in the cascade models is therefore found to be justified. Our objective is to show the impacts of this type of bias on mimetic behavior and on prices.

Consequence for mimetic behavior: The situation becomes different from those discussed earlier, in which it was shown that no "informational cascade" could form. In fact, with the introduction of underconfident investors, "informational cascades" are now possible.

Underconfident investors thus have a tendency to overestimate public information in comparison to the private information that they possess, which has the consequence in certain cases of blinding them to the latter and causing them to adopt the same behavior as their predecessors, thereby joining in the information cascades. Hence the following proposition:

- **Proposition** 1: When there are underconfident investors along with rational investors and/or overconfident ones, informational cascades may form when a flexible price mechanism exists. Example: Consider: $p = 0.51; p' = 0.55; p'' = 0.45$. We then have $p' > p > 1/2 > p''$. The fact of having a probability p = 0.51 indicates a very noisy signal (therefore an uninformative one). It is therefore conceivable that an underconfident investor, such as we have described, would underestimate the quality of this information.

➢ Position I: pt = 0.5 (also represents the price of Asset B because A and B have the same probability of occurrence at the outset). Let us assume that this first investor is rational and receives the private information "a"; we then have:

$$P(A/Ht,a) = (0.51*0.5)/(0.51*0.5 + 0.49*0.5) = 0.51$$

Hence, since $P(A/Ht,a) - pt = 0.51 - 0.5 = 0.01 > 0$, this investor will then choose to invest in Asset A.

➢ Position II: pt = 0.51 we assume that this second investor is rational and also receives the private information "a"; we then have $P(A/A,a) \approx 0.52$. Hence since $P(A/A,a) - pt \approx 0.52 - 0.51 \approx 0.01 > 0$, this investor will also choose to invest in Asset A.

➢ Position III : $pt \approx 0.52$ Let us now assume that this third investor is underconfident and receives the private information "b"; we then have

$$Pmc(A/A,b) = [0.52*(1-0.45)]/[0.52*(1-0.45) + (1-0.52)*0.45] \approx 0.57$$

Hence since $Pmc(A/A,b) - pt \approx 0.57 - 0.52 \approx 0.05 > 0$, this investor will also choose to invest in Asset A. This third investor will then ignore its private information "b", making the same decision as the previous investor. This investor will then, by definition, begin an informational cascade.

Proof: For this demonstration we will put ourselves in position $t(1 \le t \le n)$ while assuming that up to this position only rational investors or overconfident ones have participated. We will now assume that an underconfident investor takes action in this

position. Position t thus represents the first appearance of an underconfident investor[16]. The price facing this investor is therefore pt C]0 ;1[. We then have:
If this investor receives the private information s = b:

We insert $\alpha = P(A/Ht)$, $Pmc(A/Ht,b) = [\alpha(1-p'')]/[\alpha(1-p'')+(1-\alpha)p'']$ and $Pmc(A/Ht,b) - \alpha > 0$.

$$\Leftrightarrow [\alpha(1-p'')]/[\alpha(1-p'')+(1-\alpha)p''] > \alpha \Leftrightarrow 1-p'' > \alpha(1-p'')+(1-\alpha)p''$$
$$\Leftrightarrow 1-p'' > \alpha - 2\alpha p'' + p'' \Leftrightarrow 2\alpha p'' - 2p'' - \alpha + 1 > 0 \Leftrightarrow 2p''(\alpha-1) > \alpha - 1 \Leftrightarrow p'' < 1/2$$

So this underconfident investor will choose Asset A in spite of the contradictory private information s = b and thus start a cascade[17].

- **Proposition 2**

Once a cascade is created, it will stop only upon the intervention of rational or overconfident investors. A cascade will therefore continue as long as underconfident investors follow one another in the decision sequence.

Proof : A corollary of Proposition 1 is that by giving too much weight to the public information contained in these market prices, each underconfident investor will indeed opt for the same asset as the preceding investor. Since this is true whatever the value of t, the moment of intervention in the sequence, a cascade will last as long as underconfident investors succeed one another.

