Finance : the new paradigm

Understanding finance and economy with Mandelbrot, Taleb, …

Philippe Herlin

> Goal: find an English Publisher!

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Description

The current crisis also represents a crisis in the classical financial theory which was developed in the USA in the sixties following theorists such as Markowitz, Sharpe, Fama, Black, and Scholes. From that era French mathematician Benoît Mandelbrot squares up against certain diminutive or straight out erroneous hypotheses. In particular he denounces the use of the normal distribution (or the Gauss curve) to gauge variations in the stock market. The so called 'random hazard' of financial markets largely exceeds what may be foreseen by this distribution. Likewise he rebukes notions of market efficiency or rationality of actors and instead he updates a dissertation on stock prices. Mandelbrot combines this idea in *The (Mis)behavior of Markets* (2004) and he will be followed suit by others, in particular the Lebanese-American Nassim Nicholas Taleb with *The Black Swan* (2006). However, nothing comes in the way of the predominance of the classical model, which establishes itself equally in company management and thus takes part in « the financialization of the company. »With the start of the crisis in September 2008 Mandelbrot came back in the picture and he has been quoted in numerous articles since. This book evaluates the criticism against the classical theory and outlines new approaches in a didactical way. They allow a better understanding of financial market mechanisms and the economy. A change of paradigm is necessary. This book also highlights underlying threats and possible regularisation of the financial world.

The public, the market

This book aims deliberately at the general public and, more specifically, professionals and students. It offers a general overview and ties together the most recent events. It is written from both a didactical and pedagogical point of view. No previous mathematical or financial knowledge is required. When the normal distribution is mentioned, it is explained in terms of a plain construction (like a stockpiling game). Fractals are clearly explained etc. This book starts with a description of Monopoly which facilitates understanding of the differences between normal distribution and the power laws, the two key players to understand chance and uncertainty.

To date no book has clearly presented Mandelbot and Taleb's approaches of finance. Obviously other books have been published on these two authors. However, they are rather lengthy and sometimes, one might say, a little confusing in their introductions (similar ideas are presented from several different angles, there are numerous digressions regarding Taleb's ideas....). There are also some other books on this topic but they are geared towards well-informed readers with a very good level of maths.

Judging by the number of quotations of Mandelbrot and Taleb in the press, one may say there is a latent demand for a book which allows a better understanding of these new approaches. (Let's quote for example « A special report on financial risk » in The Economist of 11 February 2010).

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He has published « Théorie des marchés financiers : revenir aux concepts fondamentaux » (theory of financial markets: a return to fundamental concepts) at Club Finance HEC (the leading business school in France) October 2008.

He has published several columns in *Les Echos*, *La Tribune*, (the two major financial daily newspapers in France) and on different internet sites with titles such as « The fundamental misconceptions of finance », « The role of Fair Value in crisis time », «Do banks calculate risk correctly?», «The nature of chance on financial markets», etc. All of these titles have been published in French.

He has delivered speeches on radio and TV. For an overview of his speeches, please consult his website: www.philippeherlin.com

He has set up a special group on Facebook with a list of financial articles quoting Mandelbrot and Taleb : 'Finance & Mandelbrot'
http://www.facebook.com/group.php?gid=53108760302

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Prologue
Small detour based on Monopoly

Before tackling the thick of things, let's take a detour via one of the most famous social games: Monopoly. It will actually increase understanding of the book's core reasoning, the distinction between the two types of chance as encountered in both finance and economy. A game of Monopoly unfolds in two sequences. In the first part players buy land in an effort to accumulate as much as possible. When all ownership titles have been sold, a period of exchange begins during which each player tries to form one or several pieces of land of the same colour, thus allowing him to "build" (buy) houses and hotels. One should actually have all cards of one and the same colour in order to be able to build these constructions. After that the second, and most exciting, part unravels. The players try to build, as quickly as possible, houses and hotels whilst aiming at the competitors' demise.
The face of the game is changing between these two parts and it's this interval which is most interesting to us. To be more precise: risk and uncertainty, and their implications on both game and players, will reveal two different principles in the outcome of the game.

