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Abstract

This study quantifies the possible consequences to stakeholders of reforms to the excise tax on reversions of excess pension assets. Under the Pension Protection Act of 2006 (PPA), funding in defined benefit plans is likely to improve significantly. Many plans may become overfunded over time, owing to the shortfall amortizations mandated by the PPA, as well as to precautionary contributions by sponsors and to plan investment returns. This analysis shows that a more moderate excise tax rate together with a reasonable funding threshold for asset reversions would not only enable sponsors to spend the excess funds on other corporate needs, thereby lowering the cost of sponsorship of defined benefit plans, but also would open a considerable revenue source for the government, with only a small increase in bankruptcy cost for the PBGC. Plan participants could also gain in an alternative reform, which would require a partial transfer of excess assets to them along with a still-lower reversion tax rate.

Key words: excess asset reversion, excise tax, defined benefit pensions, Pension Protection Act

JEL classification code: G23, H21, H23, H32, J32, J38

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In August 2006, the Congress passed, and President Bush signed, the Pension Protection Act (PPA). This legislation addressed almost all aspects of law affecting defined benefit (DB) pension plans, except for the penalty tax on excess asset reversions. Policy logic suggests, however, that the reversion tax also be considered as part of this broad reform.

The PPA requires DB plan sponsors to tend to any underfunding more quickly, steadily and completely than ever before.¹ The new requirements are expected to reduce losses to plan participants of accrued benefits and losses to the Pension Benefit Guaranty Corporation (PBGC) for guaranteed benefits from underfunded plans of failed sponsors. Stated another way, the new law holds plan sponsors more accountable for their obligations to pension participants. That being the case, the setting of compatible incentives would call for allowing plan sponsors to draw upon excess pension assets — after paying appropriate taxes — when plan obligations are adequately secured. Otherwise, the cost of sponsoring DB plans will be unnecessarily high. Moreover, as many plans become better funded, and indeed under most common investment policies, overfunded, excess assets will build up but be locked in the plans.^{2,3} The federal government in particular may lose the considerable revenues it could otherwise collect if taxes were paid on asset reversions.

Current Law on the Taxation of Excess Asset Reversions

Generally, under current law, employers may withdraw assets from a pension plan only after terminating the plan, which requires the sponsor to satisfy all liabilities and vest all accrued

benefits fully and immediately (one exception is explained below). Reversing the favorable tax treatment accorded to employer contributions, these withdrawals are subject to corporate income taxes (currently the federal income tax rate is 35 percent and some states charge their own corporate income taxes). The federal government also imposes an excise tax, partly to recover the tax-free buildup accumulated through investment returns on plan assets. This excise tax, however, is also a penalty tax, as explained in the next section, reflecting the historical view that excess asset reversions from pensions to plan sponsors were wrong and subject to corporate abuse.

The excise tax rate is 50 percent. It drops to 20 percent if the sponsor allocates a portion of the reversion to plan participants, either by benefit improvements immediately before plan termination or by funding benefits under another tax-qualified retirement plan, or if the plan sponsor is in bankruptcy proceeding. Assets transferred to participants in another plan must equal at least 25 percent of the potential reversion. The qualified replacement plan must cover at least 95 percent of the active participants in the terminated plan who remain employed with the sponsor. If the replacement plan is a defined contribution (DC) plan, the transferred assets must be allocated within seven years and are subject to the Internal Revenue Service (IRS) dollar limits on DC plan contributions. If the sponsor allocates assets to participants by increasing benefits before plan termination, it must spend at least 20 percent of the reversion value on the benefit improvements. This must be done on a pro rata basis for all active and most inactive participants.

