

Reforming the Defined-Benefit Pension System in the United States

David W. Wilcox
Division of Research and Statistics
Federal Reserve Board
March 21, 2006

This paper was prepared for the March 2006 meeting of the Brookings Panel on Economic Activity. I am grateful to Zvi Bodie, Jeremy Bulow, Jeff Brown, Ed DeMarco, Mark Iwry, Wendy Kiska, Nellie Liang, Debbie Lucas, Steve Oliner, George Pennacchi, Marvin Phaup, Paul Smith, and Jonathan Wright for helpful conversations and comments on earlier drafts; several of these individuals have been extraordinarily generous with their time. I am also grateful to Blake Bailey for excellent research assistance. The views expressed here are those of the author and are not necessarily shared by the Board of Governors of the Federal Reserve System or the other members of its staff.

Preliminary and incomplete draft
Please do not quote or cite without permission

I. Introduction

The world of defined-benefit pension plans is changing rapidly. By the end of 2004, eleven percent of DB sponsors from among the Fortune 1000 had already frozen or terminated at least one of their plans, and an additional four percent had closed their plans to new hires.¹ During 2005, United Airlines and US Airways both terminated their plans and between them transferred an estimated \$9 billion in unfunded obligations to the government insurance program for defined-benefit plans. In addition, Delta Air Lines, Northwest Airlines, and Delphi Corporation entered bankruptcy, taking them one step closer to shifting their net pension liabilities—totaling another \$15 billion—to the government as well. Since December, 2005, IBM, Verizon, and General Motors, among others, have frozen their plans. On the legislative front, the recently enacted budget bill boosted one component of the premium for federally-provided pension insurance from \$19 per participant to \$30. Meanwhile, the Congress is at work on legislation that would implement more thorough reform of the environment in which defined-benefit plans operate.

Though the pace of change has picked up recently, change itself is hardly new in the world of defined-benefit plans. As can be seen in chart 1, more than a third of private wage and salary workers in 1980 were covered by a government-insured defined-benefit plan; by 2002, that fraction had declined to 19 percent. The scale of operations at the Pension Benefit Guaranty Corporation (PBGC), the government corporation providing insurance for private defined-benefit pension plans, has increased markedly in recent years. In fiscal year 2005, for example, plans for which the PBGC was serving as trustee

¹ Watson Wyatt Worldwide (2005). In a frozen plan, as the term is used by Watson Wyatt, no employees accrue benefits. (Other analysts use the term “hard freeze” for this situation.) Alternatively, a sponsor may close a plan to new hires but continue to allow incumbents to accrue benefits; other analysts label this a “soft freeze.” In either case the plan continues to pay accrued benefits when due and the sponsor retains the obligation to fund accrued benefits. In a “terminated” plan, the sponsor essentially causes the plan to cease operations. If sufficient assets are available, the sponsor may close the plan out by purchasing annuities or making lump-sum payments to participants (a “standard termination”). If the sponsor is in bankruptcy proceedings, it may transfer the assets and liabilities of the plan to the government (a “distress termination”).

paid \$3.7 billion in benefits to nearly 700,000 recipients; these figures are up roughly fourfold and threefold, respectively, since fiscal year 2000.²

As the scale of PBGC operations has been ramping up, its net financial position has been deteriorating. As shown in chart 2, the PBGC estimates that, as of September 30, 2005, its liabilities exceeded its assets by \$23.1 billion. Five years earlier, at roughly the peak of the stock market boom, the PBGC estimated that it held a surplus position of nearly \$10 billion.³ The deterioration of the financial status of the PBGC during the early part of this decade owes partly to the poor investment performance of the assets in the PBGC's own portfolio and the marked decline in the interest rates that the PBGC uses to discount its future liabilities. However, as shown in chart 3, the deterioration also reflects an unprecedented onslaught of net new claims on the single-employer insurance program.⁴ Because the vast majority of the liability currently recognized by the PBGC arises from the single-employer program, this paper focuses on that segment of the PBGC's operations.

Unfortunately, the \$23.1 billion figure does not measure the full extent of the PBGC's potential liability. As shown in chart 4, underfunding deteriorated sharply from 2000 through 2003, and estimates for 2004 and 2005 (not yet available on a directly comparable basis and therefore not shown in the chart) suggest that the situation has become markedly worse than in 2003. Most unfunded liability will not become a responsibility of the PBGC because it is held in pension plans sponsored by financially healthy companies. However, the PBGC estimates that, as of September 30, 2005, \$108 billion of underfunding was held in plans sponsored by firms exhibiting some

² PBGC (2005f, p.63); see also note on p.38. In both years cited, a portion of total benefits paid were financed out of assets recovered from former sponsors.

³ PBGC (2005a). The net financial position of the PBGC is calculated as the difference between the market value of assets and the present discounted value of future PBGC obligations. The net financial position reflects plans already terminated as well as plans judged by the PBGC probable to terminate. Because it is an actuarial projection, the net financial position of the PBGC is influenced by experience gains and losses (outcomes that deviate from projected values), changes in actuarial assumptions, and the passage of time which brings future values that much closer to the present. Over the very long term, inaccuracies in these estimates of obligations will generally be resolved as benefits are actually paid out.

⁴ The claims on the PBGC have been extremely heavily concentrated in the airline and steel industries. According to Kandarian (2003a), claims from the steel industry accounted for 56 percent of total claims on the PBGC since its inception, while claims from airlines accounted for another 17 percent. However, as Belt (June 7, 2005, Supplement, p.8) notes, significant claims have come from firms in other industries as well, including insurance (\$529 million from the parent of Kemper Insurance) and technology (\$324 million from Polaroid).

symptom of financial weakness. More formally, the CBO (2005b, p.7) estimated the market value of the PBGC's coverage over the next ten years at \$63 billion over and above the \$23 billion already terminated or judged probable to terminate by the PBGC.⁵

Against that backdrop of rapid change and deep financial distress, this paper puts forward a traditional package of reforms for the single-employer insurance program, including adjustments to funding requirements, portfolio investment rules, insurance pricing, and accounting rules. Given the speed with which the DB universe seems to be shrinking, one might well ask “why bother?” Fundamentally, there are two reasons for undertaking such a program of reform even at this late date: First, even if conventional DB plans are doomed to extinction, considerable time will be required to unwind the plans still in existence today, and the benefits of navigating that unwinding under better rules rather than worse ones could be substantial. Second, the demise of DB plans is hardly a foregone conclusion. While a number of high-profile freezes and terminations have occurred recently, most large sponsors have preserved their plans thus far. Under streamlined rules, a greater number of firms and workers might decide that a DB plan should be retained as part of the overall compensation package.

Much of the disagreement and confusion in the academic literature relating to the issues discussed in this paper has reflected a lack of clarity about whether a potential future beneficiary should be able to regard the promise of a future pension as a risk-free proposition or must see it as entailing some risk. In the latter case, the sponsor effectively holds a put option allowing the sponsor to shed some of its stated pension obligation under certain conditions (for example, if the financial health of the company becomes precarious enough). And this is indeed the way that the pension system has operated in the United States thus far: Plans have been allowed to make promises they did not know they could keep *for sure*, and some have fallen into straitened financial conditions and defaulted on their pension promises. Some of the resulting loss has been borne by beneficiaries, some has been transferred to surviving sponsors, and some may ultimately come to be borne by taxpayers.

⁵ The CBO aims to estimate the amount the federal government would have to pay a private insurer to assume the financial responsibilities of the PBGC over the specified period, net of premium income. In addition to expected losses, its estimate therefore includes the premium that the government would have to pay to compensate the insurer for market risk. Market risk is discussed in greater detail below.

To be sure, it is possible to imagine a world in which pension promises are subject to default and yet both workers and taxpayers are treated entirely fairly. In that world, the PBGC would have much greater power to monitor the behavior of plan sponsors and would be authorized to set insurance premiums in a way that would fully compensate taxpayers for bearing the risk of pension default. For their part, workers could deal with any residual risk (after taking account of the government backstop) by conceding less in current wages than they would in return for a risk-free promise, and by hedging the residual risk to whatever degree they felt appropriate. But the burden on the PBGC and workers in that world would be heavy. In particular, the PBGC would be called upon to replicate the discipline that a true market-based approach would impose—an assignment that might be impossible to execute unless the structure of insurance premium rates were to be altered greatly from its current form. Workers would likewise have to assess the financial status of the plans in which they participate in a sophisticated and ongoing manner. Even if workers succeeded in performing that assessment, they would face the challenge of coordinating their responses with one another—a challenge that would be particularly difficult outside the context of a union bargaining exercise. If a risk-tolerant approach were to operate exactly as intended, neither workers nor firms could assume that society would provide any relief to those on the short end of a broken promise.⁶

In light of these considerations, this paper attempts to identify the changes that would have to be made in order to put the pension system on a different footing—one in which the pension promise would be an essentially risk-free proposition for workers, taxpayers, and sponsors regardless of their financial health. Thus, the paper pursues the implications of three key premises. First, workers should be able to view the promise of a defined-benefit pension as free of risk.⁷ Some analysts have argued that risky DB promises serve an economically and socially useful purpose because they give workers a stake in the economic success of their employers. But the objective of aligning the economic interests of workers with those of firms can be advanced more powerfully and

⁶ Alternatively, taxpayers would have to be compensated (presumably through higher insurance premiums) for general assistance that they provided to participants in terminated plans.

⁷ In the opening sentences of his 1987 article, Ippolito suggests (p.15) that at least part of the motivation for the enactment of ERISA was precisely to reinforce the security of the pension promise: “Congress enacted [ERISA] in 1974 to reduce the long-term risk inherent in private pensions. Advertised as a major piece of worker-protection legislation, it was designed to convert pensions from conditional promises into the equivalent of wages.”

more transparently using other forms of compensation such as employee stock ownership plans and long-dated options. Moreover, those other forms of compensation have the important advantage of not involving the taxpayer as a third-party guarantor. An alternative argument that might be made in favor of a risk-tolerant approach is that, left to their own devices, workers might choose a risky pension over a safe one in hopes of capturing the upside risk. But workers' appetites for this particular form of risk should, according to conventional finance theory, be quite limited because the downside tail events associated with DB plans are heavily influenced by own-firm risk, and many workers effectively are already heavily invested in their firms by way of their investment in firm-specific human capital. As noted by Pesando (1996) and Bodie and Merton (1993), many workers are not sophisticated financial engineers, and so are not well positioned to hedge their pension risk even leaving aside the issue of the correlation with their human capital. Workers' appetites for taking on pension risk presumably would be diminished if the pension plan were to be charged an economically fair insurance premium that reflected the market price of all aspects of risk borne by the insurer. And to the extent that workers succeeded in capturing the value associated with any upside risk in the plan, one might expect employers either to trim other forms of compensation or to arrange the assets of the plan so as to reduce or eliminate the upside risk.

A second premise of the paper is that taxpayers should be compensated in full at market-consistent rates for the risk that they shoulder in backstopping the federal pension insurance program. Again, some analysts have argued to the contrary—that the Congress fully intended to set up a system that would transfer resources to firms in distress; but alternative mechanisms (such as unemployment insurance and various forms of worker education and training) are available that might better serve the purpose of cushioning the economic blow inevitably experienced by some workers and firms in a dynamic economy. A third premise is that low-risk sponsors should not have to cross-subsidize the insurance coverage provided to their high-risk counterparts. Sponsorship of a DB plan is voluntary, and low-risk sponsors perceiving a threat that excess costs might be shifted from distressed firms to them could be prone to terminating their sponsorship more quickly. Readers who disagree with any of these three premises will reach different

conclusions from the ones that are derived here.⁸ Equally, readers who find the implications of these three premises unacceptable must then, as a matter of logic, be willing to identify at least one premise they would be willing to compromise.

In aiming to minimize the risk in the pension promise, the paper will deliberately build in a degree of redundancy. Thus, for example, whereas one might argue that a sufficiently stringent set of funding requirements would be enough, on its own, to render the pension promise free of risk, this paper recommends that such funding requirements be complemented with market-mimicking insurance premiums and enhanced disclosure to investors and workers. The purpose of the redundancy is to provide multiple layers of protection against failure: If the funding rules do not work exactly as intended, the market-based premiums might still motivate firms to adopt a risk-free stance. And if both of those layers failed, well-informed workers might still encourage firms to provide full security on their pension promises, and well-informed investors might encourage better matching of assets and liabilities once the associated risk is fully appreciated. On the other hand, if an ideal set of funding rules were implemented and succeeded in squeezing pension risk essentially to nil, then a well-designed approach to pricing insurance would likewise squeeze the risk-based component of the premiums essentially to zero, ensuring no unnecessary cost from this element of redundancy. In the end, a sponsor that encountered severe financial difficulty would still be able to cut costs by terminating its pension plan; but if the proposals laid out here worked as intended, the sponsor would leave behind a set of pension promises that could be fulfilled in their entirety, with loss by workers of benefits already accrued, no cost to the taxpayer, and no shifting of financial responsibility to surviving sponsors.

The remainder of the paper is organized as follows: Section II provides a short course in defined-benefit plans, with the objective of giving the non-specialist enough of a toe-hold on the institutional detail of the sector to follow the remainder of the discussion. Section III then briefly provides a theoretical perspective on three issues of central importance to the regulation of pensions: the concept of liability that sponsors should be required to take as their funding objective; the discount rate that sponsors

⁸ As the discussion below will make clear, the three premises are taken as conceptual objectives toward which great progress can be made but not as ends that must be achieved at all cost.

should use in estimating that liability; and the optimal composition of the portfolio of pension assets. Section IV returns from theory to the real world, and aims to summarize what is known from practical experience about the real sources of vulnerability in the current system. In particular, this section attempts to identify the features of current law that have been most instrumental in allowing risk to persist for workers, taxpayers, and healthy sponsors. The objective of this section is to ensure that the reform proposals put forward in this paper actually address and would resolve the fundamental problems currently afflicting DB plans. Section V puts forward the proposed reform program, touching on funding requirements, portfolio investment restrictions, insurance premium pricing, and transparency. This is a case where the details matter, because if the reforms outlined here are to be credible, they must engage with the DB system as it currently exists. Accordingly, the section goes into substantially greater depth, as needed, about the design of the current system. Section VI looks many years down the road. It takes as given that the government will always have an important role as standards-setter, as monitor, and as the entity that mandates that pension sponsors must insure their pension obligations. However, this section raises the question as to whether the government must always remain the provider of that insurance, even long after a program of reforms like the one recommended here—designed to substantially eliminate the risk in pension promises—had been put into place. Finally, section VII concludes.

II. A crash course in defined-benefit pension plans⁹

The textbook defined-benefit plan promises a retirement annuity that is determined as a certain percentage (say, 1½ percent) multiplied by the number of years of service multiplied by final average salary (perhaps the average over the last three or five years of service).

Two other types of benefits are discussed less frequently in the economics literature but are disproportionately important from the perspective of the PBGC and will figure in the recommendations put forward in section V. First, some plans determine promised benefits as a function of years of service only, rather than years of service and

⁹ Compact and readable summaries of many of the provisions discussed in this section are provided in Joint Committee on Taxation (2005), Congressional Budget Office (2005a), and Center on Federal Financial Institutions (2004a).

salary; such plans are referred to by some analysts (for example, GAO/HRD-93-7) as “flat-benefit plans” and by others (for example, McGill *et al.* (2005, p.244)) as “specified dollar benefit plans.” Benefits in such plans keep pace with prices or nominal compensation only if the nominal amount paid per year of service is adjusted over time. Although such adjustments may occur regularly, they cannot—by law—be prefunded. As a result, benefit increases in these plans automatically generate new unfunded liability which, under present funding rules, can be amortized over thirty years, leaving ample time for sponsors to encounter unforeseen financial difficulties before the benefits are funded.¹⁰ In a study of 44 plans that terminated between 1986 and 1988 (accounting for 96 percent of the total unfunded liability assumed by the PBGC during those three years), the GAO estimated that flat-benefit plans accounted for \$2.4 billion or nearly 90 percent of the \$2.7 billion in total unfunded liability taken over by the PBGC during that period.¹¹

The second form of benefits which is less familiar to most economists is shutdown benefits, which are payable in the wake of events such as plant closings or permanent layoffs. These benefits may provide access to unreduced retirement benefits at an early age, and are no doubt especially important to older workers who, on average, would have a more difficult time transitioning to new employment. The problem with shutdown benefits insofar as the financial viability of the PBGC is concerned is that they are generally not prefunded because only the expected present value of shutdown benefits is included in plan liabilities, and shutdowns are generally assumed for purposes of computing funding requirements to have zero probability of occurring until they have actually happened.¹² In a 2003 report, the GAO stated that the “PBGC estimates that it could become responsible for over \$15 billion in shutdown benefits in PBGC-insured plans,” suggesting that shutdown benefits are a noticeable but not predominant source of the PBGC’s untenable financial position.¹³ Although shutdown benefits are not generally prefunded, they may be fully guaranteed by the PBGC so long as the provision for the

¹⁰ If the ratio of assets to liabilities falls below a certain level (90 percent in some cases, 80 percent in other cases), the plan would face an additional funding requirement that would speed the amortization of the unfunded liability.

