
BOOK REVIEW



Mark Kritzman, Senior Editor

**REVIEW – HEALTHCARE
FINANCE: MODERN
FINANCIAL ANALYSIS
FOR ACCELERATING
BIOMEDICAL
INNOVATION**

*Andrew W. Lo and
Shomesh E. Chaudhuri
(Reviewed by Piyush Kontu)*

As the world recovers from the COVID-19 pandemic, the importance of the healthcare industry cannot be overstated enough. The rapid development of testing kits and vaccinations from medicine experts served as a boon in these difficult times. As a finance professional, one might wonder about the potential role of financial analysis in supporting and enhancing the healthcare industry. Sure, financing is needed to grow any business, but is there an even greater opportunity to apply financial analysis in order to help advance medical science?

Financial experts Andrew Lo and Shomesh E. Chaudhuri explore this question in their recent book *Healthcare Finance*. In doing so, they illustrate how financial engineering can help create the next generation of healthcare technologies by reducing the cost of capital, bringing more lifesaving therapies to patients faster, and, reducing financial risks.

Consider, for example, the allergy medicine you took this morning or the smart watch which came in handy while exercising to measure your heart rate. The process to develop these drugs or devices might have begun decades ago with academic research, followed by animal and clinical human trials, regulatory approvals, manufacturing, distribution etc. The probability of success after such a lengthy process is fairly low and all investments entail significant risks.

Concepts in financial engineering, such as portfolio theory and securitization, can not only help manage these risks, but also lead to better financial decisions which in turn lead to more successful research outcomes.

Through their vast experience in the field of quantitative finance, the authors take us through a fascinating and informative journey by introducing intuitive examples to explain financial theories and later connect these to relevant examples in healthcare like that of drug development for ovarian cancer. The first few chapters begin by building on the convergence of finance and healthcare by providing a high level knowledge of the intricacies that go into working in the biotech or medicine industry. The next set of chapters build upon these examples and discuss the applications of various pricing theories across assets (bonds and

stocks), portfolio theory and simulation-based analysis to biomedical research. Moreover, the book mentions healthcare specific measures to be used in these tools, such as the Biomedical Research and Development Price Index (BRDPI) for inflation in medicinal research. The final chapters explore predictive healthcare analytics vis-à-vis estimation of clinical trial success rates and drug approvals through big data and analytics, machine learning, etc. Finally, the authors remain aware of the importance of morality and ethics in biopharma in ways that do not necessarily apply to the financial industry. They discuss many complex ethical issues to strike a balance between affordability and profitability resulting from pricing any drug development process. Thus, the book

provides a holistic overview to any reader standing at the intersection of healthcare and financial engineering.

As a finance professional, I gained new insights into the execution of binomial trees, Monte Carlo simulations and other widely used tools in quantitative finance to value biotech research. For example, we know that diversification forms the basis of portfolio theory, and the key to diversification is modelling pairwise correlation between assets. To this end, the authors, like many other topics, provide a specific method for estimating and simulating these correlations in the context of the biopharma industry. It's through details like these, that the authors paint a clearer picture of the immense influence of

the financial services industry on healthcare.

The authors describe their primary audience as "Students interested in pursuing a career in the healthcare industry". In my opinion, this book appeals to an even wider audience, including venture capitalists responsible for funding such startups and financial professionals who analyze this industry. The fast paced environment of the financial industry often leads into a tunnel vision of the applications of quantitative finance, and it's worth remembering that finance can be a means to an end, not the end unto itself, a message that "*Healthcare Finance: Modern Financial Analysis for Accelerating Biomedical Innovation*" perfectly captures.