During the first part:

- It is virtually impossible to go broke. Pieces of land actually cost between 6 000 (Boulevard de Belleville) and 40 000 euro (Rue de la Paix) while players earn 20 000 euro with each turn. This is on top of a start capital. When one gets stuck on a piece of

land already acquired, then the price to pay is moderate (between 200 and 500 euro, the rent of a piece of bare land)

- You obviously can't win or lose the game with one throw of the dice (you would have to be double or triple lucky to form a group of the same colour. This would be an advantage over the other players but certainly not a guarantee to win the game)
- At the start of part one, players will have more or less the same number of pieces of land. Taking for example 4 players then they would share 22 pieces of land (the stations which cannot be used for construction aside), hence 5 to 6 pieces each. Of course, the set-up will be different from one game to the other. There's always a lucky player who acquires 7 or 8 pieces of land and a less fortunate player with only 3 or 4 pieces. It is extremely unlikely though that one player puts half or two thirds of the pieces in his pocket. Distribution is usually very even following several games.
- Likewise, differences in capital between the player in the first and the one in the last position are moderate.

Part two completely changes the deal

- Bankruptcy becomes extremely likely! The game is designed for that. The winning person claims his money and the pieces of land that have fallen in his lap. Indeed, a stop at a hotel on Boulevard de Belleville costs 25 000 euro, 100 000 euro at Place Pigalle, 115 000 euro at Place de la Bourse and 200 000 euro at Rue de la Paix. The 20 000 euro each player earns at the throw of the dice has become a negligible amount of money!
- One can win or lose in a single throw of the dice. If two players are close in terms of capital and constructions, the first one that falls prey to the other has to seriously mortgage his chances. Obliged to resell (at half of its value) his houses and hotels to the bank in order to pay the rent, he acknowledges a delay, which proves to be fatal most of the time.
- The allocation of land between the players becomes more and more dishevelled. The winning player gradually claims the land of the player who has gone broke and forces him to pay off his debts by selling properties.
- Of course, differences in capital will increase tremendously, right at the end when the winner owns the whole set of land and available money.
- An interesting phenomenon pops up during the second half: the leading player is increasing his lead, which is a result from the adage "money makes money". The player with the most developed pieces of land is leaping ahead, he earns more and more, builds again and reclaims land from players that are broke. He puts in place houses and hotels and spreads his possessions on the board. While doing this, he bends the leeway to his advantage. One usually notices soon who will win the game and it then consists of retrieving as much as possible at the moment of bankruptcy.

One has clearly encountered two ways of functioning, two types of radically different risks. However, what is the fundamental explanation of these opposites? One should take a look at the figures. In the first half, price margins are small, from 6 000 to 40 000 euro in order to buy a piece of land, from 200 to 5 000 euro to claim a piece already belonging to someone. It concerns a gradual series that goes from 6 000 to 40 000 euro in 22 steps (the 22 pieces of land). The price increases with an average of 1546 euro each time (40 000-6 000/22). In that case risk is very

limited, uncertainty is weak and the risk of bankruptcy is almost impossible. It's the average which dictates its force here. The four players would have 22/4 = 5.5 pieces of land each, with a more or less limited difference. The chance that one player would retrieve half of the land would be marginal. This is the world of Gauss, dictated by the Gauss curve, in which risk is subdued, causing neither a crisis nor a bankruptcy while guaranteeing a very even distribution of resources.