¹¹ GAO/HRD-93-7, p.36, fn.1. The GAO did not examine the specific contribution to total insurance losses of *recent* increases in benefits at these plans. Ippolito (2004) also underscores the importance of flat-dollar plans in generating exposure for the PBGC.

¹² GAO/HRD-93-7, p.27.

¹³ GAO-04-90, p.26

possibility of the shutdown benefits being paid was added at least five years before the benefits are triggered.¹⁴

Under the Employee Retirement Income Security Act (ERISA), private sponsors of DB plans face a welter of regulations governing the minimum contributions they must make to prefund their future retirement obligations. In broad-brush terms, the idea of these regulations is to ensure that sponsors contribute enough each year to cover that year's benefit accruals and to amortize a fraction of any gap that may have opened up between assets and liabilities. Sponsors also face restrictions on their ability to increase benefits—but only if the plan in question is already very deeply underfunded or the sponsor is already in bankruptcy. In addition, ERISA requires the fiduciary of a defined-benefit plan to invest the assets of the plan in a diversified manner, but imposes no requirement that the characteristics of the plan's assets mimic the characteristics of the plan's liabilities. Folk wisdom has it that the asset manager is typically instructed to maximize the expected rate of return on assets for a given level of risk. An odd aspect of those instructions is that they take no account of the characteristics of plan liabilities.

Rules governing the methods that firms must use to report pension-related information in financial statements are set by the Financial Accounting Standards Board (FASB).¹⁵ Broadly, pension expense is calculated each period as (a) pension benefits accrued during the period plus (b) the imputed cost of financing the outstanding pension obligation, calculated using the assumed discount rate, minus (c) the expected return on plan assets plus (d) the amortization of past discrepancies between actual and expected returns and other adjustments such as changes in actuarial assumptions or amendments to plan provisions. The aspect of this treatment that has attracted the most controversy is that changes in the fair market value of assets and liabilities do not have to be recognized immediately, but may be smoothed in over a period of five years. Statement of Financial Accounting Standard 87 (FAS 87) requires firms to report the fair market value of their assets and liabilities, but only in footnotes to the financial statements. Since 2003, firms

¹⁴ Shutdown benefits, like other benefits, are subject to three distinct forms of guarantee limits. One of these limits—the one governing the guaranteeable amount to the amount of the normal retirement benefit under the plan—is especially pertinent in the case of shutdown benefits, which may promise a temporary supplement in addition to an unreduced benefit to workers who have not yet reached the normal retirement age.

¹⁵ The requirements are set in Statement of Financial Accounting Standard 87, which was promulgated in 1985. A summary of FAS 87 is available at <http://www.fasb.org/st/summary/stsum87.shtml>.

have been required to report the target and actual mix of plan assets, but only by broad category (for example, equity, bonds, real estate, and so on), and aggregated across plans to the level of the firm, including both qualified plans insured by the PBGC and non-qualified plans. It bears emphasizing that the measures of liability and assets used for financial reporting purposes differ from those used for such purposes as calculating required contributions and insurance premiums.

Benefits provided under a DB plan are insured, up to a point, by the Pension Benefit Guaranty Corporation, a government corporation created by ERISA. The PBGC administers two distinct insurance programs—one for single-employer plans, the other for multiemployer plans.¹⁶ The single-employer program has accumulated a much larger negative net financial position for the PBGC (\$23 billion for single-employer plans as of September 30, 2005, compared to \$335 million for multi-employer plans). However, multiemployer plans are also deeply underfunded in the aggregate (in excess of \$200 billion for multiemployer plans compared to in excess of \$450 billion for single-employer plans¹⁷), and the possibility exists that the liability associated with these plans could balloon into something much larger than currently seems in prospect. Nonetheless—as noted earlier—because the vast majority of the liability currently recognized by the PBGC arises from the single-employer program, this paper follows the bulk of the previous literature and confines its attention to that program. The PBGC is supposed to be self-financing, and its insurance function explicitly is not backed by the full faith and credit of the U.S. Treasury.¹⁸

ERISA sets rules governing the permissible means of terminating a defined-benefit plan. If a plan is fully funded, the sponsor may close out its obligations by purchasing sufficient annuities from a private insurance company to provide the plan’s participants with their accrued benefits or by making lump-sum payments to participants; this type of action is referred to as a “standard termination.” If a plan is underfunded, the sponsor may terminate it only if the sponsor is in bankruptcy proceedings—either for

¹⁶ A multiemployer plan involves, as the name would imply, more than one employer, and is created as part of a collective bargaining agreement. Such plans often involve employers in the same industry within a geographic region, and allow workers to migrate from one employer to another while continuing to accrue benefits in the same plan.

¹⁷ PBGC (2005a).

¹⁸ ERISA §4002(g)(2) states that “the United States is not liable for any obligation or liability incurred by the corporation [PBGC].”

liquidation or for reorganization—or has persuaded the PBGC that it would be unable to “pay its debts when due and [would] be unable to continue in business” unless the plan is terminated, or that the costs of funding the plan have become “unreasonably burdensome” solely due to a decline in the workforce of the sponsor.¹⁹ For its part, the PBGC may terminate a plan if it determines that the “possible long-run loss of the [PBGC] with respect to the plan may reasonably be expected to increase unreasonably if the plan is not terminated.”²⁰

The liability of the PBGC relative to promised benefits is limited in several ways.²¹ The restriction with the greatest practical effect is the one that limits the PBGC guarantee to a certain age-related amount per annum. For example, for plans terminating in 2006, benefits will be guaranteed only up to \$47,659 per year for someone beginning to draw benefits from the PBGC at age 65, and only up to \$30,978 for someone beginning to draw benefits from the PBGC at age 60.²² The maximum guaranteed amount is indexed to the same wage measure used to escalate the maximum taxable wage amount in the Social Security program. A second limitation on the PBGC guarantee excludes a fraction of benefit improvements implemented within the five years preceding termination—100 percent of improvements introduced within the last year being excluded, 80 percent of improvements that had been in effect between one and two years, and so forth.²³ Although the PBGC *guarantees* benefits only up to these amounts, it may

¹⁹ The requirements for distress termination are enumerated in 29USC§1341(c)(2)(B); see http://www4.law.cornell.edu/uscode/search/display.html?terms=1341&url=/uscode/html/uscode29/usc_sec_29_00001341----000-.html. The conditions for involuntary termination are spelled out in section 1342. In its original form, ERISA did not formally require a sponsor to demonstrate that it was experiencing financial distress before it could put its pension obligations to the PBGC. According to Weaver (1997, p.146), McGill *et al.* (2005, pp.806-807, 819), and CBO (2005a, p.10), a sponsor could virtually at will put the obligations of the plan to the PBGC in return for 30 percent of the net worth of the firm. However, Boyce and Ippolito (2002, p.122) state that, notwithstanding the absence of a formal statutory provision so requiring, “in fact, bankruptcy always has been the condition under which the underfunding could be put to the PBGC. This reality was codified in the Pension Protection Act of 1987.” In a study of plan termination that occurred between 1983 and 1985, GAO (1987) found that 96 percent of claims came from sponsors that would have met the distress criteria that were put in law in 1986.

²⁰ 29USC§1342 also includes other criteria for involuntary termination.

²¹ See PBGC (2000) for a helpful description and analysis of these benefit limitations.

²² PBGC (2005e).

²³ A third restriction causes the PBGC guarantee to exclude amounts in excess of what the participant would have received from a straight life annuity drawn at the plan’s normal retirement age. Based on a study of a non-random sample of large plans terminated since 1987, PBGC argued that the three guarantee limits taken together affect “relatively few” participants, but can “significantly reduce benefits for a few of the participants who are affected” (PBGC 2000, p.2).

pay more than the guaranteed amounts subject to availability of assets (including not only the assets of the plan but also any recoveries from the employer).

In return for this insurance, plan sponsors pay the PBGC a premium which is calculated in two parts: a flat-rate premium now equal to \$30 per participant in the plan, plus a variable-rate premium equal to \$9 per \$1000 of unfunded vested liability. In practice, most unfunded liability is exempted from the variable-rate premium, so income derived from that provision is far less than 0.9 percent of unfunded liability.

The assets of the PBGC are derived from premium income, assets taken over from terminated plans, and recoveries from employers. The PBGC invests its portfolio almost entirely in a mix of Treasury securities and equities. Over time, the investment policy of the PBGC has fluctuated a good deal; at some times, it has sought a substantial exposure to equity risk, while at other times it has placed much greater emphasis on matching assets to liabilities, thereby reducing risk.

The PBGC defines its liability as the price it would have to pay a private entity to assume the financial obligations associated with terminated plans; this concept of liability is known as “termination liability.” The PBGC’s methodology for estimating termination liability depends importantly on a survey conducted by the American Council of Life Insurers in which insurance companies are asked to price a range of immediate and deferred life annuities. The PBGC uses these annuity prices to infer a pair of discount rates (one applicable for the first twenty or twenty-five years, the other applicable thereafter) by first positing a mortality table and then choosing the two discount rates that best explain the observed annuity prices.²⁴ Chart 5 compares the resulting near-term annuity rate to the Aa corporate bond rate—representative of what many corporate sponsors used in preparing their financial statements—as well as the corridor of rates that sponsors were allowed to choose from in calculating the plan’s current liability which is used to determine if additional contributions are required. The annuity rate is systematically below the Aa rate but tracks its movements reasonably closely, though between late 2000 and early 2004, the annuity rate moved down noticeably more,

²⁴ Helpful descriptions of the PBGC’s methodology with regard to termination liability are contained in PBGC (2005b) and GAO-03-313, pp.24-25.

implying that over that period, the overall decline in interest rates gave a greater boost to termination liability than to current liability.²⁵

In the federal budget, the PBGC is treated essentially on a cash basis, consistent with general practice in the rest of the budget. Premium income and some investment income are recognized as revenue upon receipt; benefit payments and administrative expenses are treated as outlays insofar as they are deemed to have been funded out of premium income (and the investment income derived therefrom) rather than out of assets recovered from plan sponsors. This cash-oriented budgetary treatment has some unfortunate implications that will be discussed in section V.

III. Some theory

As additional background for the design of reforms to the current system, this section presents some simple theory pertaining to three issues that have been the topic of much debate among pension analysts: the concept of liability that sponsors should be required to take as their funding objective; the discount rate that sponsors should use in estimating that liability; and the optimal composition of the portfolio of pension assets. The section builds directly on the three axioms stated in the introduction: that the pension promise should be essentially free of risk; that taxpayers should be fully compensated for bearing any residual risk; and that healthy sponsors should not have to subsidize unhealthy ones.²⁶

What measure of liability? One key controversy has concerned the measurement of a firm's liability. Two main competing measures have been put forward. The first is

²⁵ An implication of the PBGC's methodology for measuring termination liability is that the appropriateness of the discount rates used by the PBGC generally cannot be judged in isolation (see PBGC 2005b, p.3); one must take account of all the factors influencing annuity prices, including not only discount rates but also assumptions about mortality, lump-sum payments, and early retirement, to name a few. The sample period shown in Chart 5 is an exception because during that period the PBGC was using the same mortality table that private sponsors were required to use for purposes of calculating their minimum required contribution; in addition, many private sponsors were using the same table (or one not too unlike it) for purposes of preparing their financial statements.

²⁶ An approach that would be preferable to simply postulating the three axioms would be to derive them from a formal model of optimizing behavior on the part of workers and firms. Such an undertaking is the subject of ongoing work but is well beyond the scope of this paper, not least because a convincing analysis would have to take account of the evident inability of even equity investors to accurately process information about DB plans. A full welfare analysis would also need to take account of the puzzling acquiescence of many workers in taking on own-firm risk even beyond the risk that they already bear by way of having invested in firm-specific human capital.

known as the accumulated benefit obligation, or ABO. The ABO is computed by determining the benefits to which each employee would be entitled at retirement based on current years of service and current salaries, and then discounting these benefits back to the present. The other main gauge of liability is known as the projected benefit obligation, or PBO. The PBO is computed by forecasting future increases in salaries (but not years of service), computing the benefits implied by those forecasts, and then discounting them back to the present. The choice of a measure of liability is important because it determines both the funding objective and the stochastic characteristics of liabilities (the latter factor determining, in turn, the characteristics of the immunizing portfolio of assets).

At first blush, the PBO seems attractive as a measure of the firm's true economic liability because it recognizes that, in all probability, at least some workers will continue in their employment with the firm and so will experience further increases in salary; the PBO also makes the conservative assumption that the plan will be operated on its current terms into the indefinite future. Indeed, eminent scholars including Black (1980, 1989) and Lucas (2005) have argued that firms may appropriately choose to hedge a PBO-based measure of liability. Even so, Bulow (1982) and Bodie (1990b), among others, have argued that the ABO is the better measure of the pension-related liability of the firm. The argument on behalf of the ABO rests partly on the observation that in the simplest classical model of the labor market, the ABO is exactly the appropriate economic measure of a firm's liabilities. In that model, the labor market clears continuously on the basis of total compensation and is perfectly competitive, so total compensation equals the marginal product of labor, period by period. The firm has no incentive to hedge against fluctuations in benefit accruals alone because wages and salaries already provide the perfect hedge.²⁷ A separate argument on behalf of the ABO is that firms offering a DC

²⁷ One might be concerned that the ABO approach might expose firms to undue financial stress as their workforces age. But if—as in Bulow's benchmark model—labor markets clear each period on the basis of total compensation, the high rate of benefit accruals associated with an aging workforce would be offset by slow growth of wages and salaries. In other words, the rapid pace of benefit accrual would not imply that overall compensation was increasing at an inappropriate or burdensome pace. Because pension costs are typically a small fraction of total compensation, only a small adjustment in salary is generally required to accommodate fluctuations in pension cost due to changing demographics. Moreover, an ABO-based approach would not prevent firms from accumulating liquid assets on their balance sheets (that is, outside the plan) without either tax penalty or tax benefit, for later use in funding the plan.

plan use the ABO approach without controversy. For example, a firm that matches its employees' contributions, and automatically steps up their contribution rates each year unless they opt out, would account for the cost of the plan on a current basis, not using a forecast-based accrual pattern reflecting the trajectory of a typical employee.

Bulow concedes that if a certain form of implicit contract bound the future actions of workers and firms, the PBO would be the better measure of the economic liability of the firm with respect to its pension plan. But on a number of grounds, he expresses skepticism about the likely relevance of such contracts. Furthermore, he argues that even if such contracts did exist, the generosity of a firm's DB plan might be a poor guide to the empirical importance of the implicit contract at that firm.

Ultimately, the net implication of the choice between ABO and PBG for the risk that plans present to the workers and the PBGC may not be too great: If the ABO were the economically correct concept but the PBO were nonetheless adopted as the legal standard, the funding objective would generally be higher than with the ABO, providing an extra barrier against risk. On the other hand, the adoption of the PBO as the funding standard might also be taken as justification for investing part of the pension trust in equities, as a hedge against future salary risk. But investing part of the trust in equities would move the portfolio away from immunizing the ABO—a step that would, all else equal, increase risk. Which of these two influences would predominate is not clear. *What discount rate?* If the ABO is the funding objective, the liabilities of a plan at any given moment are known in nominal terms, up to demographic risk. If we further stipulate that the capital market views the form of demographic risk that manifests itself in pension plans as diversifiable and therefore does not price it, the present-discounted value of liabilities should be computed using the risk-free nominal yield curve.²⁸ The only question of operational interest is how best to construct an empirical proxy for that yield curve—an issue that is addressed in section V.

With respect to the appropriate discount rate, two claims quite different from the one put forward here are often asserted. First, the argument is often made that because

²⁸ Having calculated the present-discounted value of liabilities in this manner, the determination as to whether a plan had met the postulated standard of security would then be made by verifying that the market value of assets was at least equal to the PDV of liabilities and that the assets were invested in risk-free nominal bonds structured so as to deliver their cash flows just as the pension obligations are coming due.

pension sponsors sometimes default on their pension obligations, the pension promises they make should be discounted at a rate appropriate for risky cash flows. After all, so the argument goes, participants in the pension plan are creditors of the firm just as bondholders are, so why should the obligations payable to one be treated any differently from the obligations payable to another? The difference is that the pension trust serves as security for the pension obligations; because of that trust, the pension promises of *any* sponsor can be risk-free. And to determine *whether* they are risk-free, they should be discounted at a riskless rate even if the general obligations of that sponsor are seen as highly risky.

