An Engine, Not a Camera: How Financial Models Shape Markets (Inside Technology)

Donald Mackenzie
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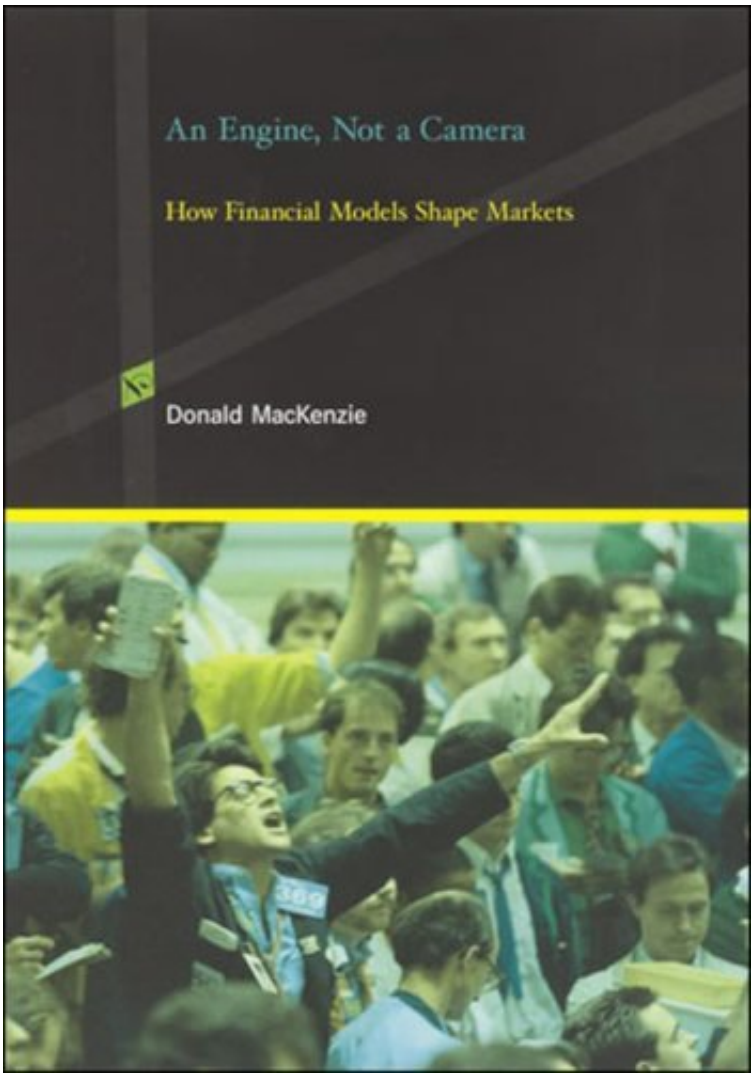

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Donald Mackenzie : An Engine, Not a Camera: How Financial Models Shape Markets (Inside Technology) before purchasing it in order to gage whether or not it would be worth my time, and all praised An Engine, Not a Camera: How Financial Models Shape Markets (Inside Technology):

37 of 37 people found the following review helpful. A plausible caseBy Dr. Lee D. CarlsonMany financial analysts and financial journalists have pointed to quantitative trading and the subprime mortgage markets as being the major cause behind the extreme volatility in the financial markets in the summer of 2007. This book therefore seems fitting for this particular time in financial history, if only at a bare minimum to educate the reader about the use of mathematical modeling in financial analysis and financial engineering. As the subtitle of the book indicates, the