In any case, whether the excise tax rate is 50 percent or 20 percent, the plan sponsor realizes very little net gain from an excess asset reversion after paying corporate income taxes,

any transfers, and other transaction and termination expenses.⁴ Not surprisingly, such transactions have ceased to occur.⁵

In one notable exception to the prohibition against asset reversions from an active pension plan, sponsors may transfer pension plan assets on a tax-free basis to a retiree medical account that is set up as a separate account of the plan. Under section 420 of the Code, as amended by the PPA, an employer may transfer excess pension assets to retiree medical accounts to fund the expected cost of retiree medical benefits for the transfer period of the current year and up to nine (and at least one) future years. The law defines excess pension assets as assets in excess of 120 percent of the target liability for funding purposes; moreover, the sponsor must maintain this funding status during the transfer period. In a qualified transfer, benefits accrued under the pension plan must be fully and immediately vested and the employer must meet a standard of no reduction in the average amount of employer cost for retiree health benefits for current year and the following four years. Alternatively, the law allows a more limited year-by-year asset transfer for plans that are at least 125 percent funded (this alternative does not require a particular sustained funding status for the pension plan beyond normal compliance with the funding rules; it does, however, require a five-year maintenance-of-effort for the retiree medical plan).

History of the Excise Tax

In the early 1980s, interest rates were unusually high, thus increasing corporate borrowing costs and decreasing pension liabilities, which are the discounted present value of accrued benefits. This, in concert with a strong stock market, pushed many plans well beyond full funding. Some plan sponsors responded by terminating their plans, retrieving the excess

pension assets (after paying the corporate income tax) and setting up replacement retirement plans. A few of these sponsors and plan terminations were involved in highly publicized “corporate raider” takeovers.

In 1984, the federal pension regulatory agencies required sponsors of terminating plans to buy immediate or deferred life annuities from insurance companies for plan benefits to protect employees from market fluctuations.⁶ The Tax Reform Act of 1986 levied a 10 percent excise tax on excess asset reversions. But reversions continued, with controversy, so Congress stepped up the tax rate to 15 percent in 1988 and to 50 percent in 1990. Although the link in the public mind between reversion and unpopular takeover and leveraged buyout activity was one reason for the increasingly punitive excise tax, proponents cited two other, more benefit-related, reasons for the increases. First, they claimed that reducing the cushion of excess assets would make benefits less secure, exposing both plan participants and the PBGC to larger losses. Although this claim may have had some validity when funding rules were weaker, its advocates did not counter propose to allow reversions if funding was above a highly conservative level of, say, 150 percent of plan liability. Second, supporters of harsher reversion penalties insisted that any excess assets either be reserved for benefit improvements or be paid directly to plan participants. This “tails I win, heads you lose” attitude may have made strategic sense for long-term labor-management relations, given the stigma once attached to terminating or freezing a DB plan. That stigma, however, has since disappeared, as it has become common for even highly profitable sponsors to freeze their DB plans. Moreover, this attitude, embodied in legislation, does not endear DB plans to their sponsors and, it may be argued, leads ironically to lower funding and, likely, to declining DB plan sponsorship. Ippolito (2001) has shown empirically that the higher excise taxes on asset reversions played a significant role in reducing pension overfunding

through the 1990s; this reduction, in turn, left plans exposed to the decline in discount rates and equity values in the early 2000s.

Nevertheless, the political arguments against asset reversions are powerful and were used successfully in the past to beat back attempts to pass reforms. They held sway in 1996 against a proposal to lower the excise tax to 6.5 percent and to allow reversions, even without plan termination, if funding was at 125 percent of liability. The risk of an adverse political reaction also convinced the Bush Administration to leave a change of the tax on excess asset reversions out of its comprehensive 2005 pension reform proposal.

Determination of “Fair” Value for the Excise Tax

As noted above, some share of the excise tax fairly recaptures the portion of the reverted pension assets that arises from preferential tax treatment. The General Accounting Office (GAO, 1989) randomly selected and reviewed 18 out of a universe of 202 reversions for \$1 million or more that terminated or announced their intention to terminate in 1988. It constructed a simulation model to calculate an appropriately offsetting excise tax rate for each case. The rate was determined as the one that would have left sponsors no better off financially than if the surplus assets had earned the pension fund’s pretax rate of return through some alternative, non-tax-favored non-pension use. The GAO considered various assumptions for the sponsor’s marginal corporate income tax rate necessary for the calculation, including the statutory and the (lower) average effective corporate tax rates.