A second claim, especially common in the actuarial literature, is that the choice of a discount rate for future liabilities should be influenced by the nature of the assets held by the pension trust. Indeed, according to Bader and Gold (2003, fn.16, p.11), the Actuarial Standard of Practice (ASOP) dealing with the selection of economic assumptions for pension plans “would generally rule out the use of a near-riskless rate to discount the well-funded pension liabilities of strong sponsors, where the assets are invested in risky securities.”²⁹ ASOP 27 reads in part as follows: “Generally, the appropriate discount rate is the same as the investment return assumption.” This is a remarkable statement because it suggests that plan sponsors can reduce their funding obligations by investing in riskier securities, whereas conventional finance theory suggests that just the opposite should be true. Markets value claims to cash flows based on the properties of those cash flows rather than the characteristics of the assets that may be held in trust against them.

What composition of the portfolio of assets? If pension promises are known and must be met with certainty, then the sponsor must hold a core portfolio of sufficient value, invested so as to immunize the risk of its liabilities. The sponsor could, of course, hold a portfolio of greater value than the required minimum, in which case the surplus value would not have to be held in the immunizing asset. But the sponsor cannot hold less than the required minimum amount and cannot invest any of that required minimum in any asset other than the immunizing asset—in this case, bonds structured to deliver their cash

²⁹ The claim here, of course, is even stronger—that a near-riskless rate should be used to discount even the well-funded pension liabilities of weak sponsors.

flows as the pension obligations are coming due. As Bodie (1990) points out, an all-bonds portfolio has the additional advantage from the perspective of the sponsor of maximizing the benefit associated with the tax-preferred status of the pension fund.

Discussion. The triplet identified here ((a) fund to the ABO, (b) discount using the risk-free rate, and (c) either purchase deferred annuities or invest the pension trust in nominal bonds designed to mature as the pension obligations come due) provides an internally consistent set of answers to the three questions posed at the beginning of this section. Moreover, if the objective is to ground the pension promise in certainty and if the market for labor were perfectly competitive and frictionless, these answers would be exactly correct from the perspective of basic finance theory. Given the importance of the issue, it is a little surprising that the literature seems not to have progressed much beyond these statements. As was noted earlier, Bulow (1982) addresses the possibility that implicit contracts govern the life-cycle pattern of compensation, but sees such contracts as probably not very relevant, and in any event not well indexed by the size of the DB plan. To my knowledge, there has been no examination of the quality of the approximation provided by the ABO-based triplet in other market contexts, such as where efficiency wages are important.

The security of pension benefits cannot be determined simply by comparing the market value of assets to the market value of liabilities. Benefits are fully secure only when *both* the market value of assets is at least as great as the market value of liabilities *and* a portion of assets—at least as great as liabilities—is perfectly correlated with liabilities. Of course, once this condition has been met, any surplus can be invested in assets other than the ones that are required to immunize liability risk without jeopardizing the ability of the sponsor to make good on the benefit obligation.³⁰

In the world imagined here, in which the pension promise is a risk-free obligation (at least leaving aside demographic risk), the measure of liability that is relevant for pension regulators—founded on the ABO concept of liability and a risk-free rate as the discount rate—will also be the relevant concept for use by participants in bankruptcy proceedings, as well as by securities analysts constructing market-based estimates of the value of individual firms. If the regulatory objective is met (that is, the pension promise

³⁰ Bodie, 1990a, p.16.

is free of risk), the market value of a firm's pension liabilities can appropriately be measured using the yield curve of risk-free rates, regardless of the creditworthiness of the sponsor.

In the present world, in which the pension promise involves risk, the situation is a good deal more complicated, and one can imagine several alternative interesting measures of pension liability, each relevant from the perspective of a different stakeholder in the pension deal. From the perspective of the government, a measure of interest is the PDV of benefits guaranteed by the PBGC. Assuming that the taxpayer will ultimately step in, if necessary, rather than allow the PBGC to default on its stated obligations, this measure of liability should be computed using a yield curve of risk-free rates. From the perspective of financial analysts and investors, a measure of interest is the PDV of the sponsor's liability. This measure should be computed using a discount rate that reflects not only the risk-free rate but also (a) the funding ratio of the plan, (b) the extent to which the assets of the plan have been invested so as to immunize the liability risk of the plan, and (c) the creditworthiness of the sponsor.³¹ From the perspective of the worker, a measure of interest is the market value of the benefits that workers will receive under the plan. This measure can fall no lower than the amount guaranteed by the PBGC, but it also includes a call option on the assets of the plan with a strike price equal to the guarantee amount. Obviously, once one steps outside the world of perfect certainty, the range of potentially interesting measures of liability becomes much greater. However, the range is not unlimited, and a common feature of the measures described above is that they each attempt to answer a well-defined economic question. It is not apparent that the same can be said of each of the measures of pension liability currently in use.

IV. The anatomy of plan failure

Viewed from a high altitude (sufficiently high, to be clear, that the messiness of the details fades from view), the pension landscape described in section II has a generally sensible aspect: Barring a waiver from the IRS, sponsors are required to contribute

³¹ These are the same factors that determine the value of the option held by the firm to put the obligations of the plan to the PBGC.

enough each year both to fund their normal cost for that year and to amortize a portion of any unfunded liability that the plan may have accumulated. Sponsors of plans with especially deep underfunding face an additional funding requirement intended to accelerate their progress toward full funding. Taxpayers shoulder a contingent liability associated with their backstopping of private plans, but they are compensated in a way that is at least loosely tied to risk. All in all, therefore, the system has clearly been configured with an eye to limiting the risk borne by both beneficiaries and taxpayers while providing some flexibility to employers. And yet the fact remains that the PBGC currently reports a net financial position of negative \$23 billion and is likely, in the view of most analysts, to encounter even more substantial financial difficulty in the years ahead. Thus the question: In practice, what features of the current pension environment, as they operate in the real world, have allowed some plans to get themselves into desperately urgent financial condition, causing them ultimately in some cases to default on promises to workers, generate large obligations for the government insurance program, and put surviving sponsors at risk of having to bear more than their economically fair load? The purpose of this section is to lay out what is known on the basis of actual experience about the weaknesses in the current system; the goal is to ensure that the reform suggestions put forward in the following section address the real problems of that system.

No recent study has attempted to quantify the contributions of specific factors to the deficit status of the PBGC, but in Congressional testimony, Steven Kandarian (2003) pointed to several key factors without attaching numerical estimates. Among those factors were these:

- The assets in the portfolios of pension plans have not been structured to mimic the characteristics of plan liabilities. As a result, the “unprecedented, concurrent drops in both equity values and interest rates” experienced by plans in recent years both eroded the value of assets and inflated the value of plan liabilities (pp.4-5).
- The additional funding requirement faced by severely or chronically underfunded plans stops out when such plans reach a funding ratio equal to 90 percent rather than 100 percent, leaving plans with less than they would need to make good on all obligations if the plan were to be terminated immediately (p.6).

- The definition of “current liability” fails to “recognize the full cost of providing annuities as measured by group annuity prices in the private market” (p.6). In other words, on average, the combination of discount rates, retirement ages, and mortality rates assumed by firms results in too low an estimate of plan obligations, and hence of the appropriate level of plan funding.
- The definition of “current liability” also fails to recognize the increased tendency, as a plan veers toward termination, of workers to draw subsidized early-retirement benefits (p.6).
- Similarly, “current liability” ignores the incremental cost associated with lump sum payments, which may become especially prevalent during the run-up to termination (p.7).
- Credit balances allow some sponsors to make smaller contributions, or no contributions at all, even as their plans head toward termination (p.7).
- The limit on the maximum deductible contribution inhibits sponsors from “build[ing] up an adequate surplus in good economic times to provide a cushion for bad times.” (p.7).

From time to time, the GAO has taken a more quantitative approach to assessing the causes of large claims on the pension insurance fund. Although the most comprehensive of these studies, reported in GAO (1987), is now nearly two decades old, it may still shed useful light on the current situation. In that study, the GAO estimated that about seventy percent of the claims on the PBGC between 1983 and 1985 reflected funding rules that were too lax, partly because they allowed benefit improvements to be amortized over thirty years. GAO attributed the remainder of the claims on the PBGC during that three-year period to the fact that required contributions were not always paid before a plan terminates. Of the amount the GAO classified as required but unpaid, nearly half reflected required contributions that had not yet come due (because payments are not due until 8½ months after the close of the plan year to which those payments pertain); about a third stemmed from arrears; and the remainder reflected amounts that had been waived by the IRS.

In two more recent studies, GAO (2003b and 2003c) concentrated on a few terminations that generated large claims on the PBGC and corroborated a number of the points made by Kandarian. Several of the illustrations given by the GAO pertained to the

termination of the plans sponsored by Bethlehem Steel. With respect to the role of equity investments, the GAO noted that as of September 30, 2000, Bethlehem had 73 percent of the assets of its DB plan invested in equities. Over the following year, the value of those assets declined 25 percent, and by the time the plan had terminated a little more than a year after that, the value of its assets had declined another 23 percent (2003b, p.7). Credit balances also played an important role in the Bethlehem narrative. The GAO (2003b, p.12) reports that, one year prior to termination, Bethlehem faced a minimum required contribution of \$270 million. Yet, according to PBGC (2005g), in the three years preceding the termination of its plans, Bethlehem was able to avoid contributing any new resources by virtue of being able to draw on its credit balance. The Bethlehem experience also sheds some light on why termination liability often exceeds current liability. For the purpose of calculating current liability, Bethlehem participants eligible for unreduced benefits after 30 years of service were assumed to retire at age 62; for the purpose of calculating termination liability, however, they were assumed to retire at age 55. The GAO cites the PBGC as estimating that the difference in assumed retirement ages approximately doubled the liability of the plan for benefits payable to those participants (p.21).

Separately, the GAO highlighted the extent to which firms have been exempted from paying the variable-rate premium. The GAO focused on three plans that terminated in 2002 and 2003; none of these plans paid a variable-rate premium in 2001 because they qualified for the exemption available to any sponsor whose contribution into the plan in the previous year was at the so-called “full funding limit,” explained in more detail in the following section (2003c, p.22). Finally, the GAO noted a possible role of the limit on deductible contributions in having held down the contributions of the Polaroid Corporation to its plan: As of January 1, 2000, Polaroid’s DB plan had a funding ratio of more than 100 percent. “The plan’s actuarial report for that year indicates that the plan sponsor was precluded... from making a tax-deductible contribution to the plan.”³² A

³² As the GAO notes, Polaroid assumed the highest possible interest rate in computing its liability for purposes of determining its funding requirement. Had Polaroid used a lower interest rate, and hence generated a larger estimate of its liability, the corporation might have been able to make a deductible contribution.

little more than two years later, the plan was terminated with a funding ratio of 67 percent based on termination liability (2003b, p.12).

In yet another study (1998), the GAO highlighted the importance of claims from flat-benefit plans: “Most of the claims against PBGC’s single-employer program have come from ‘flat-benefit’ plans that cover hourly workers in unionized companies” (p.9). The GAO did not quantify what it meant by “most,” nor did it rule out that the other factors discussed above had also played a role in generating large claims. Elsewhere, the GAO describes various forms of moral hazard as having increased claims against the PBGC; these forms of moral hazard include increasing promised benefits, forgoing contributions either legally by waiver or illegally, and selling “a subsidiary with an underfunded plan to a troubled buyer” (p.17). No quantitative estimates of the importance of these effects were provided.

All in all, the roster of weaknesses in the current system looks rather deep.

V. The nuts and bolts of pension-system reform

The defined-benefit pension system is in need of reform in all its major dimensions—funding requirements, portfolio investment restrictions, insurance premiums, and disclosure. Unless substantial steps are taken, each of the three major constituencies involved in the system will continue to bear needless costs: Workers will confront needless uncertainty regarding their future financial security; sponsors will operate in a regulatory regime imposing unnecessary costs; and taxpayers will continue to subsidize the pension deal between workers and firms in a manner that is not widely understood and to a degree that is difficult to estimate.

Specifically with reference to the PBGC, there are two dimensions to the problem—a backward-looking one and a forward-looking one. The backward-looking problem is that the insurance fund has already sustained substantial net losses with respect to its operations thus far. The PBGC reports a negative net financial position of \$23 billion as of September 30, 2005, but the backward-looking problem is bigger than that because sponsors have accumulated put options under current law that have substantial value even though they have not yet been exercised. To deal with this overhang of history, three alternative approaches are logically possible, none of which is

attractive: taxpayers could foot the bill; premiums could be raised above their economic level in an effort to recoup already-incurred losses from surviving sponsors; and the PBGC could default on its obligations. Of these three, the first has the virtue of making good on the government's promises as they are commonly understood while still allowing PBGC insurance to be fairly priced on a prospective basis; thus, it avoids distorting employers' decisions as to whether to sponsor DB plans. In the words of the CBO (2005b, p.8), "Conceptually and practically, the prospective approach [calibrating premiums to future risks rather than accrued losses] has several advantages. The idea of a fair insurance premium is intrinsically forward-looking: it is the expected cost of future adverse outcomes covered under the terms of the insurance policy." In a competitive market for plan termination insurance, any provider attempting to raise premiums above their economic level would be priced out of the market by other providers (including new entrants) that had not sustained greater-than-expected losses in the past and that therefore would be willing to price at marginal cost on a prospective basis. Moreover, regardless of the market structure on the provider side, boosting premiums above their economic level would impose an excess burden on surviving sponsors, heightening the risk of an exodus from the DB sector.

The forward-looking problem confronted by the PBGC is that it will, in all probability, continue to accrue net economic losses so long as it continues to operate under current parameters. To remedy this situation, actions should be taken in three broad areas: to improve funding and tighten portfolio investment rules; rationalize the pricing of the PBGC's insurance; and improve the information provided about DB plans to workers, in private financial statements, and the federal budget. In principle, a thorough implementation of the steps in any one of these three areas might be sufficient to right the ship even without any reform in the other two areas. For example, an ideal system of risk-sensitive premiums might cause sponsors to fully fund their plans and immunize their liability risk. Alternatively, a perfect system of public disclosure might so enhance market discipline as to cause sponsors on their own to aim for full funding and complete immunization. Despite these possibilities, the approach taken here is to recommend fundamental changes in all three areas. This approach deliberately involves a degree of redundancy—belt, suspenders, and bungee cords—on the theory that not all

reforms may be implemented simultaneously and that even if all were implemented and functioned as intended, the cost of redundancy would be small and might be zero.³³ For example, a sponsor with a fully-funded and immunized plan would not have to pay any insurance premium except, perhaps, for a base amount to cover PBGC administrative expenses.

A. The first locus of reform: funding requirements, limitations on the ability of plan sponsors to increase benefits when plans are underfunded, and portfolio-investment restrictions.

Determination of required contributions under current law. Required contributions depend on four main factors: normal cost, supplemental liabilities that are amortized over several years rather than funded in full immediately, an additional funding requirement faced by sponsors of severely or chronically underfunded plans, and various exemptions from and disincentives for additional funding.

A plan's normal cost is the amount of benefits attributed under a funding method to the particular plan year. Many different methods for computing normal cost have been developed, each of which allocates total plan cost differently over time. Treasury regulations disallow methods that allocate total plan costs in a manner that is deemed to be too back-loaded. In the simplest of all possible worlds, setting contributions equal to normal cost each year would cause assets to keep pace with liabilities and thus cause the plan to remain fully funded.

Every forecaster knows, however, that history never unfolds exactly as projected: Rates of return, mortality, and salary growth differ from their assumed values; actuarial assumptions are adjusted; plan provisions are changed; and sponsors grant benefits based on service prior to plan inception. All of these eventualities create gaps between assets and liability. Such gaps are amortized over various periods depending on the source of the discrepancy, as shown in the table below:

³³ Bodie and Merton (1993) and Bodie (1996) emphasize the complementarity of the tools discussed here. They also emphasize the importance of improving the ability of the PBGC to monitor plan sponsors and the inadequacy of the PBGC's current tools in this regard—topics not addressed here.

Amortization Periods for Unfunded Liabilities

<i>Source of unfunded liability</i>	<i>Amortization period</i>
1. Experience gains and losses (deviations of rates of return, mortality, etc., from assumptions)	5 years
2. Changes in actuarial assumptions	10 years
3. Plan amendments	30 years
4. Initial unfunded liability, plans established after January 1, 1974	30 years

Source: McGill et al. (2005, p.686).

The idea of these amortization charges and credits is to continuously—albeit slowly—nudge assets back into line with liability.