author's main thesis is that the use of mathematical models can actually change the dynamics of the markets themselves, moving them possibly to territories even more uncertain that they were invented to describe. Quantitative trading, now done by most of the major players in the financial markets, is dependent of course on mathematical modeling, some of which uses highly sophisticated reasoning patterns and artificial intelligence. Most of these models are proprietary, and therefore one cannot ascertain their efficacy in the acquisition of wealth for the organizations that deploy them. However, with a little pertinacity one can acquire a good understanding of their workings by studying the academic literature.Some of the predominant models in the public domain are discussed in this book, mostly from an historical perspective but the author inserts some of the relevant mathematics in its appendices for the more mathematically sophisticated reader. In general the author makes a plausible case for his main thesis, but at times his conclusions are based on mere anecdotes, and he makes the typical mistake of imputing power and influence to individuals that is unsubstantiated. It is very tempting, especially among those individuals or institutions that are involved in trading, or even responsible for innovations in the same, to believe that they are the cause for some of volatility in the financial markets. But such claims, even if they seem reasonable or intuitively clear, must be substantiated with careful statistical analysis, which can be time-consuming and difficult, and few individuals it seems are willing to devote themselves to such a project. The author though is aware of this, for he states very early on in the book that historical sources may not be sufficient to allow one to decide if the influences are real. In addition, he cautions the reader to "look not just at what participants say and write but also at whether the processes in question involve procedures and material devices that incorporate economics."The author labels the idea that economics as an academic project is actually part of economic processes the `performativity of economics', which he further breaks down into subclasses that serve to clarify the distinctions he wishes to make. One of these is more of a passive notion, called "generic" performativity, which is used to describe the participant's use of economic theories or data without emphasizing their effects on economic processes. If such effects take place, this is called "effective" performativity, which is then specialized to "Barnesian" performativity. The latter is used to describe the situations where the practical use of economic theory makes economic processes resemble what they are described to be by economic theory. Barnesian performativity is to be contrasted with `counterperformativity' where the actual use of economic models makes economic processes not resemble their description by these models. The author discusses how to detect Barnesian performativity, but warns of the difficulty in proving that movements in prices are following certain model predictions.But aside from the qualitative/historical emphasis that the author makes in this book and the small number of unsubstantiated claims of model-market influence, the reader will take away a better understanding of such topics as the capital asset pricing model, the Black-Scholes-Merton model of option pricing, the Modigliani-Miller theory of capital structure, a description of Levy processes and their role in econometrics, and most interestingly, a different explanation for the demise of Long Term Capital Management. All of these topics, coupled with the intellectual honesty and literary skill of the author, make this book a highly interesting contribution to the financial literature.2 of 2 people found the following review helpful. THE PERENNIAL CRITICISMBy John Vos'[T]he belief that a theory can be tested by the realism of its assumptions independently of the accuracy of its predictions is widespread and the source of much of the perennial criticism of economic theory as unrealistic. Such criticism is largely irrelevant, and, in consequence, most attempts to reform economic theory that it has stimulated have been unsuccessful.'The quote above is from Milton Friedman's influential, if not uncontroversial, 1953 essay 'The Methodology of Positive Economics'. Friedman's essay is still topical today, perhaps even more than when it was first published 60 years ago. In recent years there's been a cottage industry of books attacking economists and quants in finance, accusing them of employing theories with suspicious assumptions, even to the point of suggesting that the supposedly 'false' theories (and their alleged proponents) are to be held responsible for the worst financial crisis in decades. At the root of that accusation lie a host of misconceptions, fallacies and popular myths surrounding financial theories, their use in universities or financial institutions, and the way financial markets operate.It takes very little knowledge or effort to spread around myths, especially ones that appeal to strong negative feelings about a particular group of people. It requires a tremendous amount of expertise, hard work and patience to unravel the facts and the fiction in a poisoned debate. Donald MacKenzie set himself a difficult task, but his 'An Engine, Not a Camera ndash; How Financial Models Shape Markets' is a remarkable achievement.MacKenzie interweaves two related narratives in his book: that of the emergence of modern economics and theoretical finance, characterized by an abstruse (to outsiders at least) mathematical formalism; and, on the other hand, that of the dramatic growth in both size and complexity of financial markets, in particular the derivatives market. In that respect he covers similar ground to Peter Bernstein's 'Capital Ideas' (MacKenzie acknowledges his 'great debt' to Bernstein in the first chapter). Unlike Bernstein, however, MacKenzie uses the historical accounts as an integral part of the argument for his unifying thesis, namely that financial models played a crucial role in molding financial markets into their current shape (Irsquo;ll come back to that in a moment).The book title 'An Engine, Not a Camera' is a direct reference to Milton Friedman's essay. As Friedman argued, the point of a model, whether in economics or another area of science, is not to serve as a camera representing reality up to its minute details. Rather, its purpose is to function as an engine ndash; a tool allowing us to make predictions, or to analyze reality. This grounding in its practical use is the very essence and raison d'ecirc;tre of any

