Foundations for Scientific Investing:
Capital Markets Intuition and Critical Thinking Skills (7th Ed)
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I wrote this book because none of the 50+ investments books on my bookshelf met my needs in the undergraduate applied investments course I teach. My course is both a capstone course (i.e., bringing together and reinforcing core courses in finance, economics, accounting, statistics, algebra, calculus, and numerical methods), as well as being a required third-year applied investments course. So, I needed a book that combines these introductory elements, but at the same time, focuses on high-level practical applications. I could not find a suitable book, so, I ended up writing it.

About 10–20% of the book is too advanced for my **undergraduate** course. I exclude this material from my course, but I could easily include it in a taught **master's** course. Note also that the book can serve as a foundation for **PhD** students in finance who don't have a strong finance background (I cover the basics very clearly, I give plenty of advanced material, and I provide literature reviews on topics like the CAPM, price momentum, post-earnings announcement drift, etc.). It also provides basic material for advanced practitioners. So, there are multiple clienteles. There is also an accompanying Q&A book (ISBN 978-0-9941386-7-5) with 455 multiple-choice questions and 125 short-answer questions.

Here is a selection of some of the things that make my book different from other investments books.

THESIS TOPICS

1. Look up "thesis topic" in the index and it points you to 30+ research questions that could be a master's thesis or a chapter of a PhD. I plan to revise the book often enough to keep this list current. I think this provides a service that no other book provides.

FOUNDATIONS OF FINANCE

2. Section 2.14.9 is called "In Defense of Active Equity." I have not found any other book that gives multiple practical examples to show why you should invest in actively managed funds even if you expect the fund manager to underperform the benchmark and charge high fees. I also discuss practitioner arguments for investing in active funds that are typically different from anything an academic could say.

3. Section 2.3.8 is called "16 Facts about the P/E Ratio." I was surprised at how difficult it was to collect these facts together. Some of it is derived from first principles. It is basic material that every finance student or practitioner needs to know, but I have never seen it all in one place before, and some of it I have never seen before at all.

4. Figures 4.6, 4.7, and 4.8 show long histories of performance of stocks and bonds (121 years for stocks and 228 years for bonds). I had not seen the log plot in Figure 4.7 before and it contrasts strikingly with the raw plot in Figure 4.6. Also, I had no idea that there were such long-term trends in long-term interest rates before seeing Figure 4.8. It is difficult to look at Figure 4.8 and predict anything other than a 20-year secular rise in interest rates starting soon.

5. I give a practical discussion of personal FX transactions in "Moving an FX Elephant" in Chapter 2. I compare relatively unregulated FX transactions to relatively regulated stock market transactions. I show how to save as much as $10,000 on your FX transaction when moving house and country. I have never seen this discussed in any finance text, and it is much appreciated by students.

6. My discussion of ETFs in Section 4.1.1 goes well beyond what I normally see in any text book. I try to fill in a number of significant gaps in intuition I see elsewhere without getting bogged down in too much institutional detail.

7. I give a discussion of factor-based investing that ties it to passive investing on the one hand and to a defense of the CAPM on the other. This theme appears in several places including point #5 in Section 2.14.9 and when discussing smart-beta strategies in Section 4.2.10.

8. In Long-Short Quant Quiz #1 (one of 50+ quantitative quizzes in the book), I discuss a simple long-short investment and its characteristics. This simple, but rich, example is very much appreciated by students. I discuss long-short margining, risk, and return, and I compare the results with the results from a long-only investment.

9. I like the "Be the Coin" classroom experiment in Section 1.18 because it allows me to extract information about perceptions of randomness from students' brains and to then contrast it with the underlying statistical theory. This has direct implications for behavioral biases and momentum trading.

10. To write Section 2.9 on retirement, I collected practitioner and academic retirement-related information over 20 years. Students really appreciate it—especially the survey results and discussion of their implications. I have not seen this material in any other investments text.

11. My discussion of the efficient markets hypothesis in Section 3.3 is a realistic and practical take on the EMH. I discuss transaction costs, risk aversion, and taxes, and how they interact with the EMH. I think that this topic is often confused and confusing in other investments texts.

12. Figures 4.1, 4.2, 4.3 and 4.4 on investment companies and on the distribution of global managed money AUM present the big picture in an easily digested way. I

distinguish between mutual funds, ETFs, CEFs and UITs, and discuss their AUM. I discuss active AUM versus passive AUM, and trends. I cobbled this information together from more than a dozen sources and made some estimates.

13. Section 4.3.1 is called "Who Controls the Prices?" It discusses price making and trading in a practical way I have not seen elsewhere.

STATISTICS

14. The constructive intuition for Z, chi-square, F, and t random variables in Section 1.3.8 is much appreciated by students. I link the notion of sample data collection to the underlying definitions of these random variables and then I link both of these notions to the choice of and execution of specific statistical tests.

15. Building upon the previous point, Section 1.3.16 shows how to build a t-stat for the mean. It goes back to first principals and uses 100+ years of statistics research to help students to understand what they are doing when they run a t-test of the mean.

16. My students are always surprised by the three correlation examples in Section 1.3.13. I use them to demonstrate that 99% of students do not understand what correlation is. Then, I present simple economic arguments/intuition for what the correlation is and should be between common economic variables like stock prices and returns.