Single-employer plans with more than 100 participants may face an additional funding requirement (AFR) if they are either severely or chronically underfunded.³⁴ The determination as to whether a plan is subject to an AFR rests on the plan's funding ratio, defined as the ratio of the actuarial value of the plan's assets to the plan's current liability.³⁵ If either the funding ratio is less than 80 percent or the funding ratio is between 80 percent and 90 percent and has not been above 90 percent two consecutive years within the past three years, the plan is subject to the additional funding requirement. Sweeping aside many details, the AFR is determined roughly as follows:

$$\text{AFR} = \text{unfunded liability} \times \text{amortization fraction},$$

where the amortization fraction is 18 percent for plans with a funding ratio of 90 percent, 30 percent for plans with a funding ratio of 60 percent or lower, and linearly interpolated for plans in between. Thus, the additional funding requirement is intended to cause plan sponsors with severely or chronically underfunded plans to contribute enough each year,

³⁴ The additional funding requirement was introduced in the Omnibus Budget Reconciliation Act of 1987 (see GAO/T-HEHS-94-191, p.2) and amended in the Retirement Protection Act of 1994 enacted as part of P.L. 103-465. Current statutory requirements are specified in 26USC§412(l). See McGill *et al.* (2005, pp.689ff) for a helpful description of the requirements. Regarding the actuarial value of assets, see 26USC§412(c)(2)(A); http://www4.law.cornell.edu/uscode/html/uscode26/usc_sec_26_00000412----000-.html. Treasury Department regulations (26CFR§1.412(c)(2)-1) fill in the details, and specify that the actuarial value cannot stray too far from the fair market value, nor run consistently above or below both the current fair market value and a moving average of same.

³⁵ For details on the particular version of current liability that must be used to determine applicability of the AFR, see table comparing various measures of liability.

in total, both to fund their normal cost in the given year and to accelerate their progress in closing any gap between assets and liabilities. Note, however, that the accelerated gap closure intended under the AFR does not apply to any plan with a funding ratio in excess of 90 percent nor to many plans with funding ratios between 80 percent and 90 percent. In a study of the 100 largest plans between 1995 and 2002, the GAO found that only about three plans per year, on average, were assessed an AFR despite the fact that about ten plans per year had funding ratios of less than 90 percent.³⁶

Two other provisions allow firms to contribute less than the amounts indicated above, and two more limit their incentive to contribute in excess of the minimum required amount. Under some circumstances, funding requirements may be waived altogether.

- *Credit balances.* The cumulative difference between actual and minimum required contributions is tallied in a hypothetical account called the funding standard account (FSA).³⁷ Firms that have, on net, contributed more than the minimum required amounts over the years have a credit balance in their FSA and can use that balance to offset current or future required contributions. Credit balances have enabled some distressed sponsors to defer required contributions during the run-up to bankruptcy, arguably causing the PBGC to absorb a greater loss. As noted above, Bethlehem Steel was a case in point.
- *Full funding limit.* ERISA sets a cap—known as the full funding limit, or FFL—on the amount that sponsors may be required to contribute in any given year. When it binds, the FFL causes the required contribution to fall short of the amount indicated by the plan’s normal cost, amortization charges, and AFR. The following is a stylized version of how the FFL has been determined since 2004:

$$\text{FFL} = \max[\text{AL} - \min(\text{MVA}, \text{AVA}), .9 \cdot \text{CL} - \text{AVA}],$$

where AL is accrued liability (which may be computed taking projected future salary increases into account), MVA is the market value of assets, AVA is the actuarial

³⁶ GAO-05-294, p.25.

³⁷ McGill *et al.* (2005, p.687), and 29USC§1082(b)(2); http://www4.law.cornell.edu/uscode/html/uscode29/usc_sec_29_00001082----000-.html

value of assets, and CL is current liability.³⁸ Roughly, the idea of the FFL is to stipulate that sponsors will not be required to contribute more to their plans than the amount that would cause their plans to be fully funded as defined in the law. Given that the spirit of the other funding rules is to ensure that sponsors fund their normal costs and close a *fraction* of any existing funding gap, it might seem counterintuitive that a firm could, in the absence of the FFL, have been required to make a contribution that would have taken assets above liability, but such an outcome is possible given the variety of definitions of assets and liability involved in the various determinations.³⁹

- *Maximum deductible amount.* Pension contributions may be deducted from income for tax purposes, up to a limit specified in law (see Joint Committee on Taxation (2005), p.34). The determination of the maximum deductible amount is so complex as to be more easily illustrated than described; the illustration appears in chart 6. Amounts contributed in excess of the maximum deductible amount are subject to a 10-percent excise tax.
- *Waivers.* If a plan sponsor would be unable to meet the minimum funding standard “without temporary substantial business hardship... and if application of the standard would be adverse to the interests of plan participants...,” the Internal Revenue Service may grant a waiver of some or all of the required contribution except for the amount required to amortize any previous waivers.⁴⁰ Waived contributions must be amortized over five years, beginning in the year following the waiver, and no more than three waivers may be obtained in any 15-year period.⁴¹

³⁸ See Joint Committee on Taxation (2005), pp.30-31. Between 1995 and 2003, the cap on required contributions was set as follows: $FFL = \max[\min(AL, \alpha CL) - \min(MVA, AVA), .9 \bullet CL - AVA]$, where α was 165 percent in 2002 and 170 percent in 2003.

³⁹ A likely consequence of the funding approach suggested here is that funding ratios would fluctuate in a narrow band around 100 percent. Ratios above 100 percent would probably be about as likely to occur as ratios below 100 percent because of the greater symmetry in the rules if the maximum deductible amount were to be increased and the FFL repealed.

⁴⁰ Requirements with respect to waivers and criteria for the determination of “business hardship” are spelled out in 26USC§412(d).

⁴¹ VanDerhei (1990) is the only study of which I am aware that attempts to quantify the importance of waivers. Using data from Form 5500, he identified 115 waivers granted in 1980 and 1981; across those plans, the waived amounts totaled \$622 million. By 1987, 20 percent of the sponsors that had been granted waivers in 1980 and 1981 had terminated their plans. Claims from these sponsors totaled \$136 million, but VanDerhei attributed only \$26 million of that amount to the waivers that had been granted in 1980 and 1981. Thus, he computed a loss ratio of only 4.2 percent for the waivers from this period.

Proposed reforms of funding requirements. To minimize the risk presented to workers, taxpayers, and healthy sponsors, in line with the premises stated in the introduction, sponsors should be required to fund benefit accruals each year plus amortize shortfalls or surpluses over a reasonably short period, all on a marked-to-market basis.

Implementation of this objective would require the following changes relative to current law: The method of calculating plan liability for purposes of determining required contributions should be greatly streamlined. The simple theory sketched in section III suggests that a single measure of liability defined on an ABO-type basis and calculated using discount rates taken from an empirical proxy for the risk-free yield curve should be sufficient. All gaps between assets and liability should be amortized over some uniform and reasonably short period—perhaps on the order of five or seven years—regardless of the sources of those gaps.⁴² The additional funding requirement should be eliminated, taking with it the associated funding volatility and administrative complexity. Increases in flat-dollar benefits should either be treated as part of normal cost, in line with the treatment of increases in salary-linked benefits, or be amortized over the same reasonably short period applicable to all other sources of underfunding. Shutdown benefits and improvements in plan benefits should likewise be amortized over the uniform period. Whatever length of time is chosen as the period over which funding shortfalls will be amortized should also become the length of time over which the PBGC guarantee becomes effective. Thus, for example, if shutdown benefits are amortized over five years, the guarantee of those benefits should be phased in over five years, measured not from the time when the shutdown provision was added to the plan, as under current law, but from the time when the shutdown was recognized by the actuary for the plan.⁴³ The same general approach should apply for other improvements in benefits. Assets should be valued at current market prices, and firms should no longer be able to use credit balances in the funding standard account to reduce their required contributions. The full-funding limitation on required contributions should be eliminated. Sponsors often highlight the limit on tax deductibility and the excise tax on pension-fund reversions as

⁴² If assets are invested so as to immunize liability risk, as recommended below, a key source of discrepancy between assets and liability would have been removed. Remaining sources would include experience gains and losses (outcomes that differ from actuarial assumptions) and amendments to plan provisions.

⁴³ GAO-04-176T makes a suggestion along these lines.

factors inhibiting them from funding up their plans in flush financial times. Some relaxation of these constraints may be in order, but two considerations suggest that any steps in this direction should be modest. First, the motivation for the constraint on tax deductibility is to limit the loss of tax revenue that sponsors are able to engineer by shifting the timing of their pension contributions; that motivation remains legitimate. Second, the reforms outlined here would move sponsors a long way toward contributing their normal cost year in and year out. By eliminating the bulk of the volatility in funding requirements, these reforms arguably would also eliminate most of the need to manage the timing of contributions and most of the need for a cushion of assets in excess of the required minimum.

An important issue related to the design of funding requirements is the question of how best to construct an empirical proxy for a yield curve appropriate for risk-free cash flows. One possibility would be to use quotes from the market for Treasury securities. A Treasury yield curve would have two disadvantages in this context—first, that the underlying securities are tax-advantaged, and thus are less preferred by pension funds given their tax-exempt status; and second, that prices in the Treasury market incorporate a premium for liquidity—another characteristic that may be of relatively importance to pension funds given their typical investment horizons. A second possible approach is the one currently used by the PBGC; they calculate a pair of discount rates based on a survey of annuity prices. This approach has the appeal of being tied very directly to the existing private market for this type of obligation, but has the disadvantages of involving a relatively opaque process and of dealing with the time structure of the liabilities in only a crude fashion. A third possibility that probably warrants some investigation would be to use the yield curve implicit in the market for swaps of Libor-based floating interest rates for fixed-rate payments. These rates have the disadvantage of including a small premium for credit risk, but that premium seems unlikely to be more than 50 basis points, and thus hardly disqualifying. Moreover, swaps rates have the advantage of being derived from an active and highly transparent market.

Restrictions on the ability of sponsors with unfunded liabilities to increase benefits under current law. If a plan amendment would increase the current liability of the plan and leave the funding ratio of the plan below 60 percent, the sponsor of the plan must provide

security in an amount specified in law.⁴⁴ Similarly, a plan sponsor in bankruptcy may not amend a plan in a way that would increase plan liabilities “by reason of any increase in benefits, any change in the accrual of benefits, or any change in the rate at which benefits vest under the plan.”⁴⁵ Plan amendments that would leave the funding ratio above 60 percent are not constrained so long as the sponsor is not in bankruptcy proceedings. *Proposed reforms of rules governing the ability of sponsors with unfunded liabilities to increase benefits.* Aligning the uniform amortization period with the period over which the PBGC guarantee is phased in should provide full protection to the insurance program from the risk associated with benefit increases, and substantial protection to workers. To increase the protection for workers at severely weakened firms, the restrictions embodied in current law could be retained though they should become substantially irrelevant if and as the incidence of deep underfunding is eliminated.

Portfolio-investment restrictions under current law. The fiduciary of a defined-benefit is required to “[diversify] the investments of the plan so as to minimize the risk of large losses, unless under the circumstances it is clearly prudent not to do so.”⁴⁶ Fiduciaries are not required under current law to immunize the risk in the liabilities of the plan; evidently, in fact, almost *no* consideration is given in statute or regulation to requiring that the fiduciary take any account of the characteristics of plan liabilities in designing the portfolio of assets.⁴⁷ Coronado and Liang (2005, p.9) report that, in 2003, “about two-thirds of the firms [in their sample] allocated between 60 and 75 percent of their DB assets to equity securities. Similarly, two-thirds of the firms allocated between 20 and 35 percent of the portfolio to fixed income securities.” In the aggregate, as is shown in chart 7, pension plans in 2003 held about 60 percent of their assets in equities. According to PIMCO (2005), “the 100 largest U.S. defined benefit pension plans [as of 2002 were] unhedged on more than 90 percent of their interest rate exposure.” Anecdotally, I am

⁴⁴ See 26USC§401(a)(29) and Joint Committee on Taxation (2005) pp.32-33.

⁴⁵ Joint Committee on Taxation (2005), p.33.

⁴⁶ 29USC§1104(a)(1). McGill *et al.* (2005, p.742) note that notwithstanding the diversification requirement, the fiduciary of the plan may invest all of the assets of the plan in “insurance or annuity contracts guaranteed by a life insurance company or wholly in the securities of the federal government or its agencies.”

⁴⁷ The only exception of which I am aware is that sponsors are required to take account of the liquidity needs of the plan—in other words, to ensure that such assets as may be available are sufficiently liquid as to be available for the payment of benefits as they come due.

aware of only two firms having used their assets to immunize liability risk: Boots, a British pharmaceutical retailer, which is said to have backed off this policy, and United Airlines, which is described in Walsh (2005) as having abandoned the strategy in the mid-1980s.

Proposed reforms of portfolio-investment restrictions. If firms are to immunize their liability risk to the maximum practical degree, they should hold very-high-quality debt instruments structured to deliver their cash flows when the benefit obligations are coming due. In practice, such debt instruments could include both Treasury securities and very-high-quality private securities. If the demand for such instruments were to expand dramatically, one could expect private firms to cater to that demand by adjusting their capital structures, and financial markets to repackage existing debt by slicing it into senior tranches suitable for pension fund investors and junior tranches for other investors better positioned to shoulder credit risk.

Portfolio-investment practices of the PBGC at present. The assets of the PBGC are maintained in two separate funds: An on-budget revolving fund receives premium income and is the source of benefit payments, while an off-budget trust fund receives assets taken over from terminated plans and recoveries from employers. Transfers are made from the trust fund to compensate the revolving fund for benefit payments deemed to have been backed by assets taken over from the sponsor. The PBGC invests the revolving fund entirely in Treasury securities, but invests a portion of the trust fund in equities, including actively managed equities. As of September 30, 2005, the revolving fund amounted to \$16.4 billion while the trust fund held \$32.6 billion. The share of the portfolio invested in equities has fluctuated over the years. At the end of fiscal year 2005, equity holdings represented about 25 percent of total PBGC investments, down from about 30 percent as of one year earlier; cash and fixed income securities made up virtually all of the rest. The reduction in the equity share reflected a deliberate decision on the part of the PBGC to increase its use of fixed-income securities to immunize its liabilities. Under that policy, the PBGC will reduce its equity holdings to between 15 percent and 25 percent of its overall portfolio.⁴⁸

⁴⁸ See PBGC (2005a), p.14.

Proposed reform of the portfolio-investment practices of the PBGC. The case for limiting the portfolio of the PBGC is straightforward. The liabilities of the PBGC derive from plans already terminated, and thus are not adjusted for further increases in service or salary; effectively, they are known in nominal terms, up to mortality risk. Presumably, the PBGC should conduct itself as if it will be required to meet its obligations with certainty. Under that assumption, the cost-minimizing (and therefore value-maximizing) method of operation is for the PBGC to invest its assets entirely in long-dated zero-coupon bonds structured to mature as the obligations of the terminated plans come due.⁴⁹ Bodie (2005) provides a particularly simple and elegant demonstration of the proposition that the immunizing portfolio meets the obligation with certainty at minimum cost.

Discussion. Sponsors express a great deal of concern about the volatility of required contributions under current law. Several of the reforms proposed here would eliminate mechanisms that sponsors have viewed as useful in reducing the volatility of required contributions relative to what it otherwise would have been. (The relaxation of the constraints on tax deductibility is the exception, as it would be viewed as allowing firms greater flexibility to fund up their plans when times are good.) But the volatility of contributions is entirely a choice of plan sponsors. Bader and Gold (2003, p.12) point to the obvious first step for sponsors seeking to reduce funding volatility: “Asset-liability matching can sharply curtail the volatility of financing gains and losses, and the purchase of deferred annuities can eliminate it.” If even the remaining volatility—which would derive from the influence of interest rates on normal cost—was intolerable to sponsors, they could render their funding requirements essentially entirely predictable from year to year by redefining the promised benefit under the plan. For example, they could structure the plan so that a fixed percentage of salary is contributed each year and used to purchase deferred fixed (though possibly inflation-indexed) annuities in whatever amount the

⁴⁹ Because it receives a continual flow of assets from terminated plans, and because the liquidation of those assets takes at least a little time, the PBGC will never be able to boost the measured share of Treasury securities in its portfolio to 100 percent, but it can certainly set its target at that level. If sponsors immunized their liability risk, an all-bond portfolio would be cost-minimizing for the PBGC even taking account of the fact that additional plans would be terminated in the future. If sponsors continue to carry unhedged equity risk, conventional finance theory would suggest that the PBGC should hold a short position in equities.

market would provide under current conditions.⁵⁰ Equivalently, the plan could self-insure by building a duration-matched portfolio of bonds. In either of these ways, the sponsor could achieve complete control over pension costs (by way of its control over the salary deferral rate) and complete elimination of funding volatility. At the same time, some of the critical features of the DB model would have been preserved: Workers would be given access to the annuity market at group rates; the security of the retirement promise would have been enhanced; and a considerable degree of predictability about the amount of retirement income to be provided through this means would have been retained.

