Optimal long-term management of a P&C insurance portfolio with endogenous risk control

ABSTRACT

We consider a 10 year nonlinear multistage stochastic program for a portfolio manager facing stochastic liabilities from the property and casualty business and risk capital constraints compliant with an evolving regulatory framework (e.g. Solvency II). The investment universe includes liquid (Treasuries on different maturity buckets, corporates, equity, indirect real estate) and illiquid (private equity, renewables, direct real estate, infrastructures) asset classes.

The optimization problem is formulated as an expected risk-adjusted portfolio return maximization with penalties associated with time-dependent exogenous goals set by the company. The ALM model captures the key elements of a real-world development and the risk capital constraints are studied under alternative assumptions on the risk factors correlation matrix.

Numerical results are presented for different specifications of the dynamic optimization problem and under alternative convex combinations of the return goals over the long term horizon with non-homogeneous decision stages.

References

GC, 08/12/2013
Title: Systemic risk and contagion models

Dr. Gianluca Farina

Abstract:
Due to the recent financial crisis, a lot of attention has been posed on the question of measuring systemic risk in banking networks. In the first part of the talk I will provide a quick review of the measures that have been proposed so far with a special focus on the ones based on the multivariate default distribution as constructed via the CIMDO framework, a well established methodology used by financial regulators worldwide. In the second part of the talk we will deal with the modelling assumptions underlying some of the measures introduced earlier. In particular we will focus on contagion models and show an original approach for dealing with heterogeneous portfolios. A new measure of systemic risk in the context of contagion models is finally presented.

Main references:

CIMDO methodology

Contagion models
We compute the optimal portfolio for an agent who maximises the expected utility of wealth at his death time. This problem is equivalent to the optimization of the expected intertemporal utility of agent's wealth. We take into account a stochastic force of mortality, which implies a longevity risk. We take into account an incomplete financial market where \( n \) risky assets are listed and whose prices are driven by \( k > n \) risk sources (Wiener processes). Furthermore, the economic environment is assumed to be described by a (finite) number of state variables which may be (non perfectly) correlated with the risky asset prices. We show that the optimal portfolio exists in a closed form if the state variables follow diffusion processes whose mean and variance are affine transformation of the state variables themselves. After showing a comparison with the optimal portfolio in a complete market case, we finally present an example allowing to numerically compute the optimal portfolio and show its behaviour through time.


F.~Menoncin. An approximated solution for optimal portfolio in incomplete markets. 
In A.~Sarychev, A.~Shiryaev, M.~Guerra, and M.~R. Grossinho, editors, 