In the same way, a corollary of Proposition 1 is that whatever the value of t, $pt = P(A/Ht)$ where Ht represents the history of decisions up to t, and rational or overconfident investors will opt for the asset indicated by their private information, which by definition either makes a cascade impossible, or breaks it. This is what is shown by Proposition 3.

Consequence for prices: The consequences for prices will thus be different from those shown in the preceding models. Not all of the available (public and private) information will necessarily be incorporated into the market price. The market may then become inefficient from an informational viewpoint. Bubbles will then become possible.

Examples of bubbles in market prices

Let us take the case where the number of investors is $n = 99, p = 0.55, p' = 0.6$, and $p'' = 0.45$. We thus have $p' > p > 1/2 > p''$. Let us assume that the numbers of rational overconfident, and underconfident individuals are the same, namely 33, for each type of investor, and that their position in the sequence is randomly determined. Let us now assume that the winning asset is Asset "B". Figure 1 below then represents the theoretical and real prices of Asset "A" throughout the sequence.

The theoretical prices show the change in price if all the investors, acting rationally, had made the best decision in the light of the public and private information in their possession, in accordance with Bayesian theory. The real prices tell us about the changes in market prices given the type of investor in question (rational, overconfident, or underconfident).

Figure 1
Example of price bubbles for a market with the same numbers of rational, overconfident and under confident investor:
-.-.- theoretical prices ____ real prices

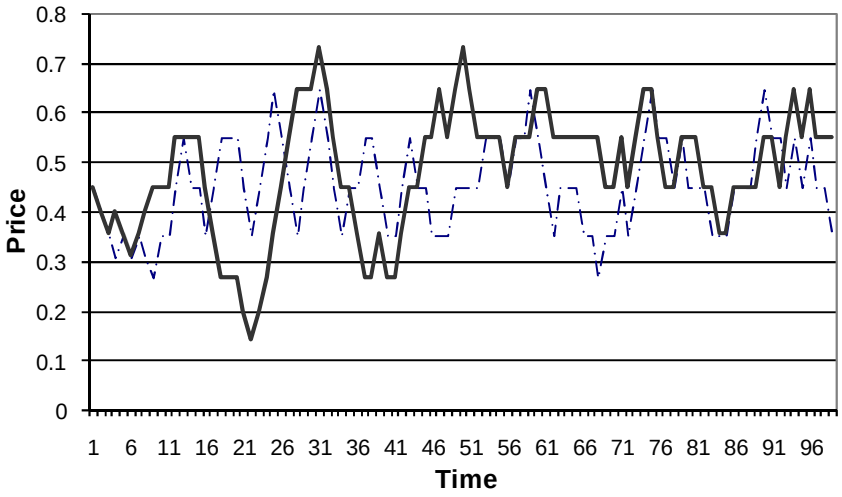
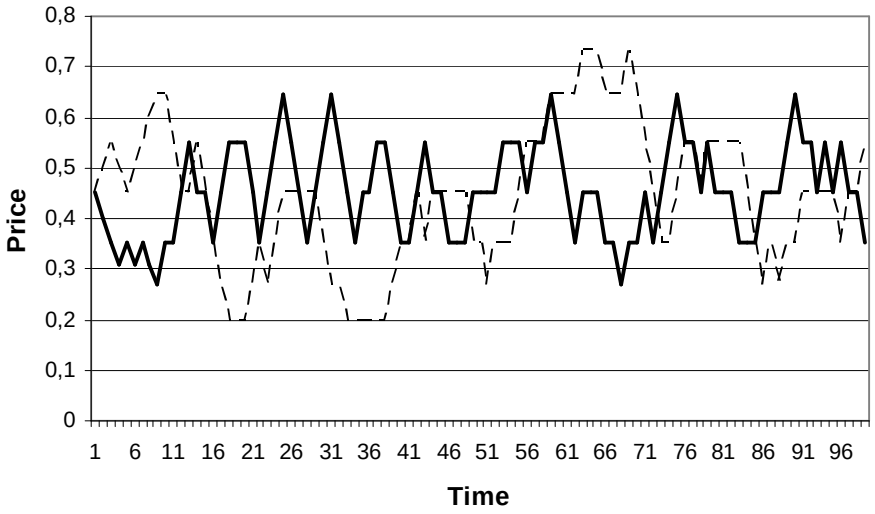


