Book Review

The Capital Asset Pricing Model in the 21st Century
Haim Levy

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November 2012

The Capital Asset Pricing Model in the 21st Century,
By Haim Levy, Cambridge University Press (2011),
Paperback/Hardcover. ISBN: 978-11-7006713

Professor Levy presents and analyzes the relationships of two of the major pillars of classical finance – Markowitz mean-variance (MV) portfolio efficiency and the Sharpe-Lintner Capital Asset Pricing Model (CAPM) – relative to the two major behavioral decision theoretic frameworks – von Neuman-Morgenstern expected utility theory (EUT) and Tversky-Kahneman prospect theory (PT) and cumulative prospect theory (CPT). While the author notes all have been the subject of severe critiques, he proposes a framework for synthesis. In particular, the author proposes to show that both CPT and EUT can be considered consistent with MV and CAPM. While "normality" and "ex ante" parameters are required the author argues they are "weak" assumptions.

Prof. Levy is a master financial theoretician. As in much of his earlier work, the effort to show consistency of financial theory with paradigms of behavioral decision making under uncertainty is of significant importance. Chapters one through eight provide a well-informed and elegant though possibly familiar summary of many issues in classical finance. However, chapters nine and ten are of notable interest. In these, the author provides an insightful and wide ranging analysis of advances in the behavioral paradigms EUT and PT and its variations. Explanations of the importance of decision weights (DW) for avoiding Allais EUT contradictions and their implications in Quiggins Rank-Dependent Expected Utility (RDEU) axioms and CPT are likely to reward many readers with interest in such foundational matters. Chapter eleven provides a clever summary and synthesis.

Of moderate concern are some limitations of EUT analysis relative to PT and CPT. Prof. Levy seems somewhat dismissive of the benefits of an axiomatic (RDEU) versus purely descriptive (PT and CPT) behavioral framework for decision making under uncertainty. Also, the author appears unaware of the Luce (1999) axiomatizations that avoid Allais EUT inconsistency and do not have the gain and loss limitation that concerns Levy about RDEU. Of more serious concern about this unique text is the lack of theoretical or practical critique of MV and CAPM. Decision theory consistency may have minimal interest if relative to frameworks with limited or vacuous financial value.

A notable absence in the text is discussion of the Markowitz (2005) CAPM critiques and the importance of inequality constraints in classical financial theory. Markowitz shows that the "market" can't be MV efficient under general realistic conditions indicating fundamental limitations of CAPM theory and applications. In addition there is not a single word on the transcendent implications of estimation error for theory as well as practice. Consider that the derivation of the CAPM presumes unconstrained MV optimization (as Levy does in much of the text). Yet more than thirty years ago, Jobson and Korkie (1980, 1981) demonstrate that unconstrained MV optimization is inherently ambiguous, unstable, and inferior to equal weighting. The instability and ambiguity of the unconstrained MV optimization theoretical framework required for analytical results raises critical issues on the viability of the CAPM.

As a noted theoretician, perhaps indulgence is in order relative to assertions of the importance of rationalizing MV and CAPM for investment practice. It is certainly true that practice includes running MV optimizations and computing alphas and betas. But the reality is far from straightforward use or application. Issues of the limitations of MV and CAPM in applications are nothing new and unrelated to consistency with EUT, PT, or CPT.

There is a vast literature critical of CAPM measures of performance or risk. Commercial risk models contain many non-CAPM factors and reflect a variety of econometric estimation methods. Departments staffed with analytically sophisticated investment professionals devoted to risk management attest to the fragility and complexity of risk estimation and performance measurement.

Moreover, investment technology of all kinds, including MV optimization and many variations, is highly suspect. Numerous examples of overnight losses of billions of dollars in managed assets (having nothing to do with derivative mismanagement) indicate pervasive flaws in many aspects of modern investment technology. In addition, for more than twenty years, practitioners have been warned of the limitations of MV analysis for practical asset management (Michaud 1989). MV optimization in practice typically consists of extensive ad hoc overrides that typically have more to do with marketing than investment management. Estimation error endemic in financial information points to a profound inadequacy of traditional MV optimization and many related optimization algorithms in actual practice (Michaud and Michaud 2008).

Prof. Levy largely succeeds in bridging the theoretical gap between classical finance and behavioral theories within the context of his assumptions. Chapters nine, ten, and eleven deserve particular praise. However, he does not address many of the substantive limitations of MV and CAPM for practical application. For this reviewer, the book represents yet another notable example of the enormous chasm that continues to plague academic teaching relative to actual institutional investment practice.

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