The GAO reported that the excise taxes required to recapture the tax benefits from excess pension assets ranged from -7 to 84 percent, with medians (depending on the specific corporate income tax rate used) at 24 or 29 percent. The highest excise tax rates were for plans primarily

invested in bonds, which are highly taxed in non-pension corporate accounts, and the lowest were for plans primarily invested in equities. Presumably, with tax rates on equity investments lowered since 2003, and most pension plans predominately invested in equities, equivalent “fair” tax rates would be lower nowadays. Of course, the fair tax rate would be altered upward slightly if plans follow the more recent trend to lower equity investment.

Although not reported by the GAO, it is possible to calculate an average tax rate, weighted by plan excess assets in the 18 cases, under the GAO’s 1989 assumptions. Employing the effective corporate income tax rate in the calculation, the resulting fair excise tax rate, on a weighted average basis, is 19 percent. The weighted average is a more appropriate estimate of the tax revenue lost to the favorable tax treatment accorded to pensions, so 19 percent is more reasonable to use as the fair rate.

A comparable situation to the United States exists in Canada. If a sponsor wants to terminate (“wind up”) its pension plan, it must, at least in Ontario and some other provinces, receive the consent of plan participants on the disposition of excess assets. This is done through negotiations, arbitration or court proceedings. In practical terms, the outcome is the imposition of “tax” from the viewpoint of the plan sponsor. Moreover, owing to the *Monsanto* decision by Supreme Court of Canada in 2004, the requirements for consent, etc. apply even in the case of a partial wind up, where only a portion of the work force is laid off (see Watson Wyatt Worldwide (2004) for more details).

Funding Prospect of Post-PPA Pension Plans

There are three major forces that will drive the improvement in the funding status of DB plans going forward. The first and most fundamental one is the new PPA funding rules. The PPA

seven-year amortization schedule (or faster six-year schedule for some severely underfunded plans) together with the normal cost contribution and limited use of credit balances mandates sponsors to contribute funds as necessary, and effectively form a lower support for the funding ratio as long as the sponsors are in business operation. Moreover, plan sponsors may well choose to set a higher funding target owing to a precautionary purpose and thus contribute more than this PPA-required minimum. The second force is the investment return. Many plans hold a substantial fraction of their assets in a growth investment portfolio, which implies opportunities to realize the equity premium, while the downside risk, from the perspective of plan participants, is mitigated by the new PPA funding rules. This investment-led asset buildup may take place for on-going plans, and, especially, for frozen or shrinking pension plans with no benefit accrual, because in many of these cases the growth of assets is likely to exceed that of liabilities and hence helps build excess assets. The third force is the asymmetry regarding asset disposals between underfunding and overfunding under current law. That is, plan sponsors have to contribute whenever there is a funding shortfall, but excess assets will remain locked in the plan and thus continue to compound if the punitive reversion taxes under current law and the administrative costs of plan terminations continue.

Reform Proposals

The first proposal for reform of the excise tax regime examined here keys off parameters in current law. It recognizes the improved funding rules and current pension environment, including plan freezes, the dearth of new DB plans and fewer significant benefit improvements. It proposes a lower excise tax rate at 20 percent and would allow excess asset reversions for plans funded at least at 120 percent of their liabilities. As in current law, sponsors would have to

fully vest accrued benefits, though they would not have to terminate their plans.⁷ The proposal's intent is to lower the cost of sponsoring a DB plan and raise revenue for federal government, while securing plan participants' benefits.

Alternatively, we model two other proposals. One would require a funded status of at least 125 percent; the other would impose a 15 percent excise tax and require a 10 percent transfer to participants. Also, the main proposal and the two alternatives go with a lower excise tax rate – 15 percent – on asset reversions in bankruptcy, instead of the 20 percent under current law. In the final report of the “Conversation on Coverage” organized by the Pension Rights Center (2007), the working group on DB plans recommended a new type of hybrid plan. As part of this suggestion, the group advocated for a “Side-Car Trust” to increase funding flexibility, which would allow for employer withdrawals subject to income tax and a 12 percent excise tax, as long as the plan is at least 110 percent funded. Although there are some other slight differences in conditions and terms from the proposal, examined here, the Conversation on Coverage group is more generous to plan sponsors than this proposal.

