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Research Report

The impact of duration on management's discount rate choice

Abraham Fried [a,*], Paquita Davis-Friday [b], Harry Z. Davis [b]

[a] Stillman School of Business, Seton Hall University, 400 South Orange Avenue, South Orange, NJ 07079, USA
[b] Zicklin School of Business, Baruch College-City University of New York, 1 Bernard Baruch Plaza, New York, NY 10010, USA

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ABSTRACT

Previous research finds that firms increase their assumed discount rates to minimize their reported pension benefit obligation. This paper demonstrates that firms whose pension plans have short durations lower their discount rates (rather than increase them), since a lower discount rate decreases their pension expense. These results are especially relevant in the present climate of low interest rates and more firms freezing their defined benefit pension plans, thereby shortening the duration of their obligations. Given its importance in shaping management motivation we believe that firms should be required to disclose the duration of their future obligations.

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Introduction

Defined benefit pension plans and the legacy costs that these plans impose on major U.S. corporations have been the subject of much discussion and analysis in the financial press over the years. The effect of these legacy costs have been far reaching. The bankruptcy of air carriers (e.g. Northwest and American Airlines), as well as manufacturers like General Motors, have been attributed, at least in part, to the burden of their defined benefit pension plans. Even successful companies, such as IBM, with reputations for "generous" employee benefit plans, have taken steps to freeze future defined pension plan benefits. Ultimately the "health" of these plans is determined by the assumptions made by management.

The financial reporting for pensions along with the economic status of pension plans are affected by management assumptions. A crucial assumption is the discount rate. According to the accounting standards, a firm should choose a discount rate equivalent to the rate at which its pension liabilities could be settled. That is, firms should be using a discount rate equal to the weighted average interest rate on a hypothetical portfolio of high quality, zero coupon bonds whose maturity dates and amounts coincide with its future benefit payments (SFAS 106 paragraph 186 (FASB, 1990)).

However, since the discount rate affects the Projected Benefit Obligation (PBO) and balance sheet liabilities of the firm as well as the reported net income of the firm, managers have a motivation to manipulate the choice of discount rate.

The discount rate affects the PBO and hence the plan's funded status (the difference between plan assets and the PBO). A higher discount rate always lowers the PBO, thereby improving the funded status of the pension plan. The literature has for the most part focused on the balance sheet effects of the choice of discount rate (Amir & Gordon, 1996; Blankley & Swanson, 1995). These studies argue that firms overstate their discount rate with the goal of minimizing their PBO, since the PBO is used to compute the funded status of a firm's pension plans. With the advent of SFAS No. 158 (FASB, 2006), requiring that the funded status be reported directly on the balance sheet, the effects of discount rate changes and the impact on the PBO and balance sheet took on even greater focus. With the balance sheet now more aligned to economic reality, Houmes, Boylan, and Crosby (2012) argue that the incremental value relevance of the balance sheet increased for firms with defined benefit plans.

With respect to the income statement, the choice of discount rate also affects the periodic pension expense (service cost and interest cost) and hence net income. Pension re-

* Corresponding author. Tel.: 973-275-2956; fax: 973-761-9217.
E-mail address: Abraham.Fried@shu.edu (A. Fried).

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Table 1
Relation of duration, initial discount rate levels and discount rate changes (assumed terminal benefit payment of $5,000).

Panel A long duration (25 years)				
Panel A1: higher discount rate				
Discount rate	PBO or Service cost ($)	% Change	Interest cost ($)	% Change
7%	**921**		**64**	
8%	730	–21%	58	–9%
6%	1,165	27%	70	9%
Panel A2: lower discount rate				
Discount rate	PBO or Service cost ($)	% Change	Interest cost ($)	% Change
5%	**1,477**		**74**	
6%	1,165	–21%	70	–5%
4%	1,876	27%	75	1%
Panel B short duration (10 years)				
Panel B1: higher discount rate				
Discount rate	PBO or Service cost ($)	% Change	Interest cost ($)	% Change
7%	**2,542**		**178**	
8%	2,316	–9%	185	4%
6%	2,792	10%	168	–6%
Panel B2: lower discount rate				
Discount rate	PBO or Service cost ($)	% Change	Interest cost ($)	% Change
5%	**3,070**		**153**	
6%	2,792	–9%	168	9%
4%	3,378	10%	135	–12%

Items in bold are the initial values and points of reference for the effects of the change in the discount rate.

search generally has not focused on the income statement. Since higher rates *generally* lower reported pension cost, thus improving reported net income, prior literature has assumed (and shown) that management prefers a higher discount rate because of its three positive effects: a lower PBO, lower service costs and lower interest costs.[1]

In this paper we note that the above results and assumptions depend on both the 'duration' of the pension plans and on interest rate levels. Duration is the weighted average time until payments are made. That is, if there is a long time horizon until most payments are made, the plan has a long duration. Newer plans, with younger workers and few retirees, fit this description. Such plans tend to have lower service costs relative to interest costs. The finding that managers raise discount rates to lower the PBO and pension costs is valid for plans with long durations.

Short duration plans, on the other hand, are plans that have a shorter horizon until payments must be made. Older plans, that have older workers and relatively more retirees than active employees, fall under this heading. For such plans, interest costs are high relative to service costs. For short duration plans, higher discount rates increase interest costs and have less significant effects on both the PBO and service costs. As a result, management prefers a lower discount rate for these plans since a lower discount rate reduces net pension expense and thus raises income, while only slightly increasing the pension liability.

Our findings suggest that duration is a key variable in evaluating the effect of management's discount rate choice. Given the results presented here we believe regulators should require the disclosure of this number.

Motivation

The relation among discount rates, duration and pension plan components

Table 1 shows the effects of differing duration levels on changes in the discount rates. The table also illustrates how these effects are magnified by the level of discount rates. Panel A illustrates the effect of discount rate changes for a long duration (25 years) plan.

For simplicity, a terminal benefit payment of $5,000 in 25 years is assumed.[2] Note that the terminal payment can be used to illustrate the effect of discount rate changes on the PBO as well as the service cost. Panels A1 and A2 differ with respect to the initial discount rate. In Panel A1 the discount rate is initially at the higher level of 7%; in Panel A2 it is at the lower level of 5%. A 1% increase in the discount rate (to 8% in A1 or 6% in A2) reduces the PBO and service cost by about 21% no matter the initial level of interest rates,

[1] Feldstein and Morck (1982), Kwon (1994), Asthana (1999), Brown (2004), see especially Blankley and Swanson (1995) who explicitly make this assumption.

[2] For a fixed terminal payment of $5,000, the starting point for the PBO, service cost and interest cost vary as a function of duration and the initial discount level. However, since the focus of our analysis is the percentage change resulting from an increase/decrease in the discount rate, the starting point is irrelevant. For any terminal value and starting point, the percentage changes are identical.

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