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Goal-based portfolio choice model with discounted preference

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Abstract

This paper proposes goal-based portfolio selection model with discounted preference. Firstly, we discuss the goal-based portfolio selection problem and then modify the portfolio selection model based on cumulative prospect theory (CPT) as well as considering investors' discounted preference in psychology. Furthermore, our proposed model is solved by martingale methods and an analytical solution with satisfying behavior is derived. Finally, we select six different discounting functions to capture investors' strategic changes. Numerical results show that investor with future bias performs adequate confidence and patience whereas investor with present bias tends to the immediate interests.

Keywords: goal-based portfolio choice; discounted preference; martingale methods; cumulative prospect theory; satisfying behavior.

2010 MSC: 00-01, 99-00

1. Introduction

Portfolio theory has become highly developed and has strong theoretical support, making it essential in economics and finance. Markowitz [1] is considered the original work of portfolio theory, later, many researchers modify and develop this theory and made great advancement in this field [2–9]. Behavioral portfolio theory (BPT) is an increasingly developing branch of portfolio theory, which is goal-based theory introduced by Shefrin and Statman [10]. Tversky and Kahneman [11] propose cumulative prospect theory(CPT), which makes a solid foundation for BPT's development.

There has been a growing research interest in incorporating CPT into portfolio selection. However, previous studies overwhelmingly limited to the single-period setting with emphases on qualitative properties and empirical experiments [12–15]. Analytical research on dynamic, especially continuous-time, asset allocation featuring behavioral criteria is few. As far as we know, the literature which based on prospect theory as well as continuous time setting is

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