



The effect of regulation on optimal corporate pension risk[☆]

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ABSTRACT

We study firms' pension prefunding and portfolio allocation choices in a model in which firms trade off the need to compensate workers for the financial risk in their pension benefit against the cost advantage that may be gained by exploiting underpriced pension insurance. In the absence of pension insurance, the firm minimizes costs by rendering promised benefits free of risk to workers, who are assumed to be unable to hedge firm-specific risk. Various forms of government intervention, such as benefit guarantees, can alter this outcome dramatically by providing the firm with an incentive to shift risk to other parties. In this case, we find that the firm's decisions depend on, among other influences, the degree of insurance mispricing, the amount of guaranteed benefits, the stringency of minimum funding requirements, and the costs of financial distress.

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1. Introduction

Twice in the past decade, steep declines in asset values during recessions have forced firms to boost contributions into their defined-benefit (DB) pension funds at times when profits were weak. As a consequence, firms and policymakers alike have begun to reassess the merits of the widespread practices of underfunding promised benefits and investing plan assets in securities that may be poorly matched to the risk profile of plan

liabilities.¹ These practices can cause the pension component of compensation to be a risky proposition from the

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¹ At the end of 2009, the median large private plan was underfunded by nearly 20% of liabilities, and about three-fifths of aggregate assets were invested in equities and other non-matching securities (Milliman Consultants and Actuaries, 2010). Because DB pensions are typically paid as life annuities, their risk profile resembles that of a portfolio of fixed-income securities much more closely than that of a portfolio of equities. The degree to which equities mismatch plan liabilities depends on the method of accounting used to compute liabilities. If one focuses on the narrower measure of accumulated benefit obligations (ABO), the mismatch will be more severe since accrued benefits are unlikely to move systematically with the stock market. If, however, one uses the broader measure of projected benefit obligations (PBO), which takes into account the effect of future wage growth on accrued benefits, then there may be some scope for equities to provide a hedge against future liabilities since DB benefits are a function of final wages, and wages may be correlated with equity prices; see Sundaresan and Zapatero (1997) and Lucas and Zeldes (2006). Nevertheless, because this argument applies only to the projected portion of benefits and not to the accrued, and because the observed correlation between wages and equity prices is relatively weak, the hedging motive does not seem capable of justifying the concentration of equities in most private plans.

point of view of employees, because under these conditions a bankruptcy can result in lost benefits. While this risk is significantly lessened by the insurance provided by the Pension Benefit Guaranty Corporation (PBGC), some risk remains for workers whose accrued benefits at the time of bankruptcy exceed the maximum insured amount. The prevailing view among pension practitioners has been that “risky pension” practices increase the value of the sponsoring firm by reducing its costs relative to a strategy of minimizing pension risk. We analyze the validity of this presumption and show how it depends on various policy interventions and financial frictions.

Issues surrounding pension risk arise regularly in public policy debates. Concerns over low levels of private pension funding and the ineffectiveness of minimum funding rules led to the Pension Protection Act of 2006 (PPA), which introduced higher funding targets and quicker remediation of shortfalls. Some of these PPA requirements were temporarily relaxed during the recent downturn to provide “funding relief” to cash-constrained pension sponsors, but the trend is toward tighter regulation of funding and accounting. For example, concerns over the lack of transparency in pension accounting led the Financial Accounting Standards Board (FASB) to announce new guidelines requiring firms to bring the fair market value of pension trust funds onto their corporate balance sheets, and FASB is currently considering similarly wide-reaching changes for corporate earnings statements.

As we discuss below, we are hardly the first to study the influence of pensions on optimal firm behavior. Previous authors have analyzed the option value that firms derive from being able to put pension shortfalls to either workers or a pension insurer (Sharpe, 1976), as well as how labor-market pressures may constrain firms in their design of pension compensation (Bulow, 1982; Bodie, 2003; Bader, 2004). In this paper, we introduce a model that combines these two considerations and investigates how firms might optimally trade them off against each other, as well as how government regulations can affect the pension decisions made by the firm. In particular, we explore the leverage over sponsor behavior that a pension regulator gains as a result of being able to set the maximum level of guaranteed benefits, the minimum contribution that the firm must make to its pension fund, and the premium that the government charges for PBGC insurance. In addition, we consider how the influence of these regulatory levers interacts with two other real-world considerations that have been emphasized in the literature: the firm’s incentive to manage the risk that poor pension performance can lead to financial distress or forgone investment opportunities (Rauh, 2009), and the possibility that workers effectively hold a partial claim on any pension surplus (Bulow and Scholes, 1983; Bodie, 1990).

We find that in a world without pension insurance (or other complications related to regulations, taxation, hedging motives, or financial frictions), firms can reduce their compensation costs, and therefore increase profits, by minimizing pension risk. This result obtains because workers demand a compensation premium in exchange

for shouldering pension risk that they are not able to hedge. Moreover, because financial-market participants are able to hedge firm-specific risk, the compensation premium that the firm must pay in return for making the pension promise risky exceeds the value that the firm derives from acquiring a put option.² Thus, we find that without pension insurance, firms would choose to minimize pension risk by fully funding their pension promises and investing the assets in a fixed-income portfolio closely matched to the profile of pension liabilities.

We show that pension insurance fundamentally changes these incentives. With complete coverage, workers no longer demand a compensation premium because they no longer face any pension risk. The firm’s attitude toward pension risk will depend on the cost of reducing risk relative to the insurance premium. An economically fair insurance premium would leave the firm indifferent among levels of funding and allocations of pension assets. A firm facing a premium greater than the economically fair level would opt to minimize pension risk, while a premium below the fair level—generally considered to be the real-world case³—would encourage risk-taking in the pension promise.

But perhaps the most interesting case is the one in which pension insurance is underpriced and pension benefits are only partly guaranteed. We find that if insurance takes a form resembling the PBGC’s, with premiums a linear function of underfunding and no load on investment or credit risk, firms are often pushed toward one of two extremes—either maximizing the risk in the pension promise by reducing contributions and mismatching assets and liabilities, or minimizing the risk in the pension promise by fully funding future benefits and investing in assets designed to match the liabilities as closely as possible. Oftentimes, the “middle ground” of moderate pension risk offers the worst of both worlds, with workers demanding substantial compensation for risk, while mispricing of insurance is not fully exploited.

Not surprisingly, the government offer of underpriced pension insurance induces greater risk-taking on the part of the firm. We show that the government could correct this moral hazard by any of several means. Most simply, it could of course charge an economically fair insurance premium. In that case, any worker exposure to residual pension risk would cause the firm to choose to make the pension riskless to the worker. Alternatively, it turns out that the government can achieve, at least in some instances, much the same outcome by imposing a minimum funding requirement. Interestingly, we demonstrate that there exist cases in which even a partial funding requirement can induce firms to choose full funding as the cost-minimizing strategy. These results occur because the constraints imposed by regulation limit the ability of the firm to exploit the insurance mispricing. Given that constraint, moving to the other extreme—full defeasance

² This result assumes, for example, that the worker is not able to short her firm’s stock, while the market can do so—in our view, generally a realistic assumption.

³ See Brown (2008) and Congressional Budget Office (2005).

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