Methodology for Analysis of the Proposal⁸

We first lay out the dynamics of pension assets. Let A_t denote the market value of pension assets in year t , R_t gross return on investment, P_t annual benefit payout, and X_t contributions to pension plans if $X_t > 0$ or assets reverted back to plan sponsors if $X_t < 0$. Then pension assets evolve according to equation (1) below:

$$A_{t+1} = R_{t+1}(A_t - P_t + X_t) \quad (1)$$

For simplicity, assets are assumed to be invested in two classes: equities with fraction α_t and bonds with $(1-\alpha_t)$, and hence, $R_{t+1} = \alpha_t R_{t+1}^e + (1-\alpha_t)R_{t+1}^b$, where the gross returns of equity and

bonds, R_t^e and R_t^b , respectively, are assumed to be log normally distributed. The dynamics of pension liabilities are expressed in equation (2) below:

$$L_{t+1} = (1 + \phi_t - \Delta r_{t+1}^d D + r_{t+1}^d)(L_t - P_t) \quad (2)$$

where L_t denotes the pension liabilities accrued as of year t . The liabilities are generally measured as the net present value (NPV) of future benefit payouts and they accrue interest at discount rate r_t^d . As the discount rate has a significant impact on the NPV calculation, the term $-\Delta r_{t+1}^d D$ is used to reflect the impact of its changes multiplied by the liability duration D . A small percentage swing in the discount rate often results in a large increase or decrease in liabilities because the duration is typically long. The parameter ϕ_t indicates the growth rate of pension liabilities that are associated with the normal cost or annual gross benefit accrual.

To compare the reform proposal with current law, we establish metrics to measure sponsors' payoff from funding status outcomes and contribution/reversion decisions. This analysis assumes that plan sponsors benefit from higher rather than lower funding levels, which is consistent with the observation that sponsors generally care about their company image, in both financial and labor markets, and they value ease in workforce-management relations. In addition, under the PPA, sponsors of well-funded pension plans gain considerably more flexibility in funding and benefit policy changes compared to sponsors of "at-risk" poorly funded plans. In the model, plan sponsors try to improve current funding status, when necessary, also considering expected future funding outcomes given the uncertainty of investment returns and liability valuations.

Specifically, let $s_t = A_t / L_t$ be the funding ratio. The sponsor's payoff U_t from the funding status can be defined in a recursive pattern in equation (3) below:

$$U_t = \left\{ s_t^{1-1/\eta} + \beta [E_t(U_{t+1}^{1-\rho})]^{1-1/\eta} \right\}^{1/(1-\rho)} \quad (3)$$

where η is elasticity of intertemporal substitution (EIS) – a smaller value implies a stronger desire for smooth rather than large and volatile year-to-year changes in funding ratios, ρ is the coefficient of relative risk aversion (RRA), which indicates a sponsor's reluctance to take risks regarding future uncertain funding outcomes, β is the rate at which sponsors discount future expected payoffs, and E_t is the expectation operator over future payoffs. This class of functional forms was first introduced by Epstein and Zin (1989) and is used widely in academic research in financial economics.⁹

A well-defined maximization problem generally requires a budget constraint. It is, however, a formidable task to model the complex corporate revenue-generating process and the optimal revenue split between a pension plan and operating capital needs. We therefore take a shortcut. We assume that corporations have unlimited capacity to make contributions as needed, but that contributions are not without cost. That is, contributions yield negative payoff to sponsors, while assets reverted give a positive payoff. Consistent with current law, the model incorporates the asymmetrical taxation of contributions and asset reversions. Specifically, contributions are tax-deductible at the corporate income tax rate. Reversions are subject to the excise tax in addition to the income tax. Let z_t be contributions or reversions net of all taxes applicable, expressed as a fraction of liabilities. The payoff function of contributions/reversions is defined below:

$$V_t = \begin{cases} z_t^{\gamma_1}, & \text{for reversion} \\ -z_t^{\gamma_2}, & \text{for contribution.} \end{cases} \quad (4)$$

