

On the Role of the Growth Optimal Portfolio

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The paper discusses various roles that the growth optimal portfolio (GOP) plays in finance, see [1], [2]. For the case of a continuous market we show how the GOP can be interpreted as a fundamental building block in financial market modeling, portfolio optimization, contingent claim pricing and risk measurement. On the basis of a portfolio selection theorem, optimal portfolios are derived. These allocate funds into the GOP and the savings account. A risk aversion coefficient is introduced, controlling the amount invested in the savings account, which allows to characterize portfolio strategies that maximize expected utilities. Natural conditions are formulated under which the GOP appears as the market portfolio. A derivation of the intertemporal capital asset pricing model is given without relying on Markovianity, equilibrium arguments or utility functions. Fair contingent claim pricing, with the GOP as numeraire portfolio, is shown to generalize risk neutral and actuarial pricing. Finally, the GOP is described in various ways as the best performing portfolio.

1. PLATEN, E. (2002). Arbitrage in continuous complete markets, *Advances in Applied Probability* **34**(3), 540-558.
2. PLATEN, E. (2005). On the role of the growth optimal portfolio in finance. University of Technology, Sydney. QFRC Research Paper 144, to appear in *Australian Economics*.