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Lecture 1: Constant Proportion Debt Obligations, Zeno's Paradox, and the Spectacular Financial Crisis of 2008--2018

Abstract: We analyze a coin-tossing model used to justify the sale of constant proportion debt obligations (CPDOs) and prove that it was impossible for CPDOs to achieve the Cash-In Event. In the best-case scenario in which the coin is two-headed, we show that the goal of attaining the Cash-In Event in a finite lifetime is precisely the goal, described more than two thousand years ago in Zeno's Paradox of the Dichotomy, of evaluating the sum of an infinite geometric series with only a finite number of terms. In the case of a fair coin, we show that a CPDO player operating on 9X margin (and hence subject to margin calls) has, approximately, an 89% chance of bankruptcy; moreover, even if the margin broker is infinitely wealthy and infinitely patient, his CPDO customers who lose on the first or any given toss are doomed, with high probability, to suffer losses for hundreds of successive tosses.
In light of these results, we are dismayed by many of the mathematical models propagated over the past decade by financial ``engineers" and ``experts" in structured finance, and it heightens our fears about the durability of the on-going worldwide financial crisis.

Lecture 2: Return Optimization Securities, and Other Remarkable Structured Investment Vehicles

Abstract: We analyze the mathematical foundations of three types of structured investment products: return optimization securities, yield magnet notes, and reverse exchangeable notes. On the basis of the mathematical structure, we infer that these products will provide positive returns to a purchaser only if the stock market continues on a substantial upward climb for most or all of the holding period. In particular, the purchaser runs high risk of moderate-to-large risk of high losses of principal even if the stock market remains relatively flat for protracted periods of time. We conclude that such structured investment products are unsuitable for typical unsophisticated retail "investors".

Lecture 3: Models for Real-World Investors, and the Abyss Between Value Investing and Financial Engineering, I

Abstract: At a time like the present, when banks worldwide have declared collective losses in the trillions of dollars, financial markets on most continents have seen high volatility, and even major central bankers have shown signs of panic, it is appropriate to consider the difficulties faced by investors. But what is an "investor"? What is a "speculator"? We argue that not many people appear to know the meaning of, or the difference between, these terms. To answer those questions, we review some of the history of value investing. In particular we shall review the life and work of Benjamin Graham, the Father of Value Investing and Security Analysis, and we shall pay close attention to his definition of the terms "investor" and "speculator".

Lecture 4: Models for Real-World Investors, and the Abyss Between Value Investing and Financial Engineering, II

Abstract: In reviewing the development of mathematical models for financial assets, we compare the empirical results of these models with the results obtained by students and acolytes of Benjamin Graham. In so doing, we argue that there exists a fundamental abyss between value investing and so-called "financial engineering." We examine a sample of research articles in the field of financial engineering and point to fundamental disparities between the real world, on the one hand, and the hypotheses and assumptions underlying the theorems in these articles, on the other. We conclude that the abyss between value investing and financial engineering will be difficult to bridge, in which case the consequences for the pension funds of real-world investors, like me, are startling.