On the other hand, when stepping on a piece of land with one, two, three, four houses or a hotel the price to pay increases rapidly. For Boulevard de Belleville it goes up from 200 euro (bare land), to 1 000 (1 house), 3 000 (2), 9 000 (3), 16 000 (4), 25 000 (hotel). For Rue de la Paix, it is 5 000, 20 000, 60 000, 140 000, 170 000, 200 000. For Avenue de Neuilly : 1 000, 5 000, 15 000, 45 000, 62 500, 75 000. These increases point towards the so-called power laws, based on the formula $f(x)= x^k$, x to power k. The adjustment is obviously approximate. They aren't purely mathematical functions but segments (1, 2, 3, 4 houses, hotel) that generally move closer. For Avenue de Neuilly, the exponent k varies from 1.23 ($1\,000^{1,233} = 5\,000$) to 1.01 ($62\,500^{1,0165} = 75\,000$). Hence we are in the realm of the power laws, in which risk is very important, bankruptcies are frequent, and the distribution of capital is very unequal. Moreover, the adage "money makes money" gains momentum here.

It is important to understand that we are dealing with two radically different types of chance. Each has its own characteristics, appearance, and mathematical roots. Saying that the risk increases the moment one goes from the first to the second part of the game, is too partial an answer; we are changing worlds, which is exactly the ingenuity of the game.
One can easily guess to what type of chance the financial world is attached. One often talks about the « finance casino », but it is a mistake: a casino is governed by the Gauss curve. Winning once at the one-armed bandit or at the roulette table doesn't increase the chance to win a following time. Each time the player has a – small – probability to win and this probability remains constant (ignoring the effect of training which would follow the principle of "money makes money"). Notwithstanding, casinos have regularly gone bankrupt. In Monopoly however, the player that takes in his competitor's land extends his position on the board and thus his chance to win. Finance is not the same as a casino, but more like Monopoly full of hotels! We will see that the power laws, applicable to finance, are also applicable to the economy.....

Invented in the USA in 1934, that is to say right after the crisis of 1929, Monopoly presents a playful means to understand the two types of chance, to which we are confronted in the economic life. One being peaceful and harmless (but tedious) and based on the Gauss curve. The second being thrilling and risky, following the power laws (one either walks away with everything or one goes bankrupt). It is exactly the history of finance and the economy as we will see.

Let's finish with a remark. As we know, each household sorts out the Monopoly rules and this is also what makes the game appealing. So let's ask ourselves a question: what rule should be changed to avoid bankruptcies in spite of the strong uncertainty of the power laws? The answer is straightforward: money creation. In fact, each player makes 20 000 euro when he passes the starting point (see here: money creation). This amount of money is enough in the first part but becomes trivial in the second part. It would be enough to reach to 200 000 or 300 000 euro and

none of the players would go broke. This is what the central banks have done since the crisis of September 2008. However, isn't this settlement slightly excessive?

Chapter IV : The company infected by the finance of Gauss

The classical financial model hasn't limited its impact on the financial market. Its success has lead to a remarkable entrance in the business world.

Financial corporate management has long been confined to a calculation of flux and ratios in a mechanical sense, such as accountancy. Accountants would calculate the gross surplus of operations, cash flow needs, the capacity for self-financing, profitability before taxes etc. They were able to elaborate on different scenarios (which profitability for such and so turnover) but that remained in the framework of strict accountancy. Risk though is an integral part of a company and the question is if it takes this risk into account. Should it develop blank techniques? Some well-informed and some less hurried spirits have reflected it would be a waste of time as financial theory simply creates a range of tools. For this reason the CAPM and the theory of options have been gradually integrated into financial corporate management.

We now know that the hypotheses of these models are incorrect. Especially common distribution largely underestimates the risk on financial markets. The risk related to companies is not necessarily as important as the one prevalent on the stock market. However, it suffices to take a look at the lifespan of companies to realise that it's not just the placid and kind idea of normal distribution that governs them! Incorporating these mathematical tools that reduce risk may therefore have more or less serious consequences on the decisions the company takes. This is the so-called "financialization of the company", which is even more twisted than when it's based on incorrect maths.....

Chapter IV : The company infected by the finance of Gauss
The tyranny of the WACC?

