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ANTICS OF "THE INVISIBLE HAND" – CONTRADICTORY VIEWS OF THE MARKET

BY DR BERTIE DU PLESSIS

SUMMARY

Over recent years a number of books appeared that try to explain the behaviour of the market. What is the logic (or lack of it) behind the "invisible hand" that steers the market according to Adam Smith? The various explanations differ on three points: (1) How do prices fluctuate in the financial markets (2) How accurate are prices, and finally (3) How do people make decisions? The mathematician, Benoit Mandelbrot, was the first to oppose the accepted economic theory that alleges that price fluctuations on the financial markets can be described with a bell curve (the normal distribution curve or Gaussian distribution). Extreme drops and rises in prices are much more general than represented by the bell curve. Daniel Kahneman, Nobel Memorial Prize Winner for Economics, experimentally proves that people often make irrational decisions and that irrational behaviour follows a particular pattern. The conclusions of the insights affect each facet of our market participation. Financial markets fluctuate extravagantly, not in moderation. Prices are sometimes inaccurate and people mainly make illogical decisions. We are normally effective but are often deceived by our instant recipes emanating from evolutionary history. These errors run according to clear patterns.

Over the past three or four years a spate of books appeared on the market that try to elucidate the volatility of financial markets or to describe the behaviour of individual participants in the market in its widest sense.

The issues raised by these books would still be of importance even if we had not experienced the volatility that hit world markets in June 2007:

- Can we avoid bubbles in the market?
- How can we sell more successfully, and
- Buy more judiciously?

These three questions include the following considerations:

- Are financial markets efficient or irrational?
- How do people of flesh and blood make decisions?
- How do we persuade consumers?
- Who should we believe, the experts or statistics?

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- How should we make decisions – rationally, or should we trust instinct? When does which one help?
- Does irrational behaviour follow a pattern?
- How do we handle the phenomenon of randomness in our daily lives or in our business management?

Seldom over the past fifty year has so much attention been paid to understand the mind behind Adam Smith's invisible hand. A single book, that of Michael Schermer, even has the title: The mind of the market.

But here follows the paragraph from Adam Smith's Wealth of Nations, the only time that he used the term invisible hand in this book:

"Every individual is continually exerting himself to find the most advantageous employment for whatever capital he can command... He generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it. He intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. By pursuing his own interest he frequently promotes that of society more effectually than when he really intends to promote it." (Adam Smith, *The Wealth of Nations*, p.184, emphasis BdP).*

The following is simply a review of approximately 19 books published over the past three to four years. The list appears at the end of the article. I write as a mathematical layman who analyses the concepts after they have been filtered by the academic scientific and technical material and appeared in publications aimed at the intelligent and well-read, interested party. We look at books which describe the underlying ideas, rather than those giving some historical cause for the market bubbles and collapses.

We ask: What is the battlefield of ideas that crop up in these books?

ON THE BATTLEFIELD OF IDEAS

There are three conflicts in this battlefield of ideas:

1. Do prices in the (financial) markets fluctuate moderately or extravagantly?
2. How accurate are prices? Do prices accurately reflect the balance between supply and demand?
3. Does the 'market', i.e. the individuals that buy and sell, decide with their own interest at heart and being properly informed about what is to their benefit?

These three points obviously describe the core elements of the classically accepted economic theory that practically culminate in:

- Portfolio management calculations
- Calculations for capital expansion projects, and
- Predictions of consumer behaviour.

The conflicts regarding the three themes we point out above have obviously been raging considerably longer in the scientific and technical literature of economists and behaviour scientists.

THE THINKERS

The ideas of three figures are on the innovative side as opposed to the classical theory.

- Daniel Kahneman, winner of the Nobel Memorial Prize for Economics in 2002 (his collaborator Amos Tversky would undoubtedly have co-jointly won the prize if he did not die of cancer earlier on)
- Herbert Simon, winner of the Nobel Memorial Prize for Economics in 1978, and
- The mathematician Benoit Mandelbrot, previously on the staff of IBM's research institute, who discovered the fractal phenomenon in mathematics.

GROUPING OF THE BOOKS

The publications are easily grouped into a few families:

Extravagant price fluctuations in the financial markets appear more often than one would gather from

the classical theory, based on the so-called normal distribution curve graphic - "bell curve" – or Gauss' distribution). Benoit Mandelbrot already set out the theory in this regard in the early seventies of the previous century. It was, however, only when a dealer in the financial markets and autodidactic philosopher, Nassim Nicholas Taleb added his practical and philosophical insights to those of Mandelbrot, that the use of the bell curve (normal distribution curve) for describing the (financial) markets was widely discussed in public. Taleb's book The black swan closely followed his Fooled by randomness and offered a prophetic view before the crash in 2008 on what was wrong with the theories used for doing calculations to limit the risk on the financial markets. Taleb's book shows that, apart from the foolishness of sub-prime loans, the financial markets were in any case doomed to experience some or other crisis for which the markets were helplessly unprepared.