Figure 1 then confirms the presence of bubbles in a market of this type. In fact, for the period where n lies between 45 and 55, for example, the real price of Asset A reaches a maximum value of 0.72, whereas over this same period the theoretical prices have a ceiling of 0.55. During this period a maximum difference of 0.27 is observed between the two types of price, plainly testifying to the existence of a bubble. However, note the positive role played by the rational and overconfident investors, who work towards the bursting of such a bubble. This rapid convergence between the theoretical and real prices results from the fact that the rational and overconfident investors have disrupted the cascade initiated by the underconfident investors. We may also note that, generally speaking, in a market where the number of investors of each type is equivalent, the changes in real prices nevertheless follow the changes in the theoretical prices. However, this is no longer the case if we consider a type of market where, this time, the number of underconfident investors is greater. Figure 2 below shows such a market. We will make the same assumptions as before, but now the number of underconfident individuals goes up to 60%, and the numbers of rational and overconfident individuals each becomes 20%.

Figure 2
Example of bubbles for a market containing 20% of rational Investors, 20% of overconfident investors, and 60% of underconfident ones
-.-.- theoretical prices ____ real prices



We see that in such a scenario, the change in real prices no longer entirely follows the change in theoretical prices. This results from the fact that the much larger number of underconfident investors in the market also strongly increases the number of cascades (both correct and incorrect). For the period going from n = 18 to n = 55, Asset "A" is clearly undervalued. The maximum value taken by the real prices over this period is 0.45, while for the theoretical prices the value reaches 0.65. We can find similarities between this type of market and the one currently in progress in the main financial centers, where numerous analysts are reporting considerable undervaluations of many shares[18].

This difference in the market's valuation of assets has a significant consequence for listed companies, since the international standards now allow their financial statements to be valued at Fair Market Value. This option, available to all, has opened the door to a new kind of mimicry at the regulatory level: legal mimicry.

III. REGULATORY MIMICRY AND THE IFRS

A. The Crisis in Accounting Standards

Unlike its predecessors, the financial crisis of 2008 was accompanied by an alignment of the international accounting standards. In an irony of fate the IFRS (International Financial Reporting Standards) were imposed on listed companies in Europe to make up for the abuses of the US GAAP (Generally Accepted Accounting Principles), which had led to the Enron scandal.

New cases resulting from legal mimicry had the effect of drawing them into this global financial crisis.

In fact, the new accounting standards were imposed by international committees, first on listed companies, then on public savings institutions, and finally they seek to involve small, very short-term businesses, without reflecting on the mimetic consequences resulting from such an alignment.

We note that among the new financial arrangements, securitization was one of the worst screens used to conceal losses; it also acted to shield the traceability of risks. Currently this is contributing to a complete absence of any revival. The true nature of the 2008 crash therefore lies not in the subprimes, as in 1929, but in securitization, which has risen tenfold. The market for Asset Back Securities (ABS) or more precisely Residential Mortgage-Backed Security (RMBS) fell by $350 billion in the third quarter of 2007, reaching $100 billion three months later. Its collapse was one of the major factors in the crisis in the banking sector. These assets are unmarketable, and intensive consumers of owners' equity for the banks that hold them (in late July 2008 Merrill Lynch disposed of $30 billion of them at about 20% of their face value).

The stated purpose of these new standards was to produce a self-regulation of the financial markets and the world banking system. To this end, they wished at the same time to assess the various entities (at "Fair Value") and to stabilize the accounting profession by imposing proper compliance and international accounting standards. These new standards were based on the American standards (US GAAP), even though these had led to the Enron scandal.