Under the pretext of integrating the classical financial model one will see how the market imposes its point of view on the company in order to calculate the WACC (Weighted Average Cost Of Capital). The price of money is not how much it costs you but what investors ("the market") expect to generate.....It is a conjuring trick. From the company's point of view, what should equity capital actually cost the company? It would depend on the amount of dividend paid to shareholders. If the company just gives a small dividend then its equity capital costs him little, and vice versa. Instead of this, it returns to a riskless rate and to a risk-related bonus (the coefficient beta of segmental volatility) thanks Mr Sharpe!

Next, in order to calculate the WACC one doesn't take the ratio debts / company equity but the average ratio of companies in the sector (thanks Modigliani-Miller!). As a result the company is back to a WACC of 10 – 15 % per year! As the WACC represents the cost of capital, the company has to clear a profitability which is higher than this figure. The last one is calculated by another well-known ratio, the ROCE (Return On Capital Employed). See here the origin of this

15% profitability on equity capital which becomes a sort of “categorical imperative” for all companies!

A healthy and profitable company which has few debts and pays minor dividends, finds itself offside with these new rules. The market requires a WACC of 10 % which results in relocation of production, dividing up of real estate etc. A company in good financial shape is no longer solvable because it is endued with a set of orthodox financial rules imposed by money lenders. It is now a company that creates its own value because the expected profitability on its invested equity is higher than the demanded profitability of silent backers.

Something has been forgotten though. When a trader compares two assets, one with a profitability of 10% and the other of 15%, he knows very well that the level of risk isn’t the same. Even if the realised benchmark underestimates this level of risk because the trader uses the Gauss curve, he is perfectly aware of the elevated concomitant of both profitability and risk. In other words, the ROCE and WACC are tokens without any risk attached to either! Likewise, one could wonder, everything else equal, why a company whose profitability has increased from 5 to 10% sees its risk increasing, its rate becoming weaker, its turnover becoming more volatile, its return to the market getting more difficult. However, the ones that introduced the CAPM to financial management didn’t have any concerns about working out a risk assessment method, a small warning light that could have lit up from time to time.....How could a stock be risky if the underlying company wasn’t? The advocates of the classical theory could answer to this that the actualisation rate includes a risk. I agree, but it is the risk of the market - or better: the sector- that stems from the shareholders and that doesn’t take into account the financial structure of the company. Thus, this doesn’t involve an identifiable risk for the average company. The use of the CAPM to calculate a risk premium implies that only the systematic risk has been considered (i.e. the risk of the market or sector, but not the one of the company, which is called specific or idiosyncratic risk).

This 15 % rate of “equity capital return” becomes hence the main objective that should be achieved and maintained. One quickly understands that in an economy with an average growth of GDP of around 3%, this figure turns into much of challenge. Only the sectors with considerable expansion can aspire to this, but others? Once a company has relocated its production and divided up its real estate, how can it possibly maintain this performance? There are two solutions.

1) Share repurchase

The company buys its own shares back with its own equity capital, which will automatically increase the profitability of the equity used, the ROCE (*Return On Capital Employed* : the ratio increases because the denominator – equity capital – decreases while the numerator – the operating result- remains constant.) Of course, it is hard to imagine a stock as anti-economic, anti-entrepreneurial as this one. Instead of investing and developing, the company weakens its liquidities for nothing! In order to please its shareholders, it applies an intrinsically stupid behaviour. Advocates of this idea will see this in a different light, the one exclusively of the shareholders that are influenced by the theories of Markowitz and friends. “Each euro issued by the company shall only be invested at a rate of profitability which is at least equal to the one

demanded by equity suppliers, the average cost of the capital weighted. Otherwise, it leads to value destruction and it will be better to hand back this euro," it is the definancialization of the Share repurchase.

2) debt increase

If the increase of company profit is mainly financed by running into debts during which equity capital remains constant, the ratio calculation of benefits on equity capital will increase. QED.

The two methods are routinely used but it's the second one that offers the most potential, if it weren't for fear (of bankruptcy) which it arouses within the company and of the motivation which follows suit. In other words – and to use the formula by Henri Kravis (one of the founders of KKR, a common equity on huge OPA and LBO), debt entails "a creating specialism". Debt accumulation is also preferred because the tax system is favourable both in the USA and in Europe. Creditor payment is deducted based on a calculation of taxes on the corporations, while payment of the shareholder, which consists of the part of profits reinvested in the company or the paid dividends, isn't. And so it becomes extremely profitable to use a helping hand in order to increase the payment of equity.

