Book Review - The (MIS) Behaviour of Markets

Author - Benoit B. Mandelbrot and Richard L. Hudson
Reviewed By Avani Pramod*

In “The (Mis)Behavior of Markets”, authors Benoit Mandelbrot and Richard Hudson takes on classic financial theory in a very straight forward manner. He is extremely critical of the way economic theory has been developed and moved forward. He spends a fair amount of time explaining how the now classic theories of price movements came about. The author has pointed out the flaws in previous thinking and using scientific research and ideas grounded his theories.

The book explains the standard tools of financial theory and injects them with the insights of a man who uses simple explanations to dissolve the false assumptions that have caused many investors to underestimate the risks involved in the market. The book explains the application of fractal concepts to markets. The author shows that price fluctuations are not independent from one time period to the next, appear to be the same regardless of the time scale involved and do not obey a normal bell-like distribution, but instead follow a power-law distribution. The book is divided into 3 sections.

Part I talks about Risk, Ruin and Reward which explains how modern financial theory is founded on a few shaky myths that lead to underestimate the real risk of financial market. Markets are far riskier than we have wanted to believe. This part talks about revolutions of IBM's stock price and the Dow, to cotton trading and the dollar-Euro exchange rate by which author shows that the world of finance can be understood in more accurate and volatile terms than through theories.

The author has investigated the financial markets not as an economist or financier, but as a mathematical and experimental scientist. This book will help investors avoid losing as much money as they do, through unwise underestimation of the risk. The author asks us to play a game; out of 4 charts shown we need to select the ones that are real and the ones that are fake. The market behaviour can broadly boil down to five rules – markets are risky, trouble runs in streaks, markets have a personality, markets mislead and market time is relative.

This section also explains how the operations of mere chance can be used to study a financial market. Chance is important in finance. There is the mild form of chance described by the bell curve. On the other hand, there is probability distribution and financial theory follows the mild path. A key point in authors work is randomness has more than one state or form and each if allowed to play out on a financial market would have a radically different effect on the way prices behave.

The author describes the inadequacies of efficient market hypothesis, CAPM and other theories in finance. In modern financial theory, including the idea that risk is the same as statistical variance, which leads to the Sharpe ratio for evaluating an assets value, Black Scholes method for pricing options and modern portfolio theory by which a portfolio is designed around the appropriate level of risk for an individual investor. The math for doing this seems very sophisticated and variations on these approaches have served as the backbone for the financial industry. Authors try to pull down the house of modern finance starting with shaky assumptions such as people are rational and aim only to get rich, all investors are alike, price change is practically continuous and price changes follow a Brownian motion. He tries to disprove these assumptions.

Part II explains how financial markets are turbulent like the wind or the flood. The author explains that we should be thinking of fractals, when we look at stock charts and uses cartoons of stock charts to achieve that. He writes, "The tell-tale traces of turbulence are plainly there, in the price charts. It has the turbulent parts that scale up to echo the whole." The normal expectations of the bell curve do not capture its changes, and only the metaphor of turbulence can be used to describe it.

Fractal geometry deals with roughness. It introduces a measure called fractal dimension, which is similar to the normal dimension in geometry, but is not an integer. He defined "fractal dimension" which is an exact measure of

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the change in detail to the change in scale of a given object. Most financial data, such as stock price over time has a fractal dimension.

The first clue to the fractal view of finance came from a research project by Mandelbrot, when he worked at an IBM laboratory. He discovered a power law in the log returns of cotton prices. The second clue to fractal finance came from lifelong study of the Nile Rives by an English hydrologist H.E. Hurst. He faced the challenge of figuring out a pattern to the Nile River and discovered long term dependence in his data set.

Two critical features of financial markets are wild price swings and long-term dependence, which is described by the authors as the Noah Effect and the Joseph Effect. The author refers to characters in the Bible to describe different forms of wild variability. How these two effects interact in the markets are explained with the help of examples.

Some days are slow, some days just fly by. Apparently this applies to trading too and it is due to the multifractal nature of time. A multifractal object is an object where more than one "fractal dimension" variable is needed to describe the object. This includes magnetic fields, fluid dynamics and stock prices over time. The authors explain that multifractal equation for investment theory are unfortunately not fully articulated, there is no agreed upon formula that would apply to all markets.

Part III talks about the ten big errors in financial theory and program for future research. Prices Often Leap, Not Glide and that adds to the risk. In financial markets, news can compel many investors to act all at once, now and instantaneously. The book ends with notes containing formulas and bibliography listing scientific articles.

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