The market, or in any case the financial markets, do not fix prices efficiently. Apart from the famous investor, Warren Buffet, who made such remarks on occasion, the most well-known figure who held this point of view over many decades is George Soros, the man who on his own destroyed the Bank of England in the nineties of the former century. A mathematician plays the market by Paulos gives the technical counterproof for the efficient price theory by taking the concept to its logical absurd end.

Our behaviour is rife with follies. Numerous books on the follies of individual consumer behaviour are the result of Kahneman's ideas. Richard Thaler is one of Kahneman and Tversky's well-known and esteemed disciples.

Even though we do not necessarily think logically, intuition does in fact enable us to decide efficiently. Herbert Simon realised that we will always have too little information the moment we have to make urgent decisions. His ideas are propagated by Gerd Gigerenzer, head of the Max Planck Institute for Human Sciences in Berlin. He emphasises the power of intuition in our decision-making. Although we may not always reason things out logically, our intuition nevertheless offers us a short cut to be able to decide effectively.

The classical economic theory is right. We make reasonable decisions because we normally know what is in our own interest. The British economist, Tim Harford, the so-called "Undercover economist" and columnist for the influential Financial Times, is amongst those who defend the classical economic theory of the reasonable market participant in the most persuasive way.

No mind controls the invisible hand. The market has no "mind". The market is a product of evolution. Despite Michael Schermer's title in his book "The mind of the market," the point of his book is exactly that the market has no single-minded intelligence that steers the hand. Like biological evolution, the market is a "complex self-adaptive system (complex adaptive)." In plain language, the complexity of the natural world originates from simple efforts of individual organisms to try and survive (Schermer, p5). The market is exactly like a system where information is processed and individuals adapt to the new information. Simple forms become more complex. Things that work survive and those that cannot master the challenges disappear. Like a turbo engine the outputs in such systems become part of a new input, resulting in extraordinary spurts or crises that are out of proportion to the cause, for example a soft whisper in a microphone becomes a deafening whistle in the sound system if the signal reverberates. Beinhocker's Origin of wealth, evolution, complexity and the radical remaking of economics (2006) was the first comprehensive book that viewed economics in these widest perspectives. Niall Ferguson also concludes his book The ascent of money, a financial history of the world (2008) with this evolutionary context of financial markets.

A few books provide particularly interesting insights but are not directly involved in the fight against the classical economic market theories. The core idea of The wisdom of crowds is that the masses are more discerning than individuals. A single individual will have difficulty getting it exactly right if he has to guess the weight of the pig at the agricultural show, but if you get enough people to guess, the average of their guesses will be on target. Supercrunchers state that statistics predict more thoroughly (considerably more) than experts. For example, ask the top legal experts about freehold right in order to make a prediction of how the American High Court will decide about an expropriation case and their opinions will be diverse and unreliable. However, compile a simple formula (where did the judges study who will hear the case, where did they grow up, are they male or female, what are their ages, and which party do they vote for?), do the statistical calculations, and you get a much more reliable answer! The insights of both The wisdom of crowds and Supercrunchers are valid for the areas where the normal distribution curve applies. Freakonomics was a New York Times bestseller. Levitt does not openly sup-

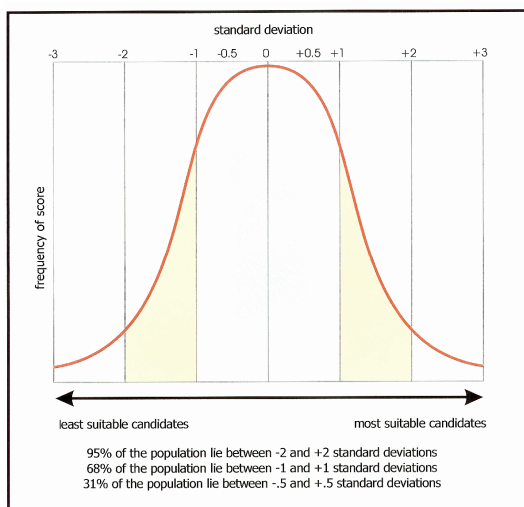
port the rational market theory but his essays in the book often show in a surprising manner how something that on the surface seems inexplicable is actually logically understandable if you dig deeply enough. Thus, for example, they can explain the peculiar phenomenon of why drug dealers in the USA mostly still stay at home with their mothers. The answer, drug dealers just do not make enough money to be able to live on their own.