model. Idealizations, also disparagingly referred to as 'false assumptions' (especially in economics), are an inevitable component of any model, not just in economics, but in any science - even physics (frictionless surfaces in physics are the counterpart to finance's frictionless markets ndash; my own example). Dismissing a model on the basis of the falsehood of one of its assumptions misses the point entirely. Besides, making assumptions does not involve any commitment on the part of the modeler as to its literal truth.One example to clarify. Black, Scholes and Merton (BSM) made a number of unrealistic assumptions in their option pricing model, for example that trading incurs no cost, or that stock price returns follow a normal distribution (chapter 5 in MacKenzie is a long discussion of the development of the BSM model and its ancestors; as well as its impact on option trading). The limitations of the model are widely recognized (and even pointed out by BSM themselves!), but that didn't stop the model from quickly gaining popularity. And it remains highly relevant till today. The assumptions can be relaxed, giving rise to extensions of the original model (e.g. options on dividend-bearing stocks). The normal distribution can be used as an ingredient of a distribution that contains fat tails; Merton's own jump-diffusion model (1976) for example, is a combination of the original BSM (diffusion) model with jumps as an extra ingredient. Jumps are a direct way to reflect discontinuous (suddenly falling) stock prices and the resulting fat-tailed distribution. After the 1987 Wall Street crash, markets found also a more roundabout way to have option prices reflect fat tails, namely through the volatility smile. The metaphor of a model as an engine is very apt in this context: the BSM model was never meant as a true description of reality; rather it's an engine of analysis, a way of getting a grip on the myriad market forces affecting asset prices. BSM taught us we neednrsquo;t know the expected return of the underlying stock in order to agree on a fair price. They taught us volatility is a much more important variable. They taught us the principle of risk-neutral valuation. These things remain valid in more advanced models. And as a very literal application of the lsquo;enginersquo; idea: option prices are usually quoted in lsquo;implied volatilityrsquo; by using the BSM formula inversely (i.e. inferring the volatility from the market price rather than plugging in the lsquo;realrsquo; volatility in the formula).MacKenzie takes Friedmanrsquo;s engine analogy one step further. Could it be, he asks, that financial models are more than just tools for the financial modeler? Could it be that they help shape the environment, which (in a narrow view) they are meant to describe? For example, could it be that the Efficient Market Hypothesis (chapters 2,3,4,9) not only inspired the invention of index tracking funds, but actually led to more efficient markets? Or, as an example of an opposite effect: could it be that the assumption of continuously moving stock prices made the markets more sensitive to discontinuities (remember 1987)?The strongest point about the book is that MacKenzie puts the models into perspective, adds the relevant context and supplies many details in order to avoid misinterpretations, of either the models, or the way they are used. In a lapse of sociological jargon, he calls this 'the material culture of modeling'. If you find that phrase puzzling, do as me and just read it as 'modeling in practise'. Practise in a very wide sense; from the models' historical development to their integration into the daily processes driving financial markets, to the fact that models must obey practical considerations (parameter estimation, tractability, availability of data, etc.) in addition to theoretical ones. It's precisely those details that are left out by the Talebs, Trianas and Salmons of pop-finance, and that make most of their criticisms totally irrelevant.MacKenzie never names Nassim Taleb(*), Pablo Triana or Felix Salmon, avoiding direct confrontation with the public heroes. He refers only obliquely to the nastiness of (for example) Taleb's diatribes as "the coarsening of the debate". His tone is dispassionate, yet engaging. I think there's a lot to be said for his sober and factual (even scholarly on occasions) writing style. It enhances his reputation as an author who has no interest in availing himself of dramatized factoids to sell a story. He understands that insults only diminish one's case. What matters in the end are hard facts and strong arguments, and there are plenty of them in this unique book. When I use the word 'unique' I mean it quite literally, for I'm not aware of any other book that matches its depth, rigor and persuasiveness. Even though there are some tedious fragments in the book, at no point did I get the feeling I was reading a textbook. Quite the contrary: his accounts of the October 1987 Wall Street crash (chapters 1 and 7) and the demise of the LTCM hedge fund (chapter 8) are lively and compelling.Another strong point, as just mentioned, is his rigor. For someone who's not a finance professor or professional quant, this is quite an impressive feat. MacKenzie appears completely at ease even on highly technical subjects (e.g. Leacute;vy distributions). In this book of nearly 300 pages, I couldnrsquo;t spot a single oversimplification or misunderstanding on his part, let alone glaring error. Better yet, I was familiar with the technical definition of a 'complete' market (a market in which you can always find a combination of trades to hedge your position), but I never understood why people call it 'complete' until I read MacKenzie's explanation (in a complete market the traded securities "span all possible outcomes").MacKenzie put a tremendous amount of effort into this book, and it shows. Much of it is based on personal interviews he had with the protagonists in the years 1999-2004. To some reviewers that's a weakness, because information provided by interviewees is less reliable, especially if it involves situations where their reputation is questioned. MacKenzie recognizes the disadvantages, however, thatrsquo;s why he 'cross-checked' interviews against one another. Secondly, many details can be easily checked by reading the literature. Thirdly, some accounts (e.g. of the LTCM debacle) were checked for their consistency with price movements in the market. And finally, MacKenzie maintains a healthy skepticism towards exculpatory claims that are difficult to verify.The rigor is also in the logic and lucidity of his arguments. MacKenzie considers alternative hypotheses, weighs the evidence of competing explanations (was the