B. The second locus of reform: pricing of PBGC insurance.

Determination of insurance premiums under current law. As was outlined earlier, the PBGC receives premium income in return for the insurance it provides. Under ERISA as originally enacted, the only form of premium was a flat-rate fee of \$1 per year per participant.⁵¹ The flat-rate premium was increased in several steps during the 1980s before reaching \$19 per year per participant in 1991. The flat-rate premium remained at its 1991 level in nominal terms (and thus obviously declined substantially in real terms) until it was raised to \$30 in the budget bill enacted earlier this year. A variable-rate premium was added in 1987. Initially, this premium was assessed at \$6 per \$1,000 of unfunded vested liability and was capped at \$34 per participant per year. The premium rate was increased to \$9 in 1991 and the cap was removed in 1996.⁵² Firms that contributed the FFL amount in the prior year are exempt from the variable-rate portion of the insurance premium in the current year.⁵³

⁵⁰ The general design sketched here would appear to preserve the DB character of the plan, but depending on the specifics, variations on this structure might raise issues as to whether they would be subject to the DB or DC regulatory regime.

⁵¹ Here, as in most other places in the paper, the description pertains to single-employer plans only. Participants include active employees, employees who have separated from the firm with sufficient service to have vested in the plan but who have not yet begun drawing benefits from the plan, and current beneficiaries.

⁵² GAO-04-90, p.9.

⁵³ See, for example, GAO-05-294, p.9, fn.24. At first blush, it might not be apparent how a firm that is subject to the variable-rate premium (by definition, applicable only to firms with unfunded liability) could simultaneously have met the standard of the full funding limit. Such a circumstance can arise because a plan's status with respect to the variable-rate premium is determined using different measures of liability

Many analysts have criticized the current structure of premiums as failing to apply economically appropriate prices to the risk that plans actually present to the PBGC (see, among many others, VanDerhei (1990), Lewis and Pennacchi (1994), Boyce and Ippolito (2002), Congressional Budget Office (2005b)). To be sure, premiums are not completely insensitive to risk under current law; the variable-rate portion of the premium (\$9 per \$1000 of underfunding) does penalize some underfunding. Even so, the current structure of premiums bears little resemblance to the economically fair structure for two reasons. First, and most obviously, only one risk factor—the level of assets relative to liabilities in the plan—is taken into account in the determination of the premium under current law; yet the risk confronted by the PBGC depends on two additional factors—the financial health of plan sponsors and the extent to which plan assets have been invested so as to immunize liability risk (see, among others, Lewis and Pennacchi (1994) and Pennacchi and Lewis (1999)). A different way to describe this first flaw in the current structure of premiums is to note that the penalty on underfunding remains the same regardless of whether sponsors (either individually or in the aggregate) face a small risk of bankruptcy or a large one, and regardless of whether sponsors have invested their assets so as to immunize the risk in the liabilities or with a heavy representation of equities.

The second major flaw in the structure of the premium under current law is that even the one risk factor recognized under current law is penalized only very incompletely. Precise figures are difficult to come by, but one set of calculations suggests that, in 2003, the variable-rate premium was assessed against only about a fifth of current-liability-basis underfunding owing to the FFL-related exemption noted above.⁵⁴

Several analysts have argued that, in addition to being too insensitive to risk, the current structure of premiums is simply too low—meaning that it generates too little

than the one that is used to determine the full funding limit for the plan (see table comparing various measures of liability).

⁵⁴ COFFI (2005b) stresses the importance of exemptions from the variable-rate premium, and states that an even larger fraction—90 percent—of liability was exempted in 2003. Precise figures are difficult to come by because the variable-rate premium is calculated using its own definition of liability. The estimate quoted in the body of the text is based on the version of current liability that is used to determine minimum required contributions. This version uses a weighted moving-average interest rate to discount liabilities whereas the version of current liabilities that is used to compute the variable-rate premium is based on a spot rate.

revenue given the current scale and structure of risks presented to the PBGC. Boyce and Ippolito (2002) simulate a detailed model of the defined-benefit sector and conclude that, in expectation, a private provider of current-law insurance would demand about twice as much premium income as would be generated by the current structure of premiums. VanDerhei (1990) concludes that the pricing prevailing as of his writing was even more inadequate: He estimates that levying an actuarially (but not economically) fair risk premium against actual exposure in 1984 would have boosted risk-related premium income to the PBGC by a factor of about 4½. Finally, Lewis and Pennacchi (1994) and the CBO (2005b) both estimate that premiums should be boosted by a factor of about six in order to reflect the full economic cost of current-law coverage.

Although premium revenue seems clearly to be too low given the current structure of risks being presented to the PBGC, it bears emphasizing that premium revenue would not necessarily be substantially greater, and could be substantially less, in a reformed system. Boyce and Ippolito (2002, p.158) note that if sponsors were bound to a more stringent set of funding rules, and therefore presented less risk exposure to the PBGC, a fully priced set of economic premiums could, in fact, generate much less revenue than is provided in expectation under current law. The same would be true to an even greater degree with both tighter funding rules *and* more stringent portfolio investment requirements.

Proposed reforms of the determination of insurance premiums. The premiums assessed by the PBGC should both allow the PBGC to cover its administrative costs and provide full compensation for all risk presented to the PBGC. Plans with a sufficient level of assets structured to immunize the risk of plan liabilities present essentially no risk to the PBGC and so should pay no premium beyond the amount required to cover the PBGC's administrative costs.

Administrative costs can be recovered by means of a successor to the current flat-rate premium. Given 44 million insured participants, the PBGC's administrative expenses of \$263 million in 2004⁵⁵ could have been raised with a flat-rate premium of about \$6 per participant. As has been noted by many observers, a premium based on number of participants subsidizes plans with older workforces and more generous benefit

⁵⁵ PBGC (2005c).

provisions at the expense of new plans and plans with younger workforces. An alternative approach that would address that concern would involve tying the administrative charge to insured liability. For example, given the \$1.553 trillion in PBGC-insured liability in 2002 (latest data available), expenses that year of \$222 million could have been recovered with a charge of about 14 cents per thousand dollars of insured liability.

Before the design of a risk-based premium can be taken up, two questions of general principle must be addressed. First, should the government merely aim to assess actuarially fair premiums—and therefore only recover expected costs as they would be calculated using the Treasury rate—or should the PBGC also be required to levy an additional charge to compensate for the fact that its losses occur disproportionately when financial resources are especially valuable? Private insurers acting in the place of the PBGC would demand compensation for such systematic risk, and basic principles of financial economics suggest that the PBGC should do the same.⁵⁶ The reason is not that the government should behave as if it were risk averse itself, but rather that a government seeking to tally the full cost of its programs should recognize that *other* participants in the economy are risk averse. An implication of that risk aversion on the part of others is that the government should take account not only of the average amount of resources it is appropriating from the private sector but also the circumstances under which that appropriation is occurring. Programs that cause resources to be appropriated disproportionately when times are bad—and hence when resources are especially valuable—should be scored as more costly than programs that appropriate the same amount of resources in expectation but without correlation to the state of the business cycle, and more costly by an even wider margin than programs that appropriate resources disproportionately when times are good.

A logical and appropriate consequence of the presence of market risk is that the PBGC would be expected to run a small surplus on average, once its insurance had been fully priced. Pennacchi (2005, p.27) addresses the same issue in the context of the

⁵⁶ The assertion here that the PBGC insurance premium should include compensation for risk does not contradict the equivalence that was noted in section III in a frictionless, perfectly competitive world in which sponsors are required to fully fund their plans and immunize their risk. If all liability risk has been immunized, as was assumed in section III, insurance premiums would not reflect a premium for market risk.

Federal Deposit Insurance Corporation, which insures certain balances held in depository institutions: “An outcome of setting fair rates is that the FDIC will make profits, on average. That is, premiums less insurance losses must be, on average, positive in order to compensate taxpayers for having to fund large net insurance losses during economic downturns.” As Pennacchi notes, the presence of a surplus might incorrectly strike some observers “as evidence of excessive, rather than fair, insurance premiums.” As noted by the CBO (2005b, p.14), the “problem” of the surplus could be addressed by having the PBGC pay the general fund a reinsurance premium, set at the estimated amount that the PBGC had collected from plan sponsors as compensation for risk. Alternatively, as noted earlier, if the PBGC comes to be viewed as backed by the full faith and credit of the Treasury, a simpler approach would be to abolish the trust fund and the revolving fund, eliminating the distraction of the balance in those two funds and putting the focus where it should be—on the question of whether premium rates have been set appropriately on a prospective basis.⁵⁷

A second matter of general principle is the question as to whether—and to what extent—premiums should be tuned to the individual characteristics of plan sponsors or only to the aggregate conditions prevailing at any given moment. Boyce and Ippolito (2002, pp.140-141) argue that premium rates should reflect only the average probability of bankruptcy across the population of insured entities. They argue that tuning premium rates to the financial health of individual sponsors would effectively tie premiums to precisely the risk being insured against. Just as an insurance company is not allowed to boost the premium under a term life-insurance contract if and when the health of the insured has deteriorated, so the PBGC should not be allowed to boost the premium for pension insurance when the creditworthiness of the sponsor has declined. Taken to its logical conclusion, such an approach could substantially reduce or eliminate the value of the insurance. The Boyce-and-Ippolito argument is sensible with respect to the risk factor to which they applied it, bankruptcy risk. However, as was noted earlier, two other factors (the degree of underfunding and the allocation of plan assets) are important as well in determining the overall risk that an individual plan presents to the insurer, and—

⁵⁷ In this case, as discussed more fully below, budget accounting could be performed by recognizing as an outlay the difference between the full economic cost of plan termination insurance and actual premiums paid.

unlike bankruptcy risk—are clearly under the control of the plan sponsor. Failure to tune premiums to those two risks at the level of the individual plan would give unnecessary scope for moral hazard to continue distorting the behavior of plan sponsors.

Taking these considerations on board, what could be done to move the system toward rational risk-based pricing of default insurance? Thus far, two detailed empirical models of the defined-benefit sector have been developed, one described in Boyce and Ippolito (2002) and housed at the PBGC, the other described in CBO (2005b) and housed at the Congressional Budget Office. While neither model may be ready to bear such pressure today, both are highly credible and might ultimately provide a suitable basis for setting risk-based premiums, especially once the reasons for some important differences between the two models are better understood.⁵⁸ Research, development, and refinement of these models should continue so that either or both can become the object not only of analysis but of operations as well.

In moving toward market-based premiums, careful thought would have to be given to the design of the transition. Going “cold turkey” to market-based premiums could force some firms into bankruptcy, because for many firms teetering on the brink of bankruptcy with deeply underfunded plans, the value of the put option associated with the PBGC guarantee under current law no doubt is equivalent to a large fraction of the net worth of the firm. One approach to minimizing unnecessary instances of bankruptcy would involve phasing in market-based premiums linearly over the same five- or seven-year period allowed for amortization of underfunding: In the first year, assuming a five year period were chosen, the premium paid would be equal to one-fifth of the market-based premium plus four-fifths of the current-law premium, and so forth. After five

⁵⁸ The discrepancy that most demands further investigation is the fact that in the vintage of the PBGC’s model described in Boyce and Ippolito (2002), current-law premiums were judged to be too low by a factor of about two. By contrast, in the vintage of the CBO model described in CBO (2005b), the scaling factor is estimated to be about six. Some convergence may already have occurred; in its 2004 Annual Report, the PBGC indicated that the expected claims implied by its model had revised up from about \$800 million per year to about \$2 billion per year. Moreover, some portion of the remaining discrepancy seems to reflect a few readily identifiable differences in underlying assumptions. For example, the CBO assumes that the plans of *all* bankrupt firms are terminated whereas the PBGC assumes that only plans with funding ratios of less than 80 percent are terminated. Also, the CBO boosts plan liabilities by 20 percent at default to reflect such considerations as the tendency of retirees at distressed firms to take subsidized early retirement and lump-sum payments when available, whereas the PBGC appears to increase its estimates of underfunding by a smaller amount; by contrast, the PBGC adjusts liability at termination directly for the additional drain from subsidized early retirement and lump-sum payments on a plan-specific basis rather than using a rule of thumb.

years, when sponsors should have eliminated their current underfunding and redeployed their assets to immunize the risk of their liabilities, the pricing of insurance would provide taxpayers full compensation for the risk they are bearing, which would, at that point, be quite small. Another possibility would be to delay the implementation of risk-based premiums altogether until the end of the first five-year (or seven-year) amortization period.

C. The third locus of reform: transparency

Four separate constituencies are considered: Workers, financial markets, the PBGC, and taxpayers. Transparency should be improved for each.⁵⁹

Requirements for disclosure to workers under current law. Under current law, “only participants in plans below a certain funding threshold receive annual notices regarding the funding status of their plans, and the information plans must currently provide does not reflect how the plan’s assets are invested” (GAO 2003b, p.17). Sponsors are required to report in their annual Form 5500 filing the proportion of plan assets invested in securities issued by the sponsor. However, as noted in GAO (2003b, p.17), this information is neither timely nor “readily accessible to participants.”

Proposed reform of requirements for disclosure to workers. Care should be exercised not to overburden workers with complex and difficult-to-understand financial material, nor to overburden sponsors with onerous compliance burdens. Two pieces of information that

⁵⁹ Yet another possible reform that could be a constructive part of the mix would be to elevate the priority of the PBGC in bankruptcy proceedings. In principle, such a move should cause other creditors to step up the pressure they apply on sponsors to fund their plans prudently. Experience suggests, however, that it would not be a panacea because clever creditors can devise ways of extracting value from the corporation before the PBGC would get its crack at the remainder. For example, Bodie and Merton (1993, p.210) describe the case of Republic Steel, which was acquired by LTV in 1984. “Four years before, the plan was underfunded but it had about \$300 million of assets. A year later senior officers of Republic Steel, some of whom were themselves approaching retirement age, changed the terms of the cash-out option in 1981 so as to make it particularly attractive to take a lump sum in lieu of an annuity. During the subsequent years preceding the merger, retiring employees (of Republic Steel) exercised their cash-out option en masse. When LTV went bankrupt in 1986, the PBGC thus found itself obligated to pay guaranteed benefits on an essentially unfunded plan (\$230 million in liabilities and \$7,700 in assets). Despite the obvious effect of the cash-out provision, both the PBGC and the Department of Labor concluded there was no violation of the law.” On page 214, Bodie and Merton go on to state more generally, “In the event of financial distress, the interests of subordinated creditors can diverge from those of the PBGC. Debt instruments, such as corporate bonds, offer creditors ways of withdrawing cash out of a troubled institution before the guarantor can—high-coupon payments, call provisions, sinking funds, and put-option provisions are examples.” These observations suggest that a higher priority in bankruptcy could be a useful part of the overall belt-and-suspenders toolkit, but should not be relied upon in isolation.

should be easy for participants to understand and straightforward for sponsors to prepare are, first, the present value of accrued benefits (useful to the worker in comparing the DB plan to a DC plan), and second, the fraction of accrued benefits that would be funded if the plan were to be terminated immediately. After the initial phase-in period of five or seven years, most sponsors should be in a position to report a funding ratio very close to 100 percent. Exceptions would include sponsors that had granted improvements in plan parameters or increases in shutdown or flat-dollar benefits, and that were contributing the minimum required amounts to amortize the unfunded liabilities generated by those improvements or increases. If plan assets are used to immunize liability risk, capital gains or losses should not be a source of material deviation from 100 percent funding, though other departures of actual experience from actuarial assumptions could generate deviations from 100 percent funding.

Accounting requirements under current FASB regulation. As noted above, current accounting requirements allow sponsors to assume a high rate of return on pension assets, commensurate with a heavy allocation of assets to risky assets, but then to smooth the associated volatility in actual returns over five years. In effect, the rules create a form of accounting arbitrage. Coronado and Sharpe (2003) show that investors seem to pay more heed to the smoothed figures reported in the body of the financial reports than to the fair-market values reported in the footnotes. Similarly, Franzoni and Marín (2006) show that firms with severely underfunded pension plans tend to underperform the overall stock market. Since 2003, some information about asset allocation has been provided in the footnotes to the financial statements; however, as noted above, this information is aggregated across all plans sponsored by the company, and provides only a very coarse breakdown of assets without, for example, any clarity about the duration or quality of fixed-income securities. More recently, FASB has proposed to move within a year to requiring that fair-market-value measures of assets and liabilities be reported on the balance sheet, and to reconsider the appropriate treatment of pension expense in the income statement over the next two to three years.

Proposed reform of accounting requirements. The general thrust of the current financial accounting requirements, which feature accrual-based concepts and allow firms to report a net pension expense (accrued expenses less returns on assets), is sensible and

economically appropriate. Within that framework, a few crucial adjustments would improve the value and transparency of financial information greatly, namely building the calculation of all items around fair market values rather than allowing delayed recognition of changes in assets and liabilities; and using the ABO concept throughout. If firms deployed their pension assets so as to immunize their interest-rate risk, demographic factors such as tenure and mortality played out as expected, and plan parameters were not changed, net pension expense each period would equal benefits accruing during the period, regardless of rates of return on financial assets or changes in the shape or level of the term structure of interest. Information about asset allocation should be released on a timely basis and at the level of the individual plan, and should include greater detail about the quality and duration of fixed-income securities held by each plan.