Let us now look in more detail at the different view points.

FINANCIAL MARKETS REACT EXTRAVAGANTLY RATHER THAN MODERATELY

The classical economic theory accepts that price fluctuations are moderate and bundle around the average. As the economy grows, prices will move moderately upward. This phenomenon is often called the swaying walk of a drunken man: a bit to this side and a bit to that side, but he lands up at the lamp post quite voluntarily every time.

The graph that reflects this walk of prices is the so-called normal distribution curve, also called the Gaussian distribution or popularly the bell graph ("bell curve"). This graph looks as follows:



Approximately 68% of all price fluctuations will for example appear between minus one and plus one, and 95% between minus two and plus two. Nil represents the average. A human being of taller than 2.0 m will for example only appear at plus three or further and people shorter than 1,5 m will only appear at minus 4 or further.

According to Mandelbrot the picture looks as follows:



Book sales will for example be described by this picture, the graph of a so-called power law, not by the normal distribution curve. In 2006 only 96 out of the hundred thousand books published sold more than 250 000 copies (according to Taleb); the majority sold only hundreds or several thousands. Success is intended for the minority, there is no potbelly of average sales, only a long tail of more or less losers.

Mandelbrot formulated his insight that the financial markets look like a power law and not like the bell curve after

his investigation into cotton prices on the commodities exchange in Chicago: 'If cotton price-changes fit the standard theory, they would be like sand grains in a heap; somewhat different sizes, but all grains nonetheless. My cotton research showed something different. The changes were more like a mixture of sand, pebbles, rocks and boulders.' (Mandelbrot 2005: 168).

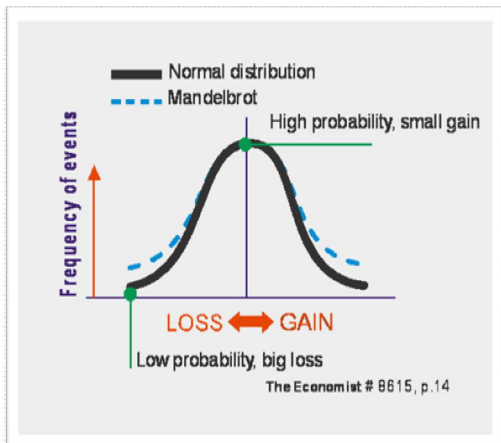
Taleb comments as follows after the drop in shares prices on Black Monday, 19 October 1987: 'If the world of finance were Gaussian, an episode such as the crash ... would take place every several billion life times of the universe.' (Taleb, 2007: 276).

Compare this to the following comment in the British magazine The Economist (#8615, p14): "When David Viniar, chief financial officer of Goldman Sachs, told the Financial Times in 2007 that the bank had seen '25 standard-deviation moves several days in a row, he was saying that the markets were in the extreme tail of their distribution. The centre of the models did not begin to predict that the tails would move so violently. He meant to show how unstable the markets were. But he also showed how wrong the models were."

Once again look at the picture of the bell graph above (Gaussian distribution, normal distribution curve).

What the author says in The Economist is that the market swayed 25 squares to this side and to that side of the nil line per day. *What are the chances?*

In the same issue of The Economist a picture appears that depicts the difference between Mandelbrot and the classical theory, the one's estimate of the probability that the exceptional will occur, versus that of the other. See the depiction below:



According to Mandelbrot's depiction the dotted line will merely take much longer to reach the basis line than the bold black line of the normal distribution curve (in reality none of the lines ever touch). It is in this gap between the dotted line and the bold black line that the whole sub-prime and bank crisis occurred. When the mathematical formulae that determine risk according to the normal distribution curve alleged that the improbable was improbable enough not to be taken account of, it was according to Mandelbrot's curve still completely within the reach of the probable event! From Mandelbrot's perspective we can once again look at our book sales example. It is very probable that as many as 96 books may sell more than 250 000 per annum, although we see masses of books that barely sell a thousand copies!

The normal distribution curve forms the basis of so much that is being done in economic and financial calculations. *The point is if Mandelbrot is right and the bell graph is not applicable to this end, everything is contaminated.*

There is a similar example from history, the representation of Ptolemaios, the antique astronomer who drew the sun in the middle of the universe with earth and the planets revolving around it. We know now that nothing is further from the truth, yet it applied for more than a thousand years. Amazing is the fact that this picture could predict the position of the planets and stars remarkably accurately. Like the advocates of the classical economic theory, Ptolemaios and his disciples noticed deviations (what else could be expected, seeing how far removed it was from reality!), but they always compensated for these deviations – anomalies – with complicated calculations.