We impose restrictions $\gamma_1 < 1$ and $\gamma_2 > 1$ for the following reasons: 1) the marginal gain from asset reversions is generally diminishing, hence, $\gamma_1 < 1$; 2) the marginal cost of contributions is increasing, hence, $\gamma_2 > 1$, which implies that a steady flow of moderate contributions is more desirable than a bumpy flow. These two conditions ensure that the payoff function in (4) is globally concave over all values of contributions and reversions. This technical subtlety has an important implication here: plan sponsors are committed to pension liabilities and have no intention of abandoning an underfunded pension plan, i.e., exercising the pension put option (Sharpe 1976). That is, they remain risk-averse and continue to try to remedy any underfunding, rather than switch to a risk-tolerant behavior and bet on high asset returns, as would be otherwise implied by $\gamma_2 < 1$.¹⁰

The plan sponsor's problem in each period is to choose the optimal contribution or reversion so as to maximize the total payoff defined as the sum of equations (3) and (4), i.e., the objective function in equation (5) below:

$$U_t + V_t. \tag{5}$$

As no analytical solution to the model exists, numerical methods are used. The computation begins by discretizing the continuous-state variables (assets and liabilities). The maximization problem is then solved from the last period backward to the first period for all possible combinations of state grid points and realizations of random variables (equity-bond returns and pension discount rates). Given the optimal decision rules recorded along this backward process, a large number of Monte Carlo simulations are finally carried out to generate the best actions (contribution or reversion) for sponsors from the first period forward to the last period of the analysis.

Before displaying results, a further explanation of the specific parameter values listed in Table 1 below is appropriate here. The value of relative risk aversion $\rho = 2$ is borrowed from the household investment and consumption literature, but its value is at the lower end of the range because corporations are generally more risk-tolerant than individuals. Plan sponsors desire a smooth change in funding status, with $\eta = 0.1$, that is, they try to fill any funding gap, often contributing more than the minimum required contribution to that end, but do so gradually. The discount rate for future payoff in equation (3) is set equal to the rate of liability interest accrual, i.e., $\beta = 0.95$, being the reciprocal of average gross bond return. The payoff parameters ($\gamma_1 = 0.5$ and $\gamma_2 = 2$) in equation (4) are set to mimic the behavior of a responsible sponsor, as stated above.

Table 1 here

In our base case, we assume that the plan sponsor invests plan assets in a consistent and constant proportionality of 60 percent equities and 40 percent bonds. Although plans do verge from this average mix, over time and across plan situations, it is nonetheless a good approximation of the central tendency of most pension funds in most time periods. Both academics and consultants have urged plan sponsors generally to move toward a liability-directed investment strategy, which generally means more and longer-term bonds, but many plan sponsors feel strongly that they want to capture the equity premium. Indeed, even the strongest academic advocates of “immunization” acknowledge that if a pension plan, sponsored by a healthy profitable risk-tolerant employer, is an on-going, growing, and long-term retirement vehicle then higher return and risk investments like equities can be part of the fund mix. Nevertheless, in our simulations below we also consider alternative investment approaches with

higher proportions in lower return and risk investments like bonds, either on a dynamic or static basis.

The distributions of nominal yearly equity return (mean 9.2 percent and standard deviation 16.1 percent) and bond return (mean 5.7 percent and standard deviation 11.9 percent) are based on Watson Wyatt January 2007 U.S. Asset Return Assumptions, which are in turn derived through a blend of economic theory, historical analysis and the views of investment managers. The distribution of pension liability discount rates (mean 6.1 percent and standard deviation 0.6 percent) is estimated on composite corporate bond rates from 2001-2007 drawn from the IRS data. The duration of liabilities (12 years), the nominal annual benefit accrual rate (4 percent of liabilities) and the annual benefit payout (3 percent of liabilities) are largely consistent with many U.S. pension plans.

