

# Stochastic Control and Behavioral Theory in Financial Asset Allocation

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## Abstract

The classical expected utility maximization theory for financial asset allocation is premised on the assumption that human beings when facing risk make rational choices. In the dynamic situation the asset allocation can be formulated as a stochastic control problem solvable by the dynamic programming approach. Yet, the theory has been challenged by many observed and repeatable empirical patterns as well as a number of famous paradoxes and puzzles. The prospect theory in behavioral finance use cognitive psychological techniques to incorporate anomalies in human judgement into economic decision making. This lecture reviews the history of the stochastic control and prospect theory applied to financial investment problems, and explains the interplay between risk and human judgement, and its impact on dynamic asset allocation.



**Prof. Xunyu Zhou** is the Nomura Professor of Mathematical Finance at the Mathematical Institute, University of Oxford. Before he joined Oxford he was a Chair Professor of Systems Engineering and Engineering Management at the Chinese University of Hong Kong. He received his BSc and PhD degrees from Fudan University (1984, 1989) and worked in Kobe University and University of Toronto. His research areas include Financial Engineering, Manufacturing Systems, and Stochastic Control Theory and Applications. He has published 1 book ("Stochastic Controls: Hamiltonian Systems and HJB Equations", co-authored with J. Yong and published by Springer in 1999), and over 80 papers in some of the best journals in the areas. He is a Fellow of IEEE, a recipient of the SIAM Outstanding Paper Prize in 2003, and an awardee of the Croucher Senior Research Fellowship 2005-2006. He is or was on the editorial board of "Mathematical Finance", "Operations Research", and "IEEE Transactions on Automatic Control". He has been invited to give keynote/plenary speeches in numerous international conferences, and has visited and given seminars at universities around the world.