

## **Book Review: *The (mis)Behavior of Markets***

**The (mis)Behavior of Markets: A Fractal View of Risk, Ruin and Reward.**  
Benoit Mandelbrot and Richard L. Hudson, Basic Books, New York, 2004.

Benoit Mandelbrot surprises us once again with a new fractal, his recent book “The (mis)Behavior of Markets”. Indeed, the contents of the book are themselves organized in a fractal way. While some ideas are repeated a number of times, such as, for example, the analysis of the evolution of cotton prices, others, particularly those whose genesis is not directly attributable to Mandelbrot, are hardly mentioned. Entries in the bibliography have the same characteristic. Mandelbrot’s works appear in abundance, while the rest of references are rather scarce. The fractal structure of the book, far from diminishing its quality, makes it both original and provocative, as is usually the case with the works of this versatile and unique scientist.

The book is divided in three great sections that, according to Mandelbrot, represent the past, the present and the future of our knowledge of the behavior of the financial markets.

The first five chapters describe the most accepted and rational approach to an understanding of financial markets evolution up to now: the efficient market hypothesis and its consequences. Everything began with Bachelier, as is described in Chapter 3, and his idea of how to cope with the daily variations of historical price series for financial instruments in a probabilistic way. He added two more plausible assumptions about price changes that allowed him to advance in the calculations: independence and Gaussian size distribution. In the fourth chapter, using the ideas of Markowitz, Sharpe, Black and Sholes, Mandelbrot synthesizes the trajectory from this beginning to the present situation of the theory that is most frequently used nowadays to quantitatively understand the evolution in time of the state of markets. However, modern finances are built on shifting ground. Reality, at least from Mandelbrot’s sharp perspective, is not strictly in accord with any of the hypotheses on which such a huge construction is based, as he explicitly discusses in chapter 5.

Once he finishes with the review of the past, we step into the universe of fractals, where turbulence and abnormality are the norm and not the exception. Chapter 7 is devoted to a very didactic introduction to the exciting world of

fractals. We then arrive at the origin of all Mandelbrot's insights in economic sciences: the evolution of cotton prices. As opposed to the Gaussian distribution for changes, power law decay distributions show up. The genius of Mandelbrot has created a club of scientists, who were misunderstood, not to say ignored, until the moment that their works fitted in with the new universe of fractal geometry. Bachelier belongs to this select group, as along with the hydrologist Hurst whose studies on the Nile floods guided Mandelbrot to understand the decisive role of correlation. With these two ingredients, long correlation (where before there was independence) and long tail distributions (where before there were fast Gaussian decays), Mandelbrot has generated models that evolve in time and whose behavior, at least graphically, reminds us of that of real markets.

The last two chapters outline the future. First, Mandelbrot emphasizes ten points that no theory on financial markets behavior should ignore but that can hardly be understood within the framework of the efficient market hypothesis. Nevertheless, most stock market investors would accept them completely. The last chapter shows some new research by Mandelbrot and other scientists that, as he sees it, are aimed in the right direction. Finally, as often occurs in Mandelbrot's books, we find a section of notes that contains short mathematical explanations and meticulous details on all texts cited by the author.

Throughout the book, Mandelbrot transmits the enormous dissatisfaction it causes him to see that the efficient market hypothesis continues to be a widely accepted theory. No matter how many facts confirm that the theory is far from accurate, tools derived from it are used every day in a myriad of transactions that represent millions of dollars. I would point to two explanations for the present situation. The first is that markets are a purely human creation and, therefore, an understanding of them, and even more a quantitative understanding, could be as difficult to attain as an understanding, for instance, of why war exists in our times. The second, more pragmatic explanation is that the financial industry does not base its main source of profits on its knowledge of the intrinsic evolution of markets but on the mere existence of the markets themselves and the commissions that the participation in such markets entails.

Financial journalist Richard L. Hudson coauthors the book. His contribution seems to have been definitive in creating the direct style of the text, in perfect harmony with the Mandelbrot's own, and in general in the fluency and richness of the language used. As a result, the book is extremely pleasant to read.

Thus, I highly recommend Mandelbrot and Hudson's book for the way in which it is written, the intellectual provocation that it represents and the fact that it is written by such a unique scientist. On finishing the book, one will not be left indifferent. One will either ride beside Mandelbrot in his crusade against

the present foundations of modern finances or join the list of scientists who are annoyed by his sharp point of view and prefer to ignore him.

Josep M. Porrà  
*Venca, CIFDSA*  
*Barcelona, Spain*