B. Fair Value

At the same moment, every financial institution saw its equity capital melt away (accounting losses mounted with recording at market prices) and its access to financing restricted.

Since the new accounting standards advocated Fair Value, on the one hand they left the door open to an "opportunistic" management of results by banks and companies, and on the other hand they allowed economies to focus on very short-term performance instead of continuing to emphasize the long-term perspective and investments with moderate risks.

The role of Fair Value and mark-to-market imposed by the international standards, and used by companies worldwide, was the first to be blamed as a mimetic factor in the financial crisis. (e.g., Martin Sullivan, the American CEO of AIG Insurance, and Henri de Castries, the CEO of Axa).

These standards have led to confusion between liquidity and solvency: “It is becoming more and more difficult to determine whether an institution whose liquidity position has deteriorated is or is not solvent. By endorsing fair value for the valuation of many of the items on the balance sheet, the IAS-IFRS system is essentially progressively invalidating the distinction between liquidity and solvency, since the market value already incorporates the liquidity of the asset or liability in question”[19].

The problem of fair value in accounting standards thus has at least two origins:[20]

- The illiquidity or balance-sheet valuation of financial instruments that have few or no transactions has resulted in their no longer being valued on their propensity for generating future income. This fair-value principle has caused financial firms to record

book depreciations that are not justified by the economic reality. Their depreciation has led to a corresponding fall in their prices. The result is that “the sale of assets at an intermediate price is liable, for the transferor bank, to impart a definitive character to latent losses, and to make it still more urgent to raise new capital reserves”.[21]

- Pro-cyclicality had a ripple effect on the crisis. The notion that the market value of a security is a relevant indicator is disputed (Warren Buffett). Since they believed in the efficiency of the markets, the banks' balance sheets were inflated while the bubble was expanding, and deflated when the crisis arrived.

The accounting standards thus supported both the speculative highs and the crises of confidence in the markets, by allowing the managers to make opportunistic use of the values recorded in the financial statements. The agency costs and the asymmetry of information were thereby carried to the heights and amplified the cost of the crisis.

According to Ricol, the new standards were an aggravating factor. For example, the use of fair value introduces an imbalance between the valuation of listed companies and unlisted ones.

C. Financial instruments

The international accounting standards state that financial instruments (IAS 39) must be recorded at their true value on the day the accounts are closed.

Firms were then able to securitize some of their loans (dispose of them and then obtain the corresponding liquidities), which would have been proper if these debts had in fact been legally transferred, but this was not the case[22]. The financial institutions making the transfers should either have retained the risks pertaining to these loans, or transferred them to ad hoc entities controlled by them, or assumed the risks. Now, numerous securitized loans have disappeared from the balance sheets, whereas they would have been shown if the IAS-IFRS standards had been obeyed.[23]

For accounting purposes, since the start of the 1990s derivative financial instruments have greatly proliferated (their value has risen from $100 trillion in 2002 to $327 trillion at the end of 2006[24]). Moreover, these derivative financial instruments have become enormously more complex, to the point that Standard IFRS 39 appeared to be difficult to understand from the beginning.

From the outset, the IFRS were intended to bring greater clarity, transparency, and veracity to financial statements. IAS 39 thus allowed for better management of derivative financial instruments. However, not only was "this goal of a true picture and incentives for better management not attained, but the complex choices and options implemented by the IFRS often run counter to these objectives "[25].

By establishing the IFRS standards we have in fact abandoned the concept of a legal heritage, not for a financial accounting (*International Accounting Standards IAS*) but *(International Financial Reporting Standards IFRS)*, where the financial viewpoint prevails over the other stakeholders. In fact, we have re-established a liquidative banking financial analysis classified by liquidities and payabilities, and have abandoned the functional analysis advocated by the national accounting plans.