The model incorporates the new funding rules imposed by the PPA. Specifically, sponsors of plans that are at least 70 percent funded have seven years to amortize any shortfalls. Less well-funded plans must amortize shortfalls at a faster pace – six years in the model. If the funding ratio drops below 60 percent, the plan will be frozen and benefit accrual will cease. If the value of plan assets reaches the sum of liabilities plus normal cost, the amortization base automatically resets to zero. Under the PPA, the minimum required contribution is the shortfall amortization charge plus the target normal cost (that is, the value of benefits accrued during the year).¹¹ Plan sponsors may contribute more than the minimum contribution, up to an additional funding cushion of 50 percent of liabilities. This range of contributions is fully tax-deductible, and we assume corporations always have the capacity to make contributions unless they are in bankruptcy.

We also assume that sponsors of both well- and underfunded plans face an exogenous bankruptcy shock of 0.49 percent probability per annum, which is based on Moody's global analysis of the default probability for issues of corporate bonds rated Baa for 1920-2005. In bankruptcy, plan assets and liabilities are transferred to the PBGC, which bankrolls the gap between assets and 120 percent of liabilities if the plan lacks sufficient assets. The extra 20 percent cost is for "pop-up" benefits and administrative costs in a terminating plan situation. The PBGC usually recovers an average of 10 percent of the deficit from the bankrupt sponsor's corporate assets, so we make that assumption. We assume that plans whose funding falls below 40 percent undergo a forced termination by the PBGC, and the PBGC is responsible for funding the plan up to 120 percent of liabilities, using the same procedure as in bankruptcy.

Under current law, asset reversions are subject to possible alternatives, as stated above. Rather than coding all the regulatory details in the model, we assume that reversions in the benchmark must pay 50 percent excise tax and the federal and state corporate income taxes, at 35 and 5 percent, respectively. Miscellaneous market and administrative costs associated with a plan termination amount to another 20 percent. This approach, though slightly sketchy, is consistent with the reality that plan sponsors currently realize very little from a reversion. These extra costs cease to be applicable in the reform proposals, because they would neither require plan termination nor restrict the use of assets reverted.

Simulation Results

Without loss of generality, we consider a single pension plan with initial liabilities of \$5 million and a wide range of initial funding statuses: the market value of plan assets being 80-100 percent of liabilities, uniformly distributed. We run 10,000 simulations, each corresponding to a

40-year path of stochastic outcomes of assets and liabilities. For the practical policy interest, we limit the statistics shown to the first 20 years of the analysis. The results on the single plan may be aggregated, with further modest assumptions, to yield economy-wide meanings. We report the effect of the proposals versus current law. We report separately the results for “payoff-maximizing” plans, which make optimal contributions or reversions, when applicable, to maximize the objective function (5), and the results for “contribution-minimizing” plans, which make only the PPA-required minimum contributions in the case of underfunding and still optimize function (5) in the case of overfunding to determine the desirable excess asset reversion. We then further explore alternative situations by changing some of the key assumptions.

Results for Payoff-Maximizing Plans. First we report the benchmark results for payoff-maximizing pension plans under current law. The simulations show that the average asset-liability ratio will likely rise to above 1.6 in 20 years (Figure 1a). Several factors drive this steady improvement: 1) the PPA’s seven-year amortization schedule (or faster six-year schedule for some underfunded plans) together with the normal cost contributions mandates sponsors to contribute funds as necessary and effectively forms a lower support for the funding distribution – indeed, the PPA-required minimum contributions alone would push the funding ratio to over 1.2 in 20 years (Figure 3); 2) the plan sponsor values a healthy funding status and hence will contribute more than the PPA-required minimum – Figure 2a shows the percentage of scenarios in the 10,000 simulations in which positive contributions are made (solid line), along with the percentage of scenarios in which no contributions are required at all (dashed line); 3) the constant 60-40 split between equity and bond investments implies opportunities to realize the equity premium; and 4) excess assets remain locked in the plan due to the punitive reversion

taxes and thus returns continue to compound – the only excess asset reversions occur in bankruptcy (circled line in Figure 2a).

Figures 1, 2, and 3 here

The reform proposal allows the sponsor to withdraw excess assets if plan funding tops 120 percent of liabilities. This would lower the average funding ratio, but still slightly above 1.2, in 20 years (Figure 1b) – because it would be in the interest of plan sponsors to withdraw excess assets when the payoff is positive net of the lower-than-before reversion tax. In Figure 2b, the dashed line indicates the percentage of fully- or over-funded outcomes in all the simulations. Approximately half of those outcomes are associated with excess asset reversions, as indicated by the circled line in the figure.

