

DYNAMICAL MODEL IN DISCRETE TIME FOR THE EVOLUTION AND THE EFFICIENCY OF A PORTFOLIO

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The paper emphasizes a mathematical dynamical model applied to the study of a financial market in discrete time. It continues the study of economic strategies presented in [4], where the model was used for the technical evaluation of some options of European type. Other studies concerning the evolution of portfolios are presented, for example, in [1]. A thoroughgoing study for controlled linear systems is presented in [2]. The results in this paper synthesize, but from a different approach, some results obtained in [3] for the optimization problem. We study the cases of a portfolio consisting of two financial assets as well as of $n+1$ financial asset, without risk and risky. An optimal level of consumption is established and the dynamics of a portfolio is discussed, for various utility functions.

Let us consider a finite probability space denoted (Ω, F, P) , where F is the family of all subsets of the finite nonempty set Ω , and $P(\{\omega\}) > 0$ for all $\omega \in \Omega$. Let us consider the filter $(F_t)_{t \in \{0, \dots, T\}}$, $T > 0$, which is a σ -algebra that represents the information available at the moment t . T denotes the maturity moment of the assets. The financial market consists of $n+1$ financial assets, of which one without risk and n risky, with the prices at moment t expressed by means of nonnegative stochastic variables F_t -measurable.

We will consider a dynamical model of savings and optimal investments and an investor that searches solution for the optimization problem concerning the optimal consumption $\{c_t\}$, $t \in \{0, 1, \dots, T\}$.

The investor has the possibility to choose between two types of portfolio: one with equal value of the financial assets and another with a minimum variance of returns or of wealth. Also, it is useful to compare the optimal consumption in the stochastic case and in the deterministic case, which is not able to predict the level of wealth or consumption. According to all the possible investments politics, it is the investor that has the final decision regarding the structure of the portfolio, in order to maximize his wealth.

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