JOIM
www.joim.com

Journal Of Investment Management, Vol. 16, No. 4, (2018), pp. 94–95

BOOK REVIEW

Mark Kritzman, Senior Editor

The End of Theory

Richard Bookstaber
(*Reviewed by Savannah Smith*)

At first glance, *The End of Theory* gives the impression of being a rather disheartening tale.

Financial crises, the failure of economics, the "end of" something... these are not exactly "glass-half-full" topics. I was admittedly apprehensive and intimidated. That apprehension went away by the twelfth page, when I found myself smirking at a Mike Tyson reference in the middle of an eloquent history of how traditional financial theories have fallen short in crises. It is the little things.

Richard Bookstaber uses the first several chapters to prove that our current economic models fail us when the times get tough. He walks us through what he charmingly dubs "The Four Horsemen of the Econopalypse"—the four aspects of our financial system that make it too complicated to model. The Four Horsemen are: emergent phenomena, non-ergodicity, radical uncertainty, and computational irreducibility. In explaining each of these horsemen, Bookstaber cleverly draws from discoveries and challenges outside of economics to illustrate his point. For computational irreducibility, he begins with an obstacle first faced by cartographers, and later, by Isaac Newton. In his chapter on emergent phenomena, he compares financial crises to a panicked stampede. The chapter on ergodicity references *The Unbearable Lightness of Being* by Milan Kundera, a rude chatbot, and Mick Jagger. Bookstaber then calls upon The Beatles, a handful of European academics, and a hexagonal library to discuss the concept of radical uncertainty. Though the necessity of some of these references is debatable, the style in which Bookstaber builds to his proposed solution makes for a very engaging read.

The third and fourth sections of the book focus on agent-based solutions and the ways in which they can account for the complexity of our financial system. Though slightly less wrought with cultural anecdotes, I found the latter half of this book to be far more interesting than the former. Bookstaber begins by illustrating agent-based models using an example about rush hour, in which he sets the stage for the five components of an agent-based model: agents, environment, heuristics, interactions, and dynamics.

Bookstaber's argument is simple: in order to have a model that holds up during a crisis, you must first create a system that can understand crises. The rules for creating this system are as follows:

- No mathematical shortcuts
- Include the context and allow for heterogeneity
- Allow interaction
- The agents' actions must allow for heuristics
- The model must be constructed in a way that emergent phenomena are not smothered and can be observed

The difference between an agent-based model (ABM) and traditional economic methods are that ABMs account for the humanity in our economy and are built for complexity. In the closing chapters of this book, Bookstaber explores various economic crashes and how an agent-based approach could have provided a different outcome. He presents an insightful and convincing argument that reminds you of the reality of our financial system and the pain felt when the system fails us. By creating a system that accounts for humanity, that adapts during crisis, and builds on experience, Bookstaber reminds us of who we are as individuals in this system. We are complex, we are human, and therefore, imperfect. We adapt and we learn.