At first glance, the lower funding ratios might suggest that the reform is not a good idea. This impression is soon dispelled, however, by examining the redistribution of the excess funds. Table 2 reports the breakdown of costs or benefits among plan sponsors, the government, the PBGC and plan participants, with all numbers calculated as present discounted values over 20 years and averaged over the 10,000 simulations.

Table 2 here

The net contribution cost for a plan sponsor equals all contributions after income tax deduction minus all reversions net of income and excise taxes.¹² This cost reflects the true financing burden for DB plan sponsors, taking into account mandatory obligations and potential benefits. The simulations show that the net contribution cost for sponsors averages roughly \$4.5 million under current law (\$7.7 million before tax deduction), while asset reversions under the proposal help whittle the cost to roughly \$3.8 million (though total gross contributions are larger – \$8.5 million – before tax deductions and reversions).

The government loses tax revenue on plan contributions and recovers it partially or completely through income and excise taxes on reversions. The net costs under current law are roughly \$2.6 million for the federal government and \$0.4 million for state governments. Under the proposal, the net costs would be about \$1.1 million for the federal government and \$0.3 million for state governments. Allowing asset reversions would divert more revenue to the government.¹³

The proposed reform would imply slightly higher contingent liabilities to the PBGC: average plan termination costs associated with bankruptcies or forced terminations would be approximately \$0.09 million under the proposal, compared with roughly \$0.08 million under current law. It is, however, worth noting that if plan sponsors expect no gain from overfunding and so choose to contribute only the minimum required, the average bankruptcy cost would go even higher –around \$0.12 million (see Table 3). The total loss for both the government and the PBGC would be \$1.5 million under the proposal, less than half of the \$3.1 million under current law. In short, the proposal would turn out to be a Pareto improvement with the government and PBGC considered as an integrated entity, that is, all stakeholders gain from this change.¹⁴

Table 3 here

We also considered a higher funding trigger under Alternative 1 – 125 percent – for any asset reversion. Compared with the above proposal, this would yield higher asset-liability ratios for most years (Figure 1c), with the gain ranging between 0 and 5 percentage points on average; correspondingly, the fraction of plans overfunded is slightly higher and the fraction of them exercising reversions is slightly lower (Figure 2c). This, however, does not translate to significantly lower potential bankruptcy cost for the PBGC (column 3 in Table 2). Comparatively, this alternative implies higher contribution cost for sponsors (\$3.8 million) and a

lower tax recovery for the government (i.e., a larger revenue loss \$1.5 million, federal plus state), both mainly due to smaller and fewer asset reversions.

Under Alternative 2 we considered an excise tax rate of 15 percent combined with a 10 percent transfer of excess assets to plan participants. The average funding status would be almost identical to the trajectory under the first proposal (Figure 1d). Plan participants would gain from this redistribution arrangement – an approximately \$0.3 million transfer out of the excess funds being reverted (column 4 in Table 2). The participants' gain is diverted in part from the sponsor's benefit and in part from the government's potential revenue, and, as a result, the net contribution cost for the former and the revenue loss for the latter would be greater than under the other proposal. This alternative proposal would not significantly alter the PBGC's expected average bankruptcy cost.

Results for Contribution-Minimizing Plans. Some sponsors choose to contribute only the minimum required to their plans, either because finances are tight or because they ascribe less value to full funding than we assume optimizing plan sponsors do. We therefore explore the effects of reform proposals on these contribution-minimizing plans.

Even making the minimum contributions, plans with a 60-40 equity/bond asset allocation will eventually become overfunded, albeit at a slower pace, as indicated in Figure 3a. This slower funding route implies that fewer plans would be well-funded (dashed lines in Figure 4) and thus fewer reversions would occur. It is unambiguous, however, that the reversion tax reform proposals would benefit the plan sponsors for a lower net contribution cost, the government for a lower tax revenue loss and the plan participants for real transfers, albeit at smaller magnitudes (Table 3). As before, a lower excise tax would unlock excess assets for sponsors, which implies a somewhat smaller asset cushion for adverse shocks and a slightly higher potential bankruptcy

cost for the PBGC, but the average funding status would remain above 100 percent (Figure 3 b-d).