However, a major debt accumulation increases the risk of bankruptcy of the company....Who may not be keen on this, it suffices to create a specific insurance product, the CDS (Credit Default Swap)! A CDS is an insurance to which one regularly transfers an amount of money. In this case it covers the risk of bankruptcy of a corporation (or of a country, or a financial asset) and one receives an amount equal to damages. All important corporations of the global stock markets have their CDS. The game of the large investors (banks, hedge funds) is therefore simple: they push companies to increase their ROCE. The ones that do so on a large scale run into debts and, if that works, the investors put the dividends in their pockets, or, when the companies go broke, they snatch the CDS. In any case, the investors walk away as the winning party. It is like throwing a coin: "heads, I win; tails, you lose."

The CDS is a bit like "a return of the repressed", a return of risk that financial management has forgotten on purpose while embracing the CAPM. We have said this before. However, it obviously concerns a second-best, imposed by the market and which the company, with its logic and complexity, could not have but put up with.

Chapter VI : The fractal company

The specifying analytical criterion: scalable/non scalable

The distinction normal distribution / power law is essential in order to understand the nature of chance with which we are confronted. How to decide, in practical terms, to which one belongs what in a company and in finance? This is the most important preliminary question because, as it concerns decision-taking, it allows us to know to which frame it applies. Then, one could address more specific questions but skipping this stage may only lead to erroneous evaluations.

Taleb provides a very simple tool to recognise which frame it concerns, even though he doesn't work out this idea adequately. It is pivotal to know if the economic activity is « scalable » or « non scalable ». From this starting point we will consider two very easy examples.

1) The sale of take-away pizzas

Mr X. decides to open a take-away restaurant in a busy street in Paris. This business is « non scalable »: in order to make more pizzas he has to buy more ingredients (flour, vegetables, tomato sauce etc), work longer hours, recruit personnel, buy a larger fridge etc. Output and input are increasing at the same time. One doesn't mention here the economy of scale which is real of course – a larger fridge costs less than two regular fridges, so doubling its size will save some money, however, this remains negligible with regard to what we are talking about here.

The rule is simple: what is non-scalable corresponds with normal distribution. This business belongs to the Gauss curve.

Taking into account location and the product sold, a take-away specialist could say how much average turnover Mr X would make at which error margin. He would probably be right. The average and the standard deviation make legitimate and realistic sense here (they are, let's recall, the two variables belonging to normal distribution). Mr X is obliged to take into account the average price of take-away pizzas the moment he sets up shop in Paris. He could sell a little more expensive if he adds an additional service (bio ingredients, bigger choice etc.) or a little cheaper if he wants to take a considerable chunk of the market. These decisions belong to the «entrepreneur » but he has to think about it. At the same time, this is a reassuring business, risk is weak, the economy of scale guarantees a certain sales volume. While working meticulously Mr X is certain of a turnover and a regular monthly income. He won't make a fortune but his income is steady and regular. (this is the comforting side of the Gauss curve).

2) The art gallery

Mr Y decides to open an art gallery in Paris dedicated to young artists. This type of activity is « scalable »: He can increase the turnover of his gallery without being forced to increase his space or recruit personnel. It is enough to sell more expensive paintings in a larger number, while focusing on promising artists and convincing ones that are hot to exhibit in his gallery.

The rule is: what is scalable corresponds with the power law.

One has seen what the power laws imply: risk is high, repartition is extremely differentiated from the companies' turnover ("the winner takes all"). Notions of average or standard deviation are meaningless here. The average price of a painting by a young artist in Paris doesn't mean anything. He combines well-known names that sell expensive with unknown artists that put their canvases forward for hundreds or thousands of euros. The standard deviation is endless. Opening a gallery while saying that one is going to exhibit ten paintings and that one hopes to sell them at the average recorded price in Paris, shows complete lack of understanding and will be catastrophic! This works for pizzas, but not for paintings. The power law works in two manners:

either making a lot of money with limited means, or work tremendously without having sold a single painting at the end of the month!