LTCM debacle the result of a flight to quality, or of a 'Superportfolio' phenomenon?), and resists any temptation to draw premature conclusions. He presents his conclusions tentatively and never lets them surpass the evidence. Briefly, it's a book that reads like an (admittedly, sometimes difficult) novel, but which follows a high scientific standard, usually found only in top scientific papers. For the readers who like slogans: 'Genuine inquiry trumps pseudofinance' might be a good one in praise of this book.If therersquo;s going to be a new edition of this book, I hope MacKenzie adds an extra chapter on lsquo;The Formula That Is Said To Have Killed Wall Streetrsquo;. In fact, he already wrote it (with Taylor Spears as co-author): their 2012 article lsquo;The Gaussian Copula and the Material Cultures of Modellingrsquo; can be found on the web.(*) MacKenzie interviewed Nassim Taleb, and he quotes him in a neutral context, namely as an anecdote of a traderrsquo;s personal experiences of the 1987 crisis (chapter 7).15 of 15 people found the following review helpful. An Insightful Look into Finance's Twin RolesBy Craig L. HoweBoth the science and the art and practice of finance have experienced phenomenal growth since the 1970s.As a science, finance has evolved from a descriptive outpost on the economic frontiers to become of that discipline's central topics. During the same period, the financial markets changed from what often seems today like sleepy outposts of liquidity into dynamic centers for financial engineering. In the 1970s, the world was being introduced to commodity hedging and options trading. By the early part of the 21st century, derivatives contracts totaling more than $273 trillion were outstanding worldwide.Donald MacKenzie, a sociology professor at the University of Edinburgh, argues in An Engine, Not a Camera, the trends are connected. Paraphrasing Milton Friedman, he argues the emergence of economic models were an engine of inquiry rather than a camera to reproduce empirical facts. As the science of finance became authoritative, the markets were altered. These new, Nobel Prize-winning theories, elegant mathematical markets models, were more than external analyses. They evolved into intrinsic parts of the financial process.Beginning with a discussion of the work of Franco Modigliani and Merton Miller, the Capital Asset Pricing Model and Random Walk, MacKenzie takes the reader on a journey through the development of the Black-Scholes-Merton model, The Crash of 1987, Long-Term Capital Management and the Russian government's default in 1998 to bind the threads of his thesis.Detailed, astute, well-written, and with much of the technical detail relegated to the appendices, this book weaves economics, financial theory, economic sociology and science and technology studies into an essential read for anyone with a serious interest in the financial markets.

In An Engine, Not a Camera, Donald MacKenzie argues that the emergence of modern economic theories of finance affected financial markets in fundamental ways. These new, Nobel Prize-winning theories, based on elegant mathematical models of markets, were not simply external analyses but intrinsic parts of economic processes.Paraphrasing Milton Friedman, MacKenzie says that economic models are an engine of inquiry rather than a camera to reproduce empirical facts. More than that, the emergence of an authoritative theory of financial markets altered those markets fundamentally. For example, in 1970, there was almost no trading in financial derivatives such as "futures." By June of 2004, derivatives contracts totaling $273 trillion were outstanding worldwide. MacKenzie suggests that this growth could never have happened without the development of theories that gave derivatives legitimacy and explained their complexities.MacKenzie examines the role played by finance theory in the two most serious crises to hit the world's financial markets in recent years: the stock market crash of 1987 and the market turmoil that engulfed the hedge fund Long-Term Capital Management in 1998. He also looks at finance theory that is somewhat beyond the mainstream -- chaos theorist Benoit Mandelbrot's model of "wild" randomness. MacKenzie's pioneering work in the social studies of finance will interest anyone who wants to understand how America's financial markets have grown into their current form.

An Engine, Not a Camera provides an insightful appreciation of the ways in which financial models influence and shape the world they seek to understand. (Anthony Hopwood Times Higher Education Supplement)In one lifetime modern finance theory has revolutionized the arts of canny investing. MacKenzie knows this exciting story, and he tells it well. (Paul A. Samuelson, MIT, Nobel Laureate in Economic Sciences)Donald MacKenzie has long been one of the world's most brilliant social and historical analysts of science and technology. Here he provides an original, astute, and exhaustively researched account of the development of finance theory and the ways in which it is intertwined with financial markets. An Engine, Not a Camera is essential for anyone interested in markets and the forms of knowledge deployed in them. (Karin Knorr Cetina, University of Konstanz and The University of Chicago)A brilliant, extremely lucid account of the connections between financial economics and the development of futures, options, and derivatives markets between the 1950s and 2001. (Neil Fligstein American Journal of Sociology) An Engine, Not a Camera is a compelling, detailed, and elegantly written exploration of the conditions in which finance economists help to make the world they seek to describe and predict. Donald MacKenzie has long been without equal as a sociologist of how late modern futures are brought into being and made authoritative. This is his best work yet. (Steven Shapin, Franklin L. Ford Professor of the History of Science, Harvard University)About the AuthorDonald MacKenzie is Professor of Sociology (Personal Chair) at the University of Edinburgh. His books include Inventing Accuracy (1990), Knowing Machines (1996), and Mechanizing Proof (2001), all published by the MIT Press. Portions

of An Engine, Not a Camera won the Viviana A. Zelizer Prize in economic sociology from the American Sociological Association.