

Preface: Pursuit of Certainty is Vain and Risky

En hommage à Benoit Mandelbrot (1924–2010)

The standard approach of the efficient markets concept dangerously underestimates the risks in the financial system. The fall of Long-Term Capital Management (LTCM) in 1998 and the CDO market “domino effect” in 2008 are some of many examples of the disastrous effects of market risk underestimation. The problem with existing financial models is that mostly they are based on the conventional Brownian model wherein contradictory evidence is worked around rather than explained and built upon. The efficient market theory promised “expected” returns through simple risk assessment and it utilized profile models based on risk aversion—models that were adopted by financial markets, economics department, and business schools who taught this to students as the basis of modern portfolio theory (MPT). In the 1970 and 1980s, according to Professor B. Mandelbrot (1924–2010), this approach became

...the guiding principle for many of the standard tools of modern finance ... taught in business schools and shrink-wrapped into financial software packages... a house built on sand. (Mandelbrot, *The (Mis)Behaviour of Markets—A Fractal View of Risk, Ruin and Reward* 2008).

Professor B. Mandelbrot changed the way that we view the world by introducing the fractal geometry of nature. He gave us a tool to describe different systems with common characteristics. Between 1960 and 1965, Mandelbrot introduced into economics a special form of the notion of invariance that later became essential in physics and took the term “scaling.” In 1972, he introduced multifractals by replacing scaling by multiscaling. Throughout, he showed that scaling and multiscaling have many practical consequences. Applied to finance it allows us to understand market instability. Wild prices, fat tails (that is, heavy-tailed market distributions that exhibit extreme skewness or kurtosis), and the long-term memory effect, led Mandelbrot to view the financial series as a fractal series. Fractals have helped model the weather, measure online traffic, compress computer files, and analyze seismic tremors and the distributions of galaxies.

Mandelbrot's hope was to build a stronger financial industry by improving its systems of control and regulation. He developed a multifractal model with variable market times, exponential price distributions, and fractal generators. Some say that Mandelbrot described the financial system without explaining it, but can anyone elucidate it? He was a wise observer and had a special way of scrutinizing objects and nature. His hope was that people would accept the reality of risky markets and stop pretending otherwise... thinking in a fractal way in finance is about observing, analyzing, and trading opportunities arising from the markets anomalies!

By identifying markets' structures, what we essentially learn from Mandelbrot is that a measure of risk should take into account long-term price dependence and the tendency of bad news to arrive in waves. Our focus should not be on how to predict prices; but on how to foresee risks:

Opportunities are in small packages of time, large price changes tend to cluster and follow one another. If there was a large price change yesterday, then today is a risky day. (Mandelbrot, *The (Mis)Behaviour of Markets—A Fractal View of Risk, Ruin and Reward*, 2008).

This is a delicate statement, meaning that we may not be able to forecast market direction, but during its clustery periods we either exit the market and thereby reduce the chances of loss or trade its volatility.

The question he left unanswered is how to do this in practice and the aim of this book is to seek an answer to that question. The book seeks to guide financial practitioners through the fractal approach and to help them develop appropriate models for estimating risks. Each cycle, each market, each strategy and each underlying asset requires an appropriate dedicated model. Nothing can be generalized to an entire portfolio. To analyze a market's dissimilarities is difficult and tricky. Each field needs its own appropriate—in the zone—skilled person. Ultimately, the book is dedicated to all those who do not want to fall in the next financial crisis and to those who want to get to the next level to perceive opportunities in markets turbulences.

I hope that this book will allow readers to discern the fractal nature of the systems around us.

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