Disclosure to the PBGC under current law. Firms are required in their annual filing of Form 5500 to provide some information about their liabilities and assets, but that filing need not take place until 9½ months after the close of the plan year. On that form, the estimate of plan liabilities is as of the beginning of the plan year; therefore, by the time the PBGC receives the information from the filing, the information is almost two years old. Asset data on Schedule H of the form are as of both the beginning and the end of the plan year, so information about the holdings of the plan is “only” nearly one year out of date by the time it is received by the PBGC. Moreover, the information on the form does not, as a practical matter, allow the PBGC to parse the assets held in pools, trusts, and mutual funds into their fundamental components (that is, specific forms of bonds, equities, and so forth).⁶⁰

Proposed reform of disclosure to the PBGC. To monitor and enforce the asset allocation requirements proposed here, the PBGC would have to be provided synchronous information on assets and liabilities on a far timelier basis than occurs under current law. The information provided under FASB requirements would not be sufficient to the task because the PBGC would have to have data by individual plan, as well as more detail on

⁶⁰ As noted above, FASB does require disclosure of some asset allocation information but not in a form that is useful to the PBGC because it is aggregated across all plans sponsored by the employer, including plans that are not “qualified” under the tax code and therefore not insured by the PBGC.

the characteristics of the assets in the plan than is provided in financial statements, including information on the quality and duration of bonds.

Treatment of the PBGC in the federal budget under current law. As noted earlier, the federal budget treats the PBGC essentially on a cash basis. Revenues of the government are defined to include premium income as well as the investment income of the revolving fund (the receptacle of premium income and immediate source of benefit payments) but not the investment income of the trust fund (the receptacle of assets taken over from sponsors of terminated plans). Outlays are defined to include the portion of benefit payments and administrative expenses not covered by assets assumed by the PBGC. Thus, the net long-term obligation assumed by the PBGC upon the termination of a plan is reflected in the budget only over time, not at the moment of the termination. One consequence of this approach is that the PBGC has been shown as having reduced the unified deficit of the government by billions of dollars thus far despite having accumulated a net worth estimated at negative \$23 billion—an anomaly that arises because a large fraction of the obligations associated with plans already terminated have not yet been paid and will not be paid for many years to come. Thus, while information about the negative net position of the PBGC has certainly been available, the manner in which it has been presented could have been misleading in two respects. The first and lesser risk is that a policymaker focusing on the unified budget could have concluded that the PBGC considered in isolation was in fine shape in light of the fact that PBGC operations were recorded as bettering the budget result (reducing the unified deficit or increasing the surplus) in almost every year. The second and somewhat greater risk concerns the intertemporal stance of fiscal policy. A private insurance company operating in the place of the PBGC would have been required to allow the cash-flow surpluses of the last three decades to flow through in full measure to the equivalent of its unified surplus or deficit, thereby contributing to the accumulation of reserves in advance of future payment of benefits. Had the cost of PBGC operations been accounted for differently, policymakers intent on balancing the federal budget might have chosen a slightly tighter stance of fiscal policy during the past thirty years, thereby allowing the excess of premiums received over benefits paid to flow through, at the margin, into

government saving, putting them in position to choose a slightly easier stance of policy in the future, as reserves are run off.⁶¹

Proposed reform of budgetary treatment. One way to improve the budgetary treatment of the PBGC would be to score the economic subsidy delivered through the PBGC as an outlay. The subsidy could be calculated as the difference between the full economic cost of plan termination insurance and actual premiums paid. (CBO (2005c, p.9) describes an approach along these lines.) Scoring the PBGC in this manner would, in effect, extend the reach of the Credit Reform Act to insurance programs; currently the methods prescribed under that act are applied only to loans and loan guarantee programs.⁶²

VI. Postscript: Does the government really need to be the insurance provider?

Many pension analysts agree that the government should play a role in enhancing the security of retirement income derived from defined-benefit plans.⁶³ The argument for government intervention in some form derives in part from suspicions that neither workers nor financial-market participants would be sufficiently well informed about pension finances—even with the reforms outlined in the preceding section—to provide effective market discipline in a fully deregulated environment. It derives as well from doubts about whether workers would be well positioned to bear the risk associated with

⁶¹ Against the scale of overall government operations, the PBGC's operations over the past thirty years are too small to have been macroeconomically significant on their own, but wider application of the same principle to other insurance-like functions of the federal government might have been quantitatively significant.

⁶² The approach recommended in the text would treat the federal government as liable for *all* obligations taken on by the PBGC despite the fact that under current law the PBGC is not backed by the full faith and credit of the Treasury, and therefore is liable only for obligations that it can pay out of current-law resources. (CBO (2005d, p.5) notes this issue.) Thus, under this budgetary treatment, legislation to back the PBGC with the full faith and credit of the Treasury would be scored as having zero budgetary cost. Unattractive as that consequence is, however, the alternative may be worse. For example, if, under an accrual-type method, PBGC-related spending authority were interpreted as strictly limited to amounts that could be financed out of current-law resources, then all further plan terminations would be scored as having zero budget implications over the long term (additional outlays in the near term would be offset by reduced outlays in the longer term once the PBGC's current-law resources had been exhausted) because the PBGC is already projected to become insolvent.

⁶³ One of the few analysts who leaves his views ambiguous in this regard is Pesando (1996, pp.286-288). He notes that if workers were well-informed and financially sophisticated, government might not need to intervene at all because workers would discount the value of promised future pension benefits to an appropriate extent in light of the financial health of the sponsor and the funding condition of the plan, and would adjust their demands with respect to current wages accordingly. Through a process of self-selection, workers could also sort themselves, with the more risk-averse of them choosing to work for better-funded and more financially sound firms.

uninsured pension promises, and questions about whether workers and firms would be subject to a form of moral hazard in the absence of explicit government involvement—that is, whether workers and firms would assume that society would not let beneficiaries persist in destitution if their pension promises went sour, and so would be more inclined toward risky behavior than they would in the absence of a government safety net.⁶⁴

Although most analysts have concluded that *some* form of government intervention is warranted, some have argued that the current form of intervention, in which the government acts as the provider of plan termination insurance, is not the most appropriate one. For example, Bodie (1996, p.20) has stated that “economic reasoning establishes a rationale for insuring defined-benefit pensions against the risk that the plan sponsor will default on its promise to provide benefits. It does *not* establish a rationale for the *government* to provide such insurance. The federal government is probably not in the best position to carry out such a task [emphasis in the original].” Under the vision put forward by Bodie and others, the government would continue to mandate that sponsors obtain plan termination insurance, but government itself would not provide that insurance; instead, it would be provided by private insurers.

In part, the case for private provision rests on the view that it would reinforce the full risk-based pricing of plan termination insurance.⁶⁵ Left unfettered, private insurers could take into account the risk factors that are largely or completely ignored under the structure of insurance premiums allowed under current law. Sponsors would face the full economic consequences of their actions with respect to their plans, and so would be motivated to take on only the economically appropriate amount of risk in those plans. In return, private insurers could provide coverage of *all* promised benefits—not just those falling beneath an arbitrarily determined cap—and healthy plan sponsors could be assured of not having to subsidize the coverage provided to their shakier counterparts.

⁶⁴ With the possible exception of this third consideration, the arguments put forward here seem as relevant to retiree health benefits as to cash payments; the economic basis for enhancing the security of one but not the other is unclear. One could argue that a minimum level of economic security had been achieved once cash payments had been guaranteed; yet, for many families, the risk associated with an uninsured medical emergency undoubtedly is even greater than the risk associated with the loss of cash benefits.

⁶⁵ This approach would put insurance companies in the position of enforcing market discipline rather than workers or shareholders, and thus provides a plausible answer to the observation that workers and even equity investors seem to have considerable difficulty accurately processing information regarding defined-benefit plans.

One way to introduce a system based on private provision would be to implement the reforms outlined in the preceding section. After those reforms had been fully phased in and any transition period had passed, the risks presented to any insurer—government or private—should have been vastly reduced. Boyce and Ippolito (2002) note, for example, that the scale and dispersion of risks under a reformed regulatory structure would much more closely resemble other forms of coverage currently provided by private insurers. At that point, if the system were functioning as intended, a switchover to private provision could be implemented with little or no discontinuity.

Some analysts have recommended an even more aggressive approach in which private provision would be a first step in the reform process rather than a last step. For example, Weaver (1997, p.156) has argued that “the government should simply surrender its position as monopoly supplier of pension insurance and shift the insurance (or guarantee) function to the private sector.” Weaver (1997, fn.100) cites Pesando (1982), Sharpe (1976), and Smalhout (1993) as also supporting private provision of plan termination insurance, or “risk-based premiums brought about (in whole or in part) though private supply.” One prominent exponent of an aggressive approach has been Richard Ippolito, who was serving as chief economist of the PBGC when his 1987 article propounding this point of view was published and who has reiterated the view more recently.⁶⁶ An important impediment to the implementation of an aggressive approach would be the need to design a sensible transition. Indeed, even proponents of an aggressive approach might end up adopting a reform program along the lines of the one sketched in the preceding section as a bridge to their preferred outcome.

The support for private provision of plan termination insurance is not universal. Some of those who have taken the opposing point of view have argued that the PBGC as

⁶⁶ Ippolito (1987, p.22) wrote as follows: “Implementation of any one of these policies [charging economically fair premiums, boosting the standing of the PBGC in bankruptcy proceedings, and so forth] would substantially reduce the inefficiencies in the pension insurance system. The problem generally is that these solutions would take a long time to become fully effective.

Another approach would be to simply eliminate the PBGC, while retaining a sufficient portion of expected transfers to make the change politically feasible. This could be done by requiring termination of pension plans as of some announced date as a condition for PBGC coverage. Pension promises outstanding at the time of termination would be vested in nominal terms and guaranteed by the PBGC, as under present law, while new pension promises, including indexation of terminated benefits to future wages, would accrue under the new pension plans. All continuing plans either would be exempt from insurance coverage or would be required to purchase insurance at market rates in the private sector.”

currently constituted plays an important role in providing a form of social insurance—that is, by cushioning workers and firms from adverse economic developments. Moreover, in providing such cushioning, the PBGC encourages both workers and firms to be open to the risks inherent in a fluid, dynamic economy such as ours. Far from promoting economic efficiency, a move to limit the ability of the PBGC to provide social insurance would, in the view of these analysts, risk a backlash that could result in much more damaging constraints being placed on the economy. In the words of Salisbury (1996, pp.313), “Agree or not, Congress intended a social insurance model—that is, explicit subsidy within the defined benefit system.” And later (pp.315-316): “The program was legislatively established with social insurance goals. A move to the casualty insurance model may well be justified, but it carries with it a fundamental change of mission. Too many analysts fail to begin their work with an articulation of why Congress was wrong and why they should change the mission. Instead, they analyze the program against a casualty model and declare the program in need of reform. By so doing, they confuse rather than enlighten... The present mission is social insurance. Against that mission the PBGC has been a very successful agency.”⁶⁷

Leaving aside the normative question of whether the PBGC should have a social-insurance role as part of its mission, it is worth noting that the characteristics of the overall defined-benefit system arguably would not be altered greatly under the approach suggested here. Under that approach, employees of distressed firms could be paid *all* their accrued benefits, and a firm experiencing financial distress would still be able—as it can under current law—to lighten its financial load by halting the accrual of additional pension liabilities, though in this case by means of terminating a fully funded plan rather than by causing a deeply underfunded plan to become a public obligation. A system designed along these lines would not involve any announcement that substantial sums of

⁶⁷ Weaver (1997, p.154), among others, disagrees strenuously that the PBGC should aim to be playing any social insurance role. “Mixed insurance-transfer programs—euphemistically referred to as ‘social insurance’ by proponents—inevitably distort the allocation of resources in the economy and are notoriously poor at targeting scarce resources. In PBGC’s case, the system subsidizes wages in failing firms, artificially prolonging the life of inefficient firms at the expense of efficient ones; encourages firms with a greater likelihood of failure to offer compensation in the form of unfunded pension promises the PBGC will likely pay; and, by weakening unions’ stake in the long-term viability of firms, makes capital investment in these firms less attractive.”

money had been directed toward the employees of a certain failing firm, but for the simple reason that a funding gap would never have been allowed to emerge.

VII. Conclusion

In some respects, the defined-benefit pension system in the United States is remarkably successful. In 2001 (latest data available from the Form 5500), roughly \$130 billion was paid in benefits to 11 million recipients, and defined-benefit plans in the aggregate held an estimated \$1.8 trillion in assets as security against future benefit payments.⁶⁸ Over the thirty-plus years since the founding of the PBGC, more than 168,000 DB plans have been terminated, but only in about 3,500 of those cases has the PBGC had to step in as trustee; in the other 165,000 cases, sufficient assets were on hand to meet the accrued obligations of the plan.⁶⁹

In other respects, however, the system is not working as well as it should. The latest estimates from the PBGC put the aggregate level of underfunding in single-employer plans at \$450 billion. The current level and ubiquity of underfunding may be encouraging healthy sponsors to exit in order to eliminate the risk of having to subsidize their less-well-heeled counterparts. At the same time, potential taxpayer liability has increased sharply in recent years, and is at risk of increasing much more in future years. Many workers have suffered severe blows to their personal financial situations as firms have terminated or frozen their plans, causing some to receive much less than they had accrued on paper, and causing others to lose the opportunity to accrue benefits until the end of their working career as they might have anticipated. Sponsors complain about the volatility of the contributions that are required under current law and the cost of complying with relevant regulations.

Against that backdrop, this paper has attempted to identify the steps that would have to be taken to make the pension promise an essentially risk-free proposition for all involved. Throughout, the critical role of the premises underlying this objective—that workers should be able to treat a pension promise as substantially free of risk; that taxpayers should be fully compensated at market-based rates for bearing the risk of

⁶⁸ <http://www.dol.gov/ebsa/PDF/2001pensionplanbulletin.PDF>

⁶⁹ <http://www.pbpc.gov/docs/2004databook.pdf>, table S-3.

pension default; and that healthy sponsors should not be compelled to cross-subsidize their less healthy counterparts—has been stressed. Clearly, a different set of postulates would result in a different set of conclusions.

This paper can be viewed as representing the first step in a wider program. It maps one set of axioms into their implications, but obviously does not provide a complete mapping from all possible axioms into their implications. Nor, more fundamentally, does it derive the axioms from a formal and reasonably realistic model of optimizing behavior on the part of workers, firms, and taxpayers. (In this context, a reasonably realistic model would be capable of explaining such phenomena as the seeming inability even of equity-market participants to accurately infer the implications of information about DB plans for the market value of their sponsors, and the apparent willingness of many workers to increase their exposure to own-firm risk even beyond the amount implicit in their investment in firm-specific human capital.) Policymakers must make decisions that reflect the full complexity of the real world including all the considerations that have been swept aside here. In principle, those considerations could cause policymakers to arrive at quite different conclusions about the appropriate regulatory structure from the ones derived here.

The paper should *not* be viewed as advocating that workers should be provided with risk-free annuities as part of their compensation. Rather, it should be viewed as stipulating that DB pensions should remain as one of the compensation tools available to workers and management as they work out the value-maximizing means of delivering compensation to workers. The paper derives the implications of attaching an important caveat to the use of DB pensions—namely, that *if* workers are to be promised annuities by their employers and *if* taxpayers are to be interposed as third-party guarantors of those annuities, then the pension promise should be essentially free of risk. In the course of bargaining with their employers, workers should of course be careful not to demand too high a fraction of their overall compensation in the form of such risk-free annuities, taking account of whatever Social Security benefits to which they might become entitled. Equity-related compensation and own-firm-risk-related compensation may be complementary elements of the compensation toolbox, but other vehicles aside from DB plans are available for the purpose of giving workers exposure to those forms of risk.

The salient common feature of those other forms of compensation is that they all transparently do not involve the government as guarantor; and they are much more transparent in the manner in which they expose workers to equity risk.

The payoff to a successful program of reform could be substantial. Workers could have a benefit guarantee they could count on for the full amount of their benefits rather than an arbitrarily capped amount. Taxpayers could be relieved of the threat of significant further growth in an already-considerable contingent liability. All sponsors could face a system that was more transparent and that imposed lower costs of compliance; moreover, financially healthy firms could be freed of the risk of having to subsidize their shakier counterparts. In that event, workers and firms could evaluate the pros and cons of DB plans based on their economic merits and decide whether—and to what extent—the DB promise should be part of the preferred overall compensation package.

The Calculation of Liability

A multitude of different measures of liability exist, each built up from different assumptions and used for a different purpose. Table 1 [yet to be supplied] compares the main features of some of the most important measures of liability. For example, different measures of liability must be computed using different discount rates.