17. The discussion of time series predictability and skewness of returns in Sections 3.2.2 and 3.2.3 overturns several older results. There is material for several master's theses or a PhD hiding in there.

18. At a medium-high level, the discussion of kurtosis (section 1.3.12) rebuts some recent research in the area and gets to the root of what kurtosis is.

19. At a medium-high level, the discussion of a new conditional heteroskedasticity (CH) model in Section 3.2.1 is something I have never seen before. I like the discussion of joint, marginal, and conditional distributions. It is a bridge between casual discussion of these notions in some introductory statistics course, and applications of applied ARCH/GARCH models in the real world. I have not seen this bridging example given anywhere else before I built it.

20. At a higher level still, the discussion of degrees of freedom in Section 1.3.21 brings together eight competing definitions of degrees of freedom. This section was added in response to repeated questions from students about degrees of freedom, typically received after discussing chi-square, t, and F tests. Unfortunately, this material requires at least master's-level mathematics, and so it is too advanced to be examinable in my course.

TIME VALUE OF MONEY

21. The use of TVM to extract BEARs and PEARs (benefit- and payment-adjusted EARs, respectively) in Sections 2.4 and 2.5 shows students how to push TVM math beyond the basic FINC101-type course and get something with real implications for how to should think about matches in an investment product or fees in a financing contract. I have not seen this material anywhere else. Other advanced TVM topics are also presented.

APPLIED ACTIVE INVESTMENT TOPICS

22. I guide the reader through a Grinold-Kahn type active alpha optimization in EXCEL (Exercise B.2.2-B.2.6). The Web site has several accompanying EXCEL sheets. Grinold and Kahn's well-known practitioner book has been criticized for not having worked examples. Here it is in an easy-to-understand EXCEL implementation. You can vary constraints on turnover, on size of active positions, on portfolio beta, on short selling, on transaction costs, etc., and see the effect on the portfolio risk and return, etc.

23. The comparison of Black-Litterman (BL) and Grinold-Kahn (GK) approaches in Section 2.7.13 is new. Discussion of BL seems to be somewhat confused in the literature, and I have not seen this careful BL derivation, BL explanation, or comparison with GK anywhere else.

24. Figures 3.7 and 3.8 revisit one chapter of my PhD thesis 20 years later. The change over time in the shape of the cross-sectional distribution of first-order auto-correlation of daily returns to stocks is striking. I have never seen this illustrated anywhere else. I think decimal pricing and electronic trading explain much of this.

25. My discussion of "What is the correlation between the returns to stocks and bonds?" in Section 4.1.9 proposes an economic equilibrium argument for why we should not know the answer to this question. This argument is couched in terms of a two-fund separation argument that is repeated as a theme throughout the book.

PURE MATH

26. I give a simple intuitive discussion of differentiation and a simple intuitive discussion of integration in Sections 1.2.4 and 1.3.6, respectively. My students go from not understanding differentiation and integration beyond mechanical implementation to understanding them at a deep level within one hour for each of them.

LIERATURE REVIEWS

27. At the end of Chapter 3, there are summaries of the price momentum and earnings momentum literature, and discussions of Fama-MacBeth and Black-Jensen-Scholes, and the Fama-French research. Sure enough you can find this elsewhere, but I took great care in making my explanations very clear and pointing out why the latter papers say nothing against the CAPM. I appeal to the often-overlooked Ferguson-Shockley JF 2003 errors-in-variables argument.

NEW ZEALAND THEMES

28. Although the book is mostly US-focused, I also give a half-dozen NZ-based examples that involve unique elements of the NZ markets, making it suitable for an advanced NZ audience. These include short selling in NZ, off-market trading in NZ, the operation of the centralized limit order book (CLOB) on the NZX, dividend imputation in NZ, KiwiSaver examples, taxation of interest and dividends in NZ, etc. This is not a US book that have been written for the US market and then tweaked for the Australasian market. Rather, it is a US-focused book that also caters to NZ themes.

OTHER ASPECTS OF THE BOOK

- I pay particular attention to transaction costs ("T-costs") throughout the book.
- Dividends are discussed carefully throughout the book.
- Short selling is discussed carefully throughout the book.
- Mean blur (i.e., the fact that mean returns in finance are small relative to standard deviation of returns) is discussed repeatedly throughout the book in multiple contexts.
- My discussion of the Roll critique goes well beyond its normal presentation with a high-level algebraic discussion of extensions and limitations.
- I discuss Warren Buffett's investing style and I compare and contrast his investing style with that of his mentor Benjamin Graham. There is also a Bloomberg professional service (i.e., Bloomberg terminal) exercise implementing Graham's equity screens (Question B.3.1), but you need Graham's *The Intelligent Investor* beside you to execute it using the Bloomberg Professional Service.
- There is an accompanying Q&A book with 455 multiple-choice and 125 short-answer questions (and answers). This book can stand alone as a test bank or accompany the text. It includes Bloomberg Professional Service screen printouts, etc.
- I give an extensive list of references (more than 830 items) to both academic and practitioner literature.
- I give an extensive index (more than 7,000 entries on over 4,000 lines).

TFC
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