Here follows Mandelbrot's summary of the economic world as seen from this power law:

- Market 'timing' matters greatly. Big gains and losses concentrate into small packages of time.
- Prices often leap, not glide. That adds to risk.
- Markets are inherently uncertain, and bubbles are inevitable (Mandelbrot 2005": 242).

AT LEAST THE FINANCIAL MARKETS DO NOT EFFECTIVELY DETERMINE PRICES

We will not spend much time on this column. The opinion is comprehensible without an explanation. Of the three themes I selected in the article, this one is in any event the one that probably does not understand the point of view of the classical theory. Suffice it to give the next two quotes.

This is the view of Warren Buffet: "... if you're still being taught efficient market theory, which was standard procedure 25 years ago but we've had a recent illustration of why the theory is misguided ... So wild things happen in the markets. And the markets have not gotten more rational over the years. They've become more followed. But when people panic, when fear takes over, or when greed takes over, people react just as rationally as they have in the past.' (From Newsweek, 3 May 2008: http://money.cnn.com/2008/04/11/news/newsmakers/varchaver_buffett.fortune/index.htm)

And George Soros, in an interview regarding his book The new paradigm for the financial markets: "I have developed an alternative paradigm that differs from the current one in two important respects. First, financial markets do not reflect the underlying conditions accurately. They provide a picture that is always biased or distorted in some way or another. Second, the distorted views held by market participants and expressed in market prices can, under certain circumstances, affect the so-called fundamentals that market prices are supposed to reflect. I call this two-way circular connection between market prices and the underlying reality "reflexivity". I contend that financial markets are always reflexive and on occasion they can veer quite far away from the so-called equilibrium. In other word, it is an inherent characteristic of financial markets that

they are prone to produce bubbles.' <http://www.ft.com/cms/s/0/164f00fo-b194-11dd-b97a-0000779fd:8c.html>

OUR BEHAVIOUR IN THE MARKET PLACE IS NOT RATIONAL BUT HAS AN ABUNDANCE OF FOLLIES

The research of Daniel Kahneman and Amos Tversky regarding decision-making provided experimental proof for the irrational behaviour of individuals in the market.

The arguments may be summarised as follows and underlie the work of Arley, Brafman and Thaler:

- The human brain is uncomfortable with abstractions, therefore also with figures and particularly mathematics. Even people working with figures and mathematics for the sake of their careers, have trouble thinking clearly the moment they have to apply abstractions to reality. The following experiment by Kahneman became notorious amongst MBAs: a ball and a bat together cost \$1.10. The bat costs one dollar less than the ball. What does the ball cost?
- Confronted by the possibility of loss, we expel logic. A possible profit must be double the threatening loss before we will run the risk of achieving the profit. Numerous examples exist of experiments Kahneman and his co-researchers did. The framework within which we do our observations is of crucial importance for our judgment of affairs. Many examples of these exist but the main categories are as follows:
 - The anchoring bias. The refusal to change an initial judgment (value attribution & diagnosis base).
 - The status quo bias (endowment bias).
 - The exceptional, but spectacular, is feared more than the ordinary, but often preventative (Bartman et al).

There are too many details to quote for our purpose, but the details are compulsory reading for marketers.

OBJECTIONS AGAINST KAHNEMAN'S APPROACH

The objections against the analyses of Kahneman and his disciples are twofold.

The first stems from the classical market theory as put forward by Harford

Harford points out that the Kahneman research was mainly based on laboratory experiments. He refers to experiments with the so-called "endowment" effect that you will cling to an investment you inherited whereas you would never have acquired it to begin with. "... the laboratory experiments created a bias towards irrational behaviour, they had to put ordinary people in extraordinary situations... by contrast, when you ask an ordinary person to make the kind of decisions he or she makes everyday, you will tend to see rational behaviour" (Harford: 200, 17, emphasis BdP).

Harford sticks to the rational market theory (2008: 12, 14): compare 'rational choice theory' to the round globe. The globe is not exactly round, he says, but for all practical purposes we act as though it is. Likewise we know that people are not always rational, but for all practical purposes, when we try to explain economic behaviour, we can accept that they are (does this not sound suspiciously like the same way in which the geocentric cosmic model was defended by the disciples of Ptolemaios?)

