On Integrated Chance Constraints in ALM for Pension Funds

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Abstract

We discuss the role of *integrated chance constraints* (ICC) as quantitative risk constraints in asset and liability management (ALM) for pension fund. We define two types of ICC: the *one period* integrated chance constraint (OICC) and the *multiperiod* integrated chance constraint (MICC). As their names suggest, the OICC covers only one period whereas the whole period of study is taken into account with the MICC. A multistage stochastic linear programming model is therefore developed for this purpose and a special mention is paid to the modeling of the MICC.

Based on a numerical example, we firstly analyse the effects of the OICC and the MICC on the optimal decisions (asset allocation and contribution rate) of a pension fund. By definition, the MICC is more restrictive and safer compared to the OICC. Secondly, we quantify this MICC safety increase. The results show that although the optimal decisions from the OICC and the MICC differ, the total costs are very close, showing that the MICC is definitely a better approach.

Keywords: Pension fund, Modeling, Asset liability management, Multistage stochastic programming, Linear programming, Integrated chance constraint.