Designing a Pension Funding Derivative

Allen F. Jacobson, Jr.

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Abstract

The paper will describe the design of an option contract with payouts that are tied to the combined impact of interest rates and investment returns on the funding level of a defined benefit pension plan. Current option contracts used by plan sponsors can limit exposure to one of these risks. However, a derivative that combines these risks may provide more targeted protection to a plan sponsor at lower cost. This paper discusses several of the considerations in designing such a derivative. It will also briefly discuss pricing the option. Finally, the difference in potential outcomes between plan funding with and without option ownership will be demonstrated. As an outcome of the design work, a new way to visualize pension risk that may be useful in sponsor accounting disclosures will be shown.

Purpose and Target Audience: The purpose of the paper is to distribute the idea for this derivative and encourage discussion and work in this idea. The target audience for the paper is financial professionals who have a moderate background in defined benefit plan finances and some background in options. The mathematics is not expected to be rigorous and should be understood by many people in the pension and financial markets fields.

Items to be discussed in the Paper:

- Parameters of the sample pension plan used to design and price the option.
- Investment policy and allocation of the fund investments assumed for pricing
- Graphing pension funding outcomes on a plane with investment returns and interest rates as the two axes.
- A discussion of why these two risks were singled out for inclusion in this derivative design
- A discussion of why combining the risks instead of two different options is beneficial
- Development of a funding index that will be used to calculate payouts from the option
- What the tenor of the option should be – one-year or multiple years to expiration
- Pricing of the option using historical volatility of the index.
- A brief discussion of the benefits of option specification standardization or bespoke option design for each plan
- Graphs showing funding outcomes for the sample plan both with and without derivative ownership.

Discussion of basis risk if a particular pension plan parameters does not align with the sample plan.