- Two measures of liability—the one used to determine the basic minimum required contribution and the one used to determine whether an additional funding requirement is to be assessed—must be computed using a discount rate chosen from within a permissible range.
- The measure of liability that is used to assess susceptibility to the variable-rate premium must be computed using a specific discount rate tied to the Treasury rate.
- The measure of liability that firms report in their financial statements is computed using a discount rate of the sponsor's own choosing, usually tied to an index of rates on high-quality corporate bonds.
- The measure of liability used by the PBGC to assess its own net financial position is constructed using a discount rate derived from a survey of insurance companies regarding the prices they charge for annuities.

Chart 5 shows the evolution of these discount rates between 1995 and 2004 when, for reasons described in the text, head-to-head comparisons of this type are valid. The different movements in rates cause the liability measures to behave differently.

Other factors important in determining the various estimates of liability differ as well.

The quantitative differences among the various measures can be substantial. Most strikingly, the pension plans at General Motors were *underfunded* in the aggregate by \$31 billion as of the end of June 2005 on a termination liability basis even though they were reported in the company's 10-k statement to have been *overfunded* by \$3 billion at the end of 2004 (Walsh and Hakim (2005)). In general, the differences among the various definitions of liability cannot easily be rationalized as reflecting efforts to answer different underlying economic questions. Apparently, no comprehensive study has been undertaken to identify the most important causes of the discrepancies between the various measures of liability.

References

- Bader, Lawrence N., and Jeremy Gold (2003) "Reinventing Pension Actuarial Science," *Pension Forum* (January): 1-13.
- Black, Fischer (1980) "The Tax Consequences of Long-Run Pension Policy," *Financial Analysts Journal*, July-August, pp. 21-28.
- Black, Fischer (1989) "Should You Use Stocks to Hedge Your Pension Liability?" *Financial Analysts Journal*, 45(1), January/February, pp.10-12.
- Bodie, Zvi (1990a) "Pension Funds and Financial Innovation," *Financial Management*, Autumn, pp.11-22.
- Bodie, Zvi (1990b) "The ABO, the PBO, and Pension Investment Policy," *Financial Analysts Journal*, September/October, pp.27-34.
- Bodie, Zvi (1996) "What the Pension Benefit Guaranty Corporation Can Learn from the Federal Savings and Loan Insurance Corporation," *Journal of Financial Services Research*, volume 12(1) pp.83-100, March.
- Bodie, Zvi (2005) "Less is Less: Straight Talk about Government Pension Insurance," *The Milken Institute Review*, First Quarter, pp.38-45.
- Bodie, Zvi, and Robert C. Merton (1993) "Pension Benefit Guarantees in the United States: A Functional Analysis," in Ray Schmitt, ed., *The Future of Pensions in the United States*, The Pension Research Council of the Wharton School of the University of Pennsylvania, pp.194-234.
- Boyce, Steven, and Richard A. Ippolito (2002) "The Cost of Pension Insurance," *The Journal of Risk and Insurance*, 69(2), pp.121-170.
- Bulow, Jeremy I. (1982) "What are Corporate Pension Liabilities?" *The Quarterly Journal of Economics*, 97(3), August, pp.435-52.
- Center on Federal Financial Institutions (2004a) "PBGC: A Primer," <http://www.coffi.org/pubs/PBGC%20A%20Primer.pdf>
- Center on Federal Financial Institutions (2005a) "PBGC: Policy Options," <http://www.coffi.org/pubs/PBGC%20Policy%20Options%20%20January%206%202005.pdf>
- Center on Federal Financial Institutions (2005b) "PBGC: Premium Hike Possibilities," <http://www.coffi.org/pubs/PBGC%20premium%20hike%20possibilities.pdf>

- Congressional Budget Office (2005a) *A Guide to Understanding the Pension Benefit Guaranty Corporation*, September,
<http://www.cbo.gov/showdoc.cfm?index=6657&sequence=0>
- Congressional Budget Office (2005b) *The Risk Exposure of the Pension Benefit Guaranty Corporation*, September,
<http://www.cbo.gov/showdoc.cfm?index=6646&sequence=0>
- Congressional Budget Office (2005c) “Estimating the Costs of the Pension Benefit Guaranty Corporation,” June 9,
<http://www.cbo.gov/showdoc.cfm?index=6419&sequence=0>
- Congressional Budget Office (2005d) “The Pension Benefit Guaranty Corporation: Financial Condition, Potential Risks, and Policy Options,” June 15,
<http://www.cbo.gov/showdoc.cfm?index=6426&sequence=0>
- Coronado, Julia Lynn, and Nellie Liang (2005) “The Influence of PBGC Insurance on Pension Fund Finances,” Pension Research Council Working Paper 2005-10, The Wharton School, University of Pennsylvania.
- Coronado, Julia Lynn, and Steven A. Sharpe (2003) “Did Pension Plan Accounting Contribute to a Stock Market Bubble?” *Brookings Papers on Economic Activity*, no.1, pp.323-359.
- Franzoni, Francesco, and José M. Marín (2006) “Pension Plan Funding and Stock Market Efficiency,” *The Journal of Finance*, 61(2), pp.921-956.
- Gebhardtshauer, Ron (2003) “Strengthening Pension Security: Examining the Health and Future of Defined Benefit Pension Plans,” testimony before the Subcommittee on Employer-Employee Relations, U.S. House of Representatives, June 4.
- Gold, Jeremy, and Nick Hudson (2003) “Creating Value in Pension Plans (or, Gentlemen Prefer Bonds)” *Journal of Applied Corporate Finance* 15(4) Fall pp. 51-57.
- Groom, Theodore R., and John B. Shoven (1999) “How the Pension System Should be Reformed,” mimeo available at
www.brookings.edu/es/events/erisa/99Papers/Erisa9.pdf
- Gustman, Alan L., and Thomas L. Steinmeier (2004) “What People Don’t Know about Their Pensions and Social Security,” in Gale, Shoven, and Warshawsky, eds., *Private Pensions and Public Policies*, Brookings Institution Press.
- Halperin, Daniel I., and Alicia H. Munnell (1999) “How the Pension System Should be Reformed,” mimeo available at
<http://www.brookings.edu/es/events/erisa/99Papers/Erisa10.pdf>

- Ippolito, Richard A. (1987) "Pension Security: Has ERISA had any Effect?" *Regulation*, no.2, pp.15-22.
- Ippolito, Richard A. (2004) "How to Reduce the Cost of Federal Pension Insurance," Policy Analysis No.523, August 24, Cato Institute.
- Joint Committee on Taxation (2005) *Present Law and Background Relating to Employer-Sponsored Defined Benefit Pension Plans and the Pension Benefit Guaranty Corporation* ("PBGC"), March 7, <http://www.house.gov/jct/x-9-05.pdf>
- Kandarian, Steven A. (2003), "Statement" before the Committee on Education and the Workforce, United States House of Representatives, September 4.
- Lewis, Christopher M., and George G. Pennacchi (1999) "Valuing Insurance for Defined-Benefit Pension Plans," *Advances in Futures and Options Research*, 10, pp.135-167.
- Lucas, Deborah (2005) "Valuing and Hedging Defined Benefit Pension Obligations—The Role of Stocks Revisited," mimeo, Northwestern University.
- McGill, Dan M., Kyle N. Brown, John J. Haley, and Sylvester J. Schieber (2005) *Fundamentals of Private Pensions*, Eighth Edition, Oxford University Press.
- Mitchell, Olivia S. (1988) "Worker Knowledge of Pension Provisions," *Journal of Labor Economics*, vol. 6(1), pp.21-39.
- Munnell, Alicia H. (1982) "Guaranteeing Private Pension Benefits: A Potentially Expensive Business," *New England Economic Review* March/April, pp. 24-47.
- Oliver, Marilyn M., and Gregory S. Schlappich (2000) "American Academy of Actuaries-Conference of Consulting Actuaries PBGC Plan Termination Cost Study," <http://www.actuary.org/pdf/pension/termstudyfinal.pdf>.
- Pennacchi, George G., and Christopher M. Lewis (1994) "The Value of Pension Benefit Guaranty Corporation Insurance," *Journal of Money, Credit, and Banking*, 26(3) August, Part 2, pp.735-753.
- Pension Benefit Guaranty Corporation (2000) "PBGC's Guarantee Limits: An Analysis of Benefits Received by Participants in Selected PBGC-Trusteed Plans," in *Pension Insurance Data Book 1999*, <http://www.pbgc.gov/docs/1999databook.pdf>.
- Pension Benefit Guaranty Corporation (2005a) "PBGC Releases Fiscal Year 2005 Financial Results," <http://www.pbgc.gov/media/news-archive/2005/pr06-06.html>.
- Pension Benefit Guaranty Corporation (2005b) "Valuation of Benefits; Mortality Assumptions," available from <http://www.pbgc.gov/docs/vbma.pdf>

- Pension Benefit Guaranty Corporation (2005c) *2004 Annual Report*, http://www.pbgc.gov/docs/2004_annual_report.pdf
- Pension Benefit Guaranty Corporation (2005d) “An Analysis of Frozen Defined Benefit Plans,” <http://www.pbgc.gov/docs/frozenplans.pdf>.
- Pension Benefit Guaranty Corporation (2005e) “PBGC Announces Maximum Insurance Benefit for 2006,” <http://www.pbgc.gov/media/news-archive/2005/pr06-09.html>.
- Pension Benefit Guaranty Corporation (2005f) “Performance and Accountability Report, Fiscal Year 2005,” <http://www.pbgc.gov/docs/2005par.pdf>.
- Pension Benefit Guaranty Corporation (2005g) “Testimony of Bradley D. Belt before the Committee on Budget, United States Senate,” June 15, <http://www.pbgc.gov/media/news-archive/ExecutiveTestimony/tm13070.html>.
- Perun, Pamela, and C. Eugene Steuerle (2000) “ERISA at 50: A New Model for the Private Pension System,” The Retirement Project Occasional Paper Number 4, Urban Institute, available from <http://www.urban.org/toolkit/policybriefs/subjectbriefs.cfm?documenttypeid=407>
- Perun, Pamela, and C. Eugene Steuerle (2003) “Reality Testing for Pension Reform,” <http://www.urban.org/url.cfm?ID=410797>
- Pesando, James E. (1996) “The Government’s Role in Insuring Pensions,” in *Securing Employer-Based Pensions: An International Perspective*, Zvi Bodie, Olivia S. Mitchell, and John A. Turner, eds., The Pension Research Council and University of Pennsylvania Press, pp.286-305.
- PIMCO (2005) “Defined Benefit Pension Plans’ Interest Rate Exposure at Record High, by Seth Ruthen,” <http://www.pimco.com/LeftNav/Viewpoints/2005/Pension+Plan+Rate+Exposure+Feb05.htm>
- Salisbury, Dallas L. (1996) “Comments” on James E. Pesando’s “The Government’s Role in Insuring Pensions,” in *Securing Employer-Based Pensions: An International Perspective*, Zvi Bodie, Olivia S. Mitchell, and John A. Turner, eds., The Pension Research Council and University of Pennsylvania Press, pp.312-316.
- Smalhout, James H. (1993) “Avoiding the Next Guaranteed Bailout,” *Brookings Review*, Spring, Vol. 11(2), pp. 12-15.
- Starr-McCluer, Martha, and Annika Sundén (1999) “Workers’ Knowledge of Their Pension Coverage: A Reevaluation,” in Haltiwanger *et al.*, eds., *The Creation and Analysis of Employer-Employee Matched Data*, North-Holland.

- Taylor, Andrew (1993) "Pension Woes Raise Specter of Thrift-Style Bailout" *Congressional Quarterly*, February 13, pp. 307-8.
- United States General Accounting Office (1987) "Pension Plans: Government Insurance Program Threatened by its Growing Deficit," GAO/HRD-87-42, <http://archive.gao.gov/d2t4/132801.pdf>
- United States General Accounting Office (1992) "Pension Plans: Hidden Liabilities Increase Claims Against Government Insurance Program," GAO/HRD-93-7, <http://archive.gao.gov/d36t11/148206.pdf>
- United States General Accounting Office (1998) "Pension Benefit Guaranty Corporation: Financial Condition Improving, but Long-Term Risks Remain," GAO/HEHS-99-5, <http://www.gao.gov/archive/1999/he99005.pdf>
- United States General Accounting Office (2003a) "Pension Benefit Guaranty Corporation: Single-Employer Pension Insurance Program Faces Significant Long-Term Risks," GAO-04-90, <http://www.gao.gov/new.items/d0490.pdf>
- United States General Accounting Office (2003b) "Private Pensions: Changing Funding Rules and Enhancing Incentives Can Improve Plan Funding," GAO-04-176T, <http://www.gao.gov/new.items/d04176t.pdf>
- United States General Accounting Office (2003c) "Pension Benefit Guaranty Corporation: Long-Term Financing Risks to Single-Employer Insurance Program Highlight Need for Comprehensive Reform," GAO-04-150T, <http://www.gao.gov/new.items/d04150t.pdf>
- United States Government Accountability Office (2005) "Private Pensions: Recent Experiences of Large Defined Benefit Plans Illustrate Weaknesses in Funding Rules," GAO-05-294, <http://www.gao.gov/new.items/d05294.pdf>
- United States House Ways and Means Committee (2003) *Greenbook*, <http://waysandmeans.house.gov/media/pdf/greenbook2003/Section14.pdf>.
- VanDerhei, Jack L. (1990) "An Empirical Analysis of Risk-Related Insurance Premiums for the PBGC," *The Journal of Risk and Insurance*, June, pp.240-59.
- Walsh, Mary Williams (2005) "How Wall Street Wrecked United's Pension," *The New York Times*, July 31.
- Walsh, Mary Williams, and Danny Hakim (2005) "G.M. and a U.S. Agency See Pensions in Different Lights," *The New York Times*, October 5.

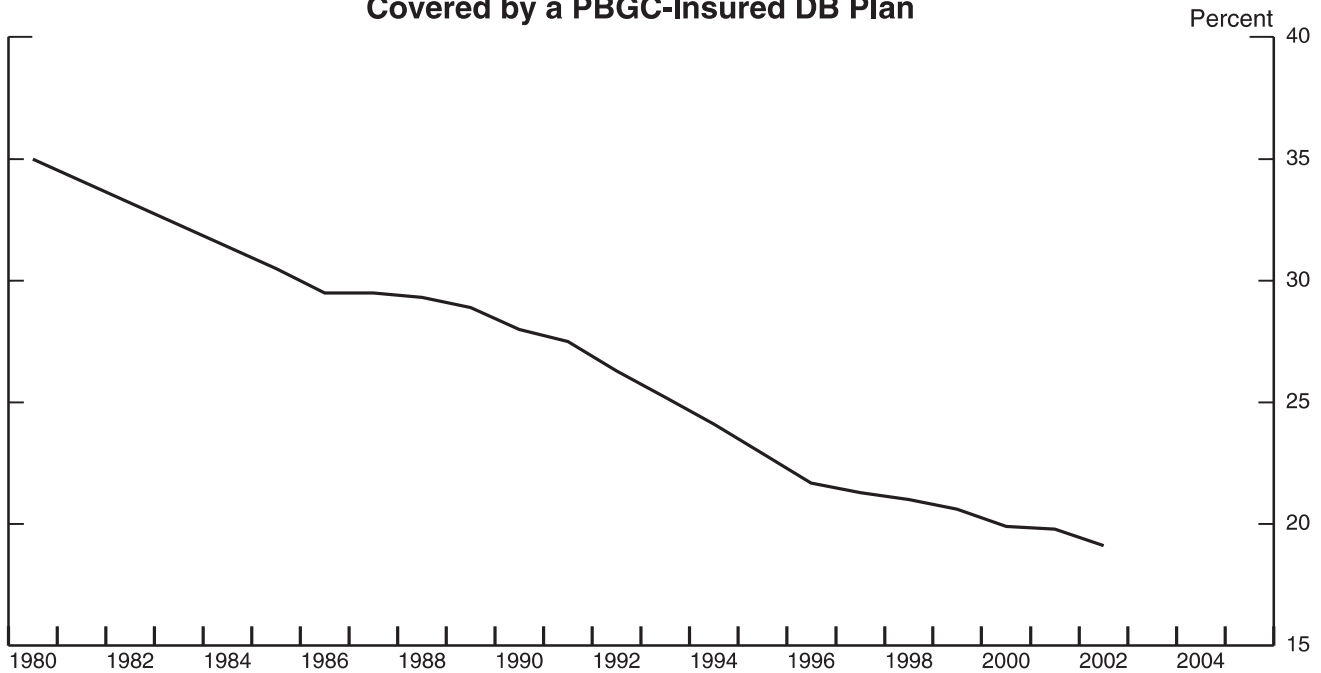
Watson Wyatt Worldwide (2005) “Recent Funding and Sponsorship Trends Among the *Fortune* 1000,”

<http://www.watsonwyatt.com/us/pubs/insider/showarticle.asp?ArticleID=14750>.