One shouldn’t apply these conceptual tools of the first case to the second or one runs into failure. One can’t say « I’ve opened an art gallery, I’ve worked 60 hours per week and I’ve failed, it’s unfair ».No, it is an error of judgement. In this case, one should have opened a pizzeria. One has to realise that an activity dictated by the power law requires more than meticulous labour; one needs an idea, a concept, a vision otherwise it’s not worth trying. One needs to understand the market that will be truly backed up, constructed, and different from or opposite common concepts. One needs to be convinced to bring in something original and so, eventually, success will follow suit (chance counts a lot) but it won’t suffice to « do a good job ».

Scaling law, power law, and scalability law are here, one has understood by now, perfect synonyms and point out the same mathematical reality. The term « scalable » reflects more practically to an economic reality that each of us may assess around him.

From an economic point of view it is essential to understand the difference between the two paradigms: the network effect, which is zero or almost zero in the first case but decisive in the second.
One only talks to colleagues about the local pizzeria. One doesn’t encourage friends that work on the other side of town to go over at noon. Customers of the pizzeria aren’t united by a single link. People come here because they work in the customer catchment area and because they fancy a pizza that day. These people are independent from each other, as are the values in normal distribution. On speaks about the same thing, the same phenomenon.
On the contrary, one will speak to one’s friends about a gallery with particularly interesting young artists. Newspapers and media will highlight it, as well as social networks. People that go to this gallery are almost all connected to each other via word-of-mouth and the buzz. One actually plans a trip to an art gallery and obviously not to a sandwich shop. At the same time, the customer catchment area is a void concept and in any case insufficient to live off. It’s all in the game of this activity. People that visit this gallery are linked together, in other words: they are not independent. Therefore, we are dealing with a power law. The network effect implies an activity corresponding to a power law.

The network effect turns out to be crucial for scalable activities. It even has an accelerating effect as indicated by the law of Metcalfe: The usefulness of a network is proportionate to the square number of its users (the number of potential links between n people: n (n-1)/2 that is n2/2 when n tends towards the indefinite, that is 1 relation for 2 people, 10 for 5, 66 for 12, etc.).
The network effect counters independence of events typical of normal distribution. The moment people start talking about the gallery, they generate a differentiation, a hierarchical organisation, a sequence (but a very unstable one) which is decisive for their behaviour. Another essential difference, which directly results from the network effect, is the non-existent brand in the first case. However, this constitutes a decisive element (an asset) in the second case. The brand allows the network effect to crystallise, to reinforce, to make it more sustainable, to act as a sign of recognition.

To come back to our table presented at the end of chapter three which compares normal distribution and the power law, particularly from the angle of « the fundamental value », one may say it is its absence, for a power law, its auto referential dimension, which allows it to be scalable. The fundamental value in normal distribution appears as a centre of gravity which blocks the possibility to change scales.

This distinction scalable/non-scalable is not a point of view but inferred from a mathematical reality (normal distribution/ power law). It is a rule but not a magical one. Its purpose is to determine which frame it concerns without giving ready-made answers. It is still necessary to specifically analyse the sector, the company on which one would like to focus. At least this distinction will avoid a vital error by wanting to apply a Gaussian reasoning on an item which belongs to power laws.

Chapter VI : The fractal company
The road to wealth

Hence one understands that the road to growth and enrichment consist of going from non-scalable to scalable. Profits and perspectives are obviously incomparably higher when one knows how to use the power of scalability. Thus it's a game of knowing how to create a network effect and a brand. Let's have another look at the previous example: one develops the concept of a bio pizza or a pizza light, one sparks off journalists' interest, one creates a buzz, then the brand and its concept will be known, established and developed.....