Primacy has thus been given to the financial statement (no longer referred to as a balance sheet) and to the liquidity risks that it sets out, supported by the stratigraphy of cash in the cash-flow statement. For this reason the operating account (profit is the change in owners' equity) no longer possesses the interest it once had, where earnings

were analyzed using standard performance indicators. The company's value has been rendered simply commercial.

Before the IAS 39 and IFRS 7 standards, forward transactions were valued and recorded in financial statements as off-balance-sheet items, either at their nominal value (forwards and futures) or at their contractual value (options, caps, floor, or collar). The losses generated by these financial instruments were recorded in the operating accounts. Some companies could use hedges and accordingly there was no need to provide for latent capital losses. Conversely, latent capital gains were naturally not recorded. On the other hand, in the case of purely speculative operations, spreads in valuation were automatically recorded in the operating account.

With the IFRS standards, not only are derivative instruments recorded in the balance sheet as of right, but in most cases they are filed under a heading called: "instruments at their fair value according to the operating account" - which means that their changes are directly recorded in the operating accounts. Thus operations that were formerly recorded as off-balance-sheet items are now to be found on the balance sheet, and the changes have been directly charged to the operating account, which makes them tremendously volatile.

Under the new IFRS standards a company that does not hedge its risks does not record any loss in its operating accounts, whereas it appears much more vulnerable than another company which has used hedging instruments. Thus "the IFRS can not only create a volatility in the earnings that is purely an accounting artifact, i.e., attributable to the accounting standard and having no relation to the economic reality, but still worse they run counter to their own objectives, penalizing financial managements that are designed to limit exposure to risk."[26]

One of the explanations for the worsening of the crisis is that most of the covered financial instruments were classified as "Available for sale". For this reason the changes in hedging derivative instruments had a direct effect on the operating accounts, whereas changes in covered instruments went into the balance sheet as owners' equity.

Since in practice the operating account became highly volatile, the IASB developed a “hedge accounting”. This was done on the one hand to reduce the accounting volatility caused by discrepancies in the handling of the latent changes in hedging instruments, and on the other hand by the underlying covered instruments.

Unfortunately, in practice the requirements were presented in such a demanding manner that the companies barely used them[27].

The IASB therefore confirmed the worsening of the crisis and published an emergency procedure, justified by this international financial crisis, and aimed at amending the two standards: IAS 39 and IFRS 7.

The change essentially consisted of reclassifying the non-derivative financial assets as outside the “at fair value” category. Certain other reclassifications were envisaged, with an effective date of November 2008.

In view of the urgency, EFRAG issued an opinion favorable to the adoption of the amendments to the standards, but the European Commission wished to examine the two standards in more detail, so as to make other changes.

Finally, the European Banking Federation pressed for a broadening of the possibilities for reclassifying out of the fair-value category, and a review of the depreciation rules for available-for-sale instruments as well as the treatment of derivatives.[28]

Numerous empirical studies show that the adoption of Fair Value in accounting is expressed by an increased volatility of earnings (Nivine et al., 2006). The same conclusion applies to the banking sector (Bernard et al., 1995 and Barth et al., 1996).

Since Fair Value opens the door to an opportunistic management of earnings (Stolowy and Breton, 2000) investors perceive higher levels of risk. Thus the volatility of earnings was naturally accompanied by price volatility (Touron and Foulquier, 2008), and hence a collapse of financial, economic, and social systems.

IV. CONCLUSION

In this article we have attempted to model the mimetic behavior of individuals, using the BHW (1992) theory of informational cascades, which we have adapted for application to share markets. We have shown that by incorporating into this type of model both overconfident and underconfident investors, together with rational investors, a number of novel results can be obtained. The principal results show in particular that when underconfident investors are accompanied by both overconfident and rational investors, cascades can form, and the consequence for prices is the appearance of bubbles, which may be larger or smaller in size depending on the number of underconfident investors in the market.