Warshawsky, Mark J., Neal McCall, and John D. Worth (2005) “Regulating Single Employer Defined Benefit Pension Plans: A Modern Approach,” Pension Research Council Working Paper 2005-12, The Wharton School, University of Pennsylvania, <http://rider.wharton.upenn.edu/~prc/PRC/WP/Warshawsky%20et%20al%20WP12.pdf>

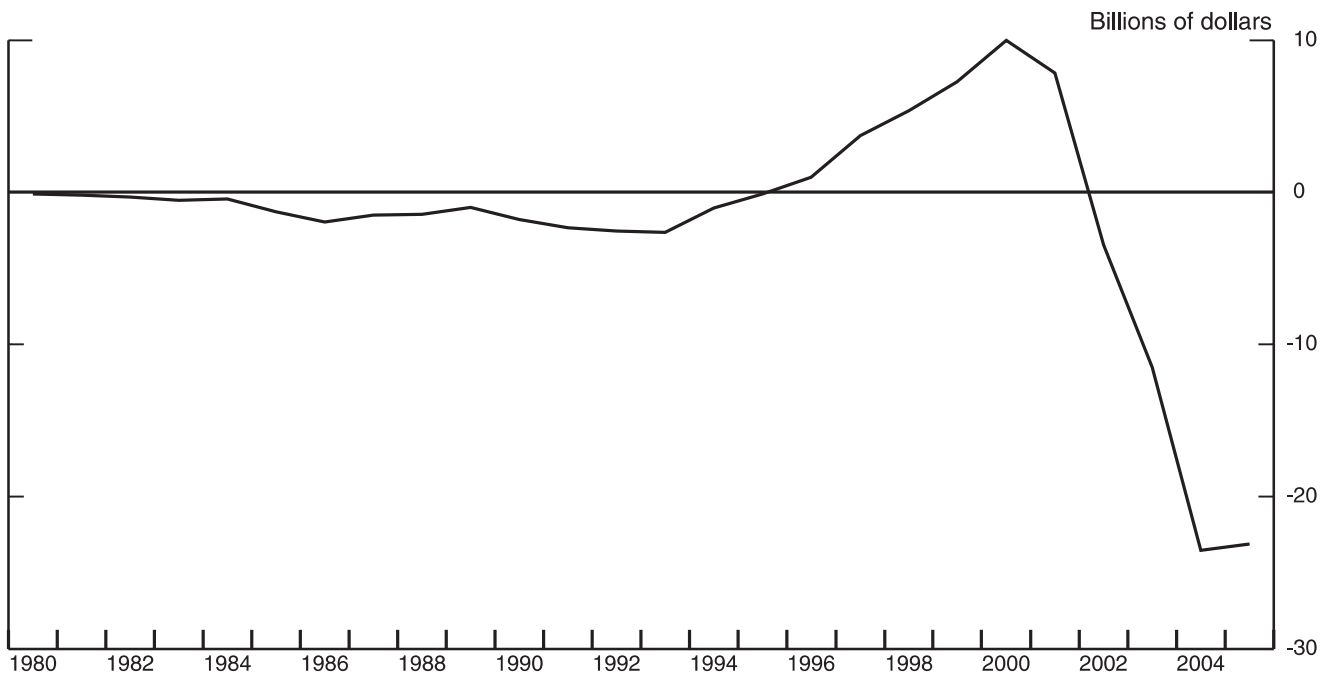
Weaver, Carolyn L. (1997) “Government Guarantees of Private Pension Benefits: Current Problems and Market-Based Solutions” in *Public Policy Toward Pensions*, Sylvester J. Schieber and John B. Shoven, eds., The MIT Press.

Chart 1
Share of Private Wage and Salary Workers
Covered by a PBGC-Insured DB Plan



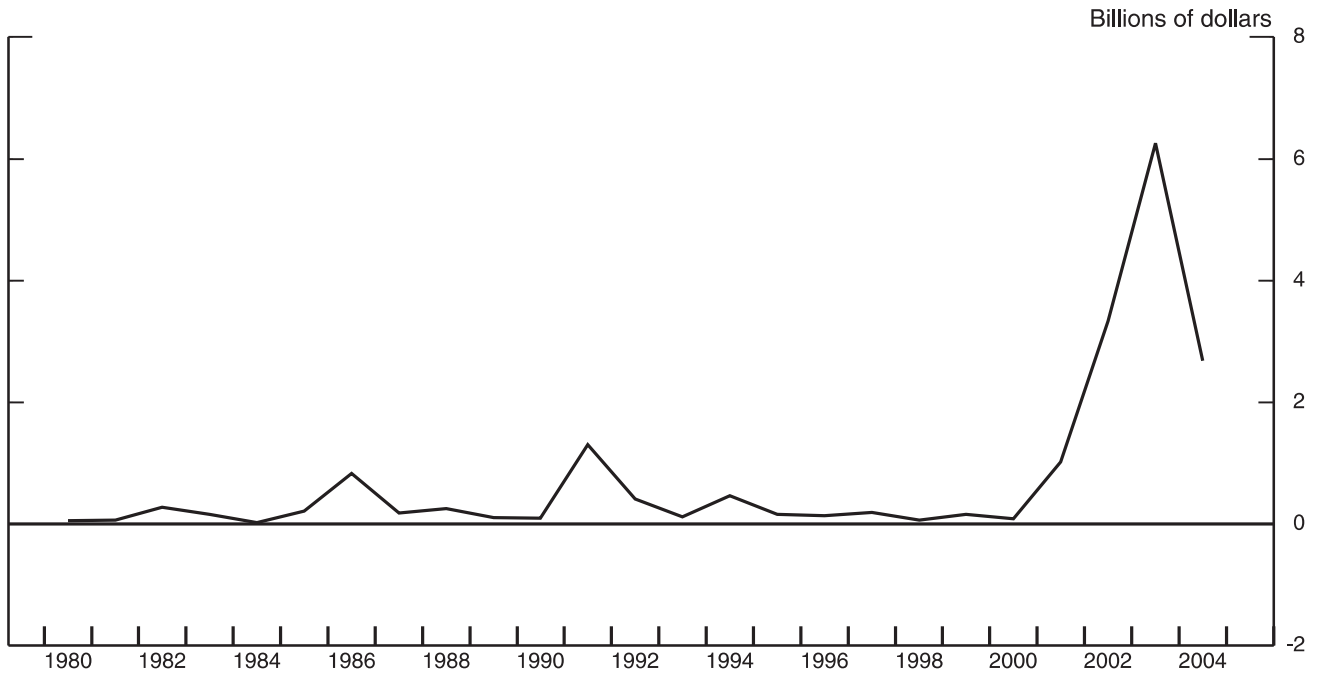
Source: PBGC Databook 1996 and PBGC Databook 2004.

Chart 2
Net Financial Position of the PBGC



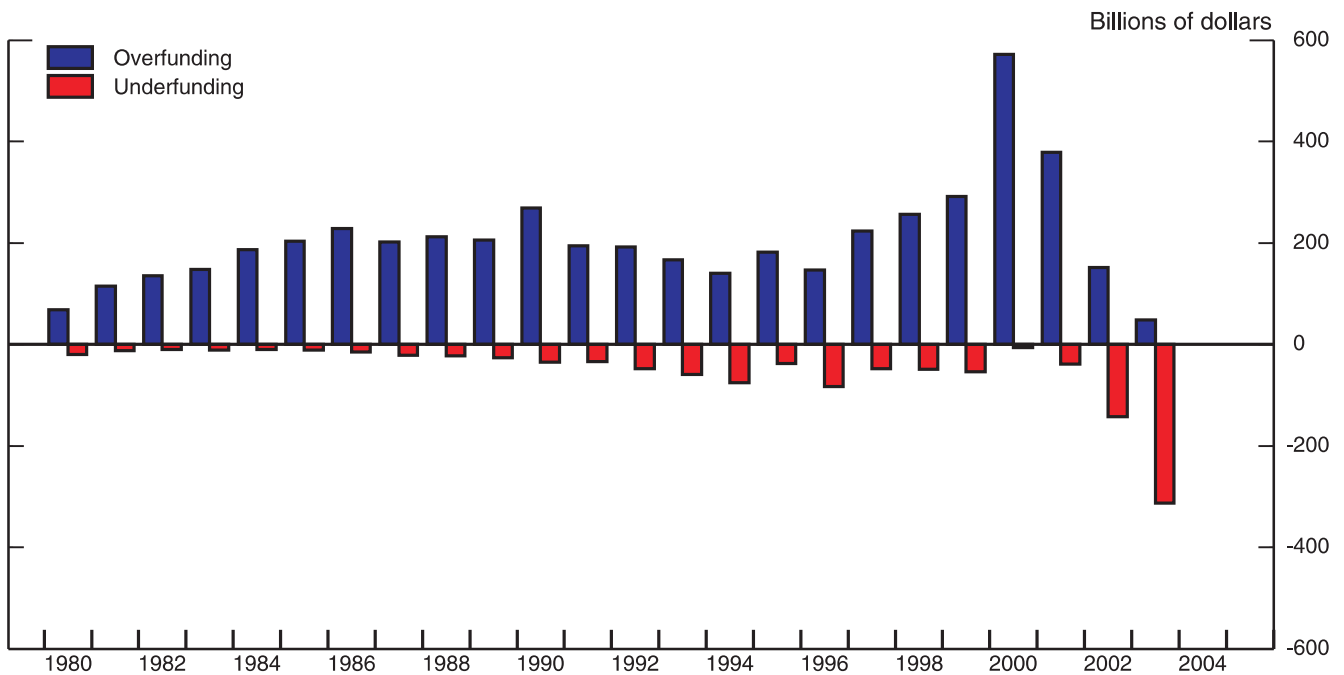
Note: Single-employer and multiemployer programs combined.
 Source: PBGC Databook 1996 and PBGC Databook 2004.

Chart 3
Net Claims on the PBGC



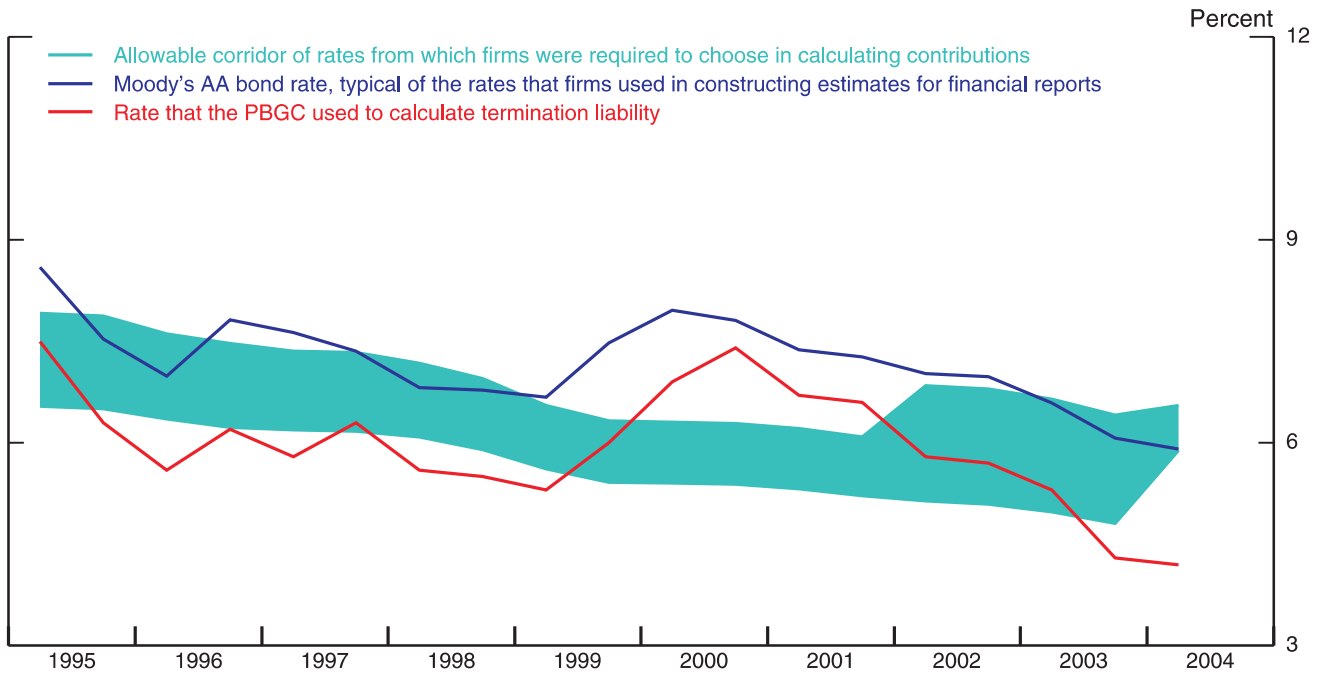
Note: Single-employer plans only.
Source: PBGC Databook 1996 and PBGC Databook 2004.

Chart 4
Funding Status of Private DB Plans



Source: Data for 1980 to 2002 are from the PBGC Databook 1996 and PBGC Databook 2004. Data for 2003 are preliminary.

Chart 5
Alternative Discount Rates for Pension Liability



Source: PBGC.

Chart 6
Determination of the Maximum Deductible Contribution

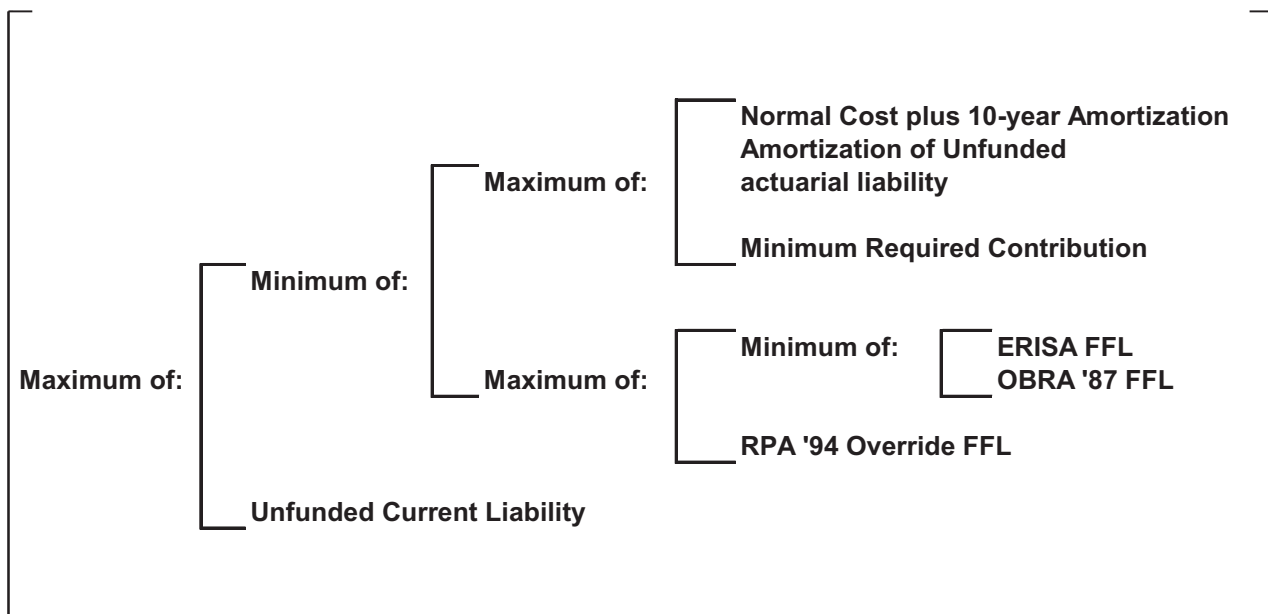
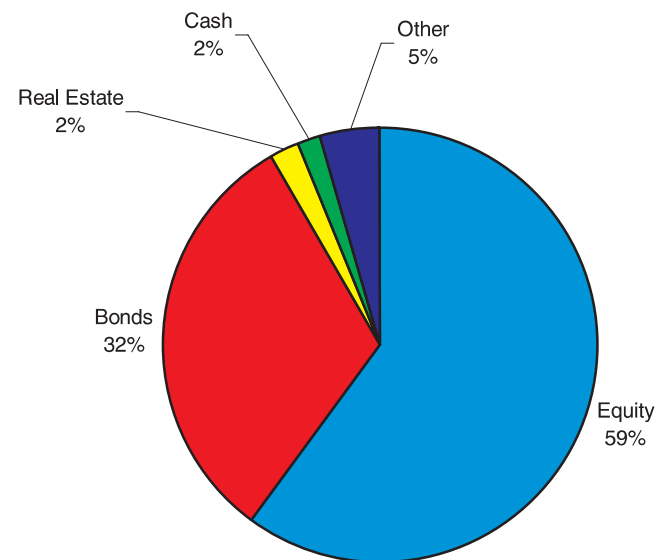


Chart 7
Allocation of Aggregate DB Pension Assets in 2003



Source: Special tabulation of data used in Coronado and Liang (2005).