In all sectors, when one classifies companies based on decreasing turnovers, one gets to the typical curve of power laws (or a straight line in a logarithmic graph) with leaders that dominate and monopolise a large part of sales (the ones that knew how to create a brand), followed by a couple of medium-sized companies and after that numerous independent workers. Mandelbrot has likewise focused on this phenomenon (the size of the companies in an industrial sector, from the powerful Microsoft emporium to the numerous small software companies, follows a fractal scheme). All sectors are involved without exception, from take-away pizzas and sport shoes to vacuum cleaners and the financial sector of course.....

To come back to our restaurant that launches the idea of a bio pizza or a pizza light, how will it be developed in practical terms? Thanks to franchise which does nothing more but separating the scalable (the brand, communication, creation, new products and profits) from the non-scalable (the shops, salaries, the stock, a slow cash-flow).
[…]

Épilogue
The end of capitalism?

On 18 December 2009 low-cost carrier Ryan Air announced it would cancel its order of 200 airplanes of the Boeing B737 series. It didn't wish to turn to another airplane constructor. At the same time Ryan Air declared that a large part of its 2.5 billion euro in liquidities would be

redistributed to shareholders in the form of an exceptional dividend or a buyback of stocks. See here the end of capitalism, dead simple. The company returns its money to the shareholders! Seek your own solution! How otherwise interpret this incredible decision? The company says « stop ». The cycle of creating stock value stops neatly. With this brash gesture the director of Ryan Air, Michael O'Leary, wants without a doubt send the WACC to the countenance of the shareholders «do you want more than 10% profitability on shareholders equity while pushing the economy into recession? You know very well guys this is impossible! Take your money back! ». Another version of « take your dough and run ». This 2.5 billion euro could have been invested to consolidate part of the market of the company, to diversify in additional services in order to make the company more resilient. However, the return on shareholders' equity would have wavered at 3 -4 %. « ''Insufficient' ordains the market, 'inconceivable' maintain management manuals, give the money back! » However, where will these shareholders find a profitability of 10% in the current year? Nowhere. Even worse, while impoverishing the company in this way, it becomes weaker and it risks bankruptcy in case of serious problems and so shareholders will have lost everything.

«This crisis is an opportunity to return to the fundaments of long-term and tenable wealth[1] » as Didier Sornette. righteously recommends. The Gaussian finance has already wreaked havoc on financial markets and among companies, it is time to abandon this model, especially because it seems to design a spiral of stock value destruction, leading us towards « the zombie economy ».It is also time to say to shareholders: « Do you want value for money? And a lot? Then set up your own company! »

The short-sightedness of the markets is the one that looks through Gaussian glasses! One should defend entrepreneurial capitalism that is long-term and takes better into account exceptional phenomena while opposing financial capitalism which reasons with the blinkers of the Gauss curve. Recognising the presence of power laws in the economy will even allow the reconciliation of the two and improve communication between both the world of the company and of finance. Let's keep our fingers crossed. Recognising the important frequency of extreme stock values equally leads to revalue what in the economy is Gaussian, stable, and recurrent. This also constitutes the preservation of a large middle class, necessary for both economic growth and political stability.

One shouldn't fear this sometimes harsh reality as Daniel Zajdenweber in *Economie des extrêmes*[2] teaches us: "In all cases of target, profits or damages, extreme stock values aren't alien in regular economic functioning. Certainly, without them, there won't be any major catastrophes. Moreover, without them, there won't be any film producers or artists, or laboratories taking the risk to invest in devising treatments against current chronic diseases, or the *start-up*, or innovators investing in new technologies. Will there be another period of economic growth?" Our world is more uncertain than we would like to think but it should be considered a chance, an extraordinary chance.

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[1] Didier Sornette, Ryan Woodard, « *Financial bubbles, Real Estate bubbles, Derivative bubbles, and the financial and economic crisis »*, *Working Paper*, May 2009.
[2] Daniel Zajdenweber, *Économie des extrêmes*, *Flammarion*, 2009, p. 207.