As regards international standards, these have contributed to a legal alignment and to herd behavior, and have removed all constraints on the valuation of financial statements. They have thereby added to the instability of a financial system that was already unsettled. To think that the markets are sufficiently efficient and well-informed to be able to operate under a “laisser faire" policy with no monitoring or state supervision is ill-advised. Fortunately, it seems that regulatory authorities worldwide have learned their lessons. Among the possible policies for resolving the crisis, institutions should consider ones that focus on liquidity and solvency. As regards State intervention on solvency, suggestions include "raising the guarantee ceiling for deposits, refinancing guarantees, asset buybacks, direct recapitalizations, and reform of the accounting regulations"[29].

These international standards therefore need to be improved, and the Basle II ratios, which have proved unable to contain the risks, should be strengthened. In fact, as confidence returns, there is nothing to prevent an exponential revaluation of assets, which would open the way for a new global crash.

ENDNOTES

1. Bikhchandani and Sharma (2001) distinguish three types of mimetic behavior: informational mimicry, reputational mimicry, and mimicry related to the investors' returns.
2. Denunciation of folly, often accompanied by a herd instinct (Rabelais's Panurge)
3. In 2008, companies listed among the CAC 40 on the Paris stock exchange posted profits that were in line with or even better than the forecasts, while their prices collapsed to the point that their market capitalization reached their owners' equity.
4. David Bensoussan, *l’Économie est affaire d’affect*, Challenge, No. 148, December 11, 2008

5 Two months after the collapse of Lehman Brothers, the US investment bank, the fraudulent international scheming of Bernard Madoff, a former chairman of Nasdaq, drew the world into a still-deeper crisis.
6. Glaser and Weber (2004) as well as Biais, Hilton, Mazurier, and Pouget (2002), and Odean (1998) have listed three different forms of overconfidence.
7. The objective here is not to describe these models but to emphasize their existence.
8. Three other conceptual limits on the theory of rational bubbles are presented in Lardic and Mignon's work on informational efficiency (2006).
9. Who had made improvements to the model of Artus and Kaabi (1993).
10. This is the situation covered by the "Tie-break" assumption (BHW, 1992).
11. In fact, in an informational cascade, it is optimal for individuals to follow the behavior of their predecessors, whatever their private information may suggest.
12. This concept of market efficiency represents the strong form.
13. This term should be understood as daring, rash, venture capitalist, etc, and not simply as someone who creates a business
14. $(p' - p)/p$ is an attempt to represent the degree of overconfidence of our investors.
15. This way of understanding overconfident investors has also been employed by Bernardo and Welch (2001) to account for the decision processes of entrepreneurs.
16. Up to point t the prices therefore reflect all the available information, the market is efficient from an informational viewpoint, and cascades are impossible.
17. If s = a, it is then evident that the investor, based on its information, will also choose Asset A.
18. We also note the presence of a positive bubble over the period n = 61 to 73, but it bursts, thanks once again to the presence of rational and overconfident individuals. We may compare this type of market to the French share market at the start of the 2000s. After the bursting of the Internet bubble, investors clearly displayed a certain amount of mistrust
19. Laurent Quignon, Manager of "Banking Economics" for BNP-PARIBAS, Note on the economic situation, Department of Economic Studies, November 2008, p 25
20. Nicolas Véron, *"La faute aux normes comptables [Blame the accounting standards]?"*, Economic Alternatives, No. 272 (September 2008)
21. Laurent Quignon, op. cit.
22. Gilbert Gélard, IASB member, *Les normes comptables : un repère stable dans la crise financière [Accounting standards: a stable point of reference in the financial crisis]* , Revue Française de Comptabilité, December 2008, pp 25 et seq.
23. Glibert Gélard op.cit.
24. According to the International Swaps and Derivatives Association, quoted by Philippe Touron and Philippe Foulquier, 2008.
25. Philippe Touron and Philippe Foulquier, 2008.
26. Touron and Foulquier, op. cit., p 9
27. Touron and Foulquier, op. cit., p 14
28. Revue Fiduciaire Comptable, November 2008, No. 355, pages 4 and 5
29. CIC Security Bloomberg, in La Tribune, January 12, 2009, p. 20

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