We unconsciously make decisions, but this is not as absurd as Kahneman and his disciples suggest

Herbert Simon (Nobel Memorial Prize for Economics, 1978) formulates the concept 'Bounded rationality', which means we are forced to make decisions with too little knowledge at our disposal, although usually effective.

His ideas are followed through by Gerd Gigerenzer (2007) who explains the recipe for decision-making with too little information and time as follows:

- Use a fast and frugal procedure ("fast and frugal")
- Choose the known before the unknown
- Decide on the basis of one important reason rather than a list of reasons.

Harford versus Gigerenzer

There is therefore a difference between logical, rational decisions and effective decisions. We can thus be effective without having calculated things point by point in a logical manner. This is the difference between Harford and his rational decision-making theory and Gigerenzer and his emphasis of intuition. Below follows an excellent example of how they differ:

Harford (2008, p.10): "I do not argue that we have the consciously calculating mind of a Spock. We do make complex calculations of costs and benefits when we act rationally, but we often do it unconsciously, just when someone throws a ball for us to catch, we aren't conscious of our brain solving differential equations to work out where it is going to land."

Gigerenzer (2007: 10-11): "... when the ball is already high up in the air... A player ... Does not need to measure the wind, air resistance, spin, or other causal variables. All the variables are contained in one variable, the angle of the gaze. Note that a player using the gaze heuristic is not able to compute the point at which the ball will land. Yet the heuristic leads the player to the landing point."

Gigerenzer quotes the well-known fact that Markowitz (Nobel Memorial Prize Winner for Economics for his theory and formula on portfolio management) did not use his own portfolio theory to manage the money for his retirement, but the I/N rule, namely simply divide your money proportionately between your assets (2007: 26-27). Gigerenzer refers to this approvingly.

But one of Kahneman's disciples, Thaler, sees the same issue as follows: Thaler on Markowitz (2008: 122-123): "Even the most sophisticated investors can sometimes find the decision about how to invest their own money daunting, and then they resort to simple rules of thumb... "I should have computed the historic covariances of the asset classes and drawn an efficient frontier..." "...Of course, an even split between the stocks and bonds is not a self-evidently dumb portfolio..." (emphasis BdP).

Gigerenzer continues by quoting an elaborate experiment where the I/N rule was tested: "Not a single one of the optimal theories could outperform the simple I/N rule" (Gigerenzer: 2007, 27).

CONCLUSIONS

- Price fluctuations in the financial markets are extravagant rather than moderate. Bubbles are part of the system and unavoidable. The normal distribution curve is not a true reflection of price fluctuations.
- All financial theories based on the normal distribution curve are contaminated.
- The market does not always fix prices efficiently. Smith's image of the invisible hand did not refer to the efficiency of price fixing but to the ability of the market to "frequently" – not always – promote the general interest of the community, although individuals only seek their own interests.
- The description of the market as a complex, self-regulating system means that small inputs can have consequences that are exceptionally large in relation to the input. That should make us so much more cautious of interfering with the market. Greed mixed with poor risk management causes losses of trillions of dollars, but interference with the market results in millions of deaths such as in China under Mao.
- We should not overestimate our abilities to control self-regulating systems; but we can influence them with caution.
- The individuals participating in the market or markets in the majority of cases do not behave like logically calculating people; they make decisions based on intuition, but the outcomes are usually effective (else there would be no people or economic growth today).
- We can decide effectively even if we have too little information at our disposal.
- When confronted with threatening losses, we expel logical, judicious thinking.
- The human brain feels uncomfortable with abstractions and mathematics. Even people who professionally earn their keep with mathematical calculations, easily make ill-founded errors when they have to apply these in practice.
- The more maths required for the processing of information the more unstable the market will be. If you buy coffee at Mug & Bean you only need to be able to count; if you own a Mug & Bean franchise

you need to be able to do accounting and if you want to trade in coffee contracts on the commodities exchange you need to be able to do maths. The latter will be much more unstable than the price of coffee at different coffee shops.

- The insights resulting from how we are influenced by instinct in our decision-making are of extreme importance for marketers and no marketer should attempt marketing without a detailed knowledge of these. The study of human behaviour was rewritten by the research of Kahneman and his disciples.
- The analyses of people like Harford, Levitt and others show how often logic is indeed hidden behind apparently bizarre examples of irrational behaviour in the market. As a practical point of departure we first need to look for the logical explanation based on individuals pursuing their own interests, before rejecting behaviour as irrational.
- Clear patterns appear in the irrational behaviour of the market. That means we can predict irrational behaviour.

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