

PROJECT EVALUATION UNDER UNCERTAINTY: FROM MINIMAL MARTINGALE MEASURES TO IMPLEMENTATION.

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Abstract

Industrial strategic decisions have evolved tremendously in the last decades towards a higher degree of quantitative analysis. Such decisions require taking into account a large number of uncertain variables and volatile scenarios, much like financial market investments. Furthermore, they can be evaluated by comparing to portfolios of investments in financial assets such as in stocks, derivatives and commodity futures. This revolution led to the development of a new field of managerial science known as Real Options.

The use of Real Option techniques incorporates also the value of flexibility and gives a broader view of many business decisions that brings in techniques from quantitative finance and risk management. Such techniques are now part of the decision making process of many corporations and require a substantial amount of mathematical background. Yet, there has been substantial debate concerning the use of risk neutral pricing and hedging arguments to the context of project evaluation.

In the first part of this presentation, we present some joint work with E. Brigatti (UFRJ), F. Macias (BTG-Pactual), M. O. Souza (UFF), where we discuss some alternatives to risk neutral pricing that could be suitable to evaluation of projects in a realistic context with special attention to projects dependent on commodities and non-hedgeable uncertainties. More precisely, we make use of a variant of the hedged Monte-Carlo method of Potters, Bouchaud and Sestovic to tackle strategic decisions.

This leads to interesting numerical analysis questions which are currently under investigation in joint work with E. Gobet and G. Liu (Polytechnique).