Figure 4 here

Results for Plans with Varying Asset Allocations. Some economic theories and actuarial literature suggest that the sponsors of well-funded pension plans may be better off if they lower their risk by adopting a more conservative investment portfolio that more closely matches plan assets with liabilities. The rationale is that risk-taking can be put to better use in more rewarding corporate functions than in pension plans. This argument is particularly convincing under current law, because the punitive reversion taxes yield little symmetric reward for taking on pension risk. We therefore conduct an experiment to examine the possible impact of the reform proposal for pension plans that adopt this investment strategy. Specifically, we assume that plans start with the 60-40 asset split between equities and bonds, but then irrevocably switch to a 20-80 split once plan funding status reaches 130 percent.

With asset allocations modified at high funding levels, the strategy apparently limits the upward potential for asset returns. In 20 years, the funding levels under current law are projected to be around 150 percent for payoff-maximizing plans (Figure 5a) and 115 percent for contribution-minimizing plans (Figure 5c). At the same time, the switch to a conservative portfolio reduces the volatility of the market value of pension assets, which implies fewer or smaller funding shortfalls. As a result of these two offsetting forces, the net contribution cost for plan sponsors and tax deduction cost for the government are only marginally different than the results of a constant 60/40 asset split (column 1 in Table 4 vs. column 1 in Table 2). This difference is more negligible for the contribution-minimizing plans (column 3 in Table 4 vs. column 1 in Table 3).

Figure 5 and Table 4 here

On the other hand, with lower investment returns, the potential efficiency improvement also would be lower from the proposed reform. That is, the reform would still benefit all stakeholders, but there would be fewer asset reversions for plan sponsors (column 2 in Table 4 vs. column 2 in Table 2) and less tax recovery for the government (column 4 in Table 4 vs. column 2 in Table 3).

More Alternative Situations. Many plan sponsors realize an effective corporate income tax rate lower than 35 percent, owing to various tax credits and deductions. As an approximation, we apply a 25 percent effective federal corporate income tax rate to the payoff-maximizing plans, without changing the 5 percent state tax.¹⁵ A lower effective tax rate implies fewer tax benefits on contributions, i.e., higher net contribution cost. As a result, the asset release from a reversion is more beneficial to the sponsor – the improvement margin is \$1.1 million (5.16-4.06) in Table 5 compared with \$0.8 million (4.53-3.75) in Table 2. On the other side of the equation, this lower effective tax rate means less revenue loss for the federal government in the first place under current law, so less revenue is recovered – a revenue gain of \$1.2 million (1.82-0.65) in Table 5 versus \$1.5 million (2.62-1.13) in Table 2.

Table 5 here

Clearly, asset returns play a significant role because they affect the amount of assets available for reversion, thereby altering the effect of tax reforms. Moreover, asset allocations in some pension plans may deviate from the 60-40 split between equities and bonds from the very beginning, in contrast to the strategy of changing the asset allocation after the plan becomes well-funded.

We consider a conservative portfolio with a 20 percent equity/80 percent bonds asset allocation, along with the PPA-required minimum contributions. The reversion tax reform has the least impact in this situation. This portfolio would yield an asset-liability ratio around 1.1 in 20 years, absent reversions under current law, and around 1 under the proposal and the two alternatives for the same time horizon (figures not shown). Unsurprisingly, the potential benefit of reversion tax reforms shrinks substantially for each stakeholder, but the comparison still supports the previous finding that the reform reduces the inefficiency (see Table 6).

Table 6 here

As mandated by the PPA, plan sponsors must contribute at least the amortization charge plus normal cost. Some plans may prefer to contribute more than the minimum to fill the funding gap more quickly. Contribution amounts desired are modeled by the parameter value of η , in addition to the forceful PPA rules. We alter η to 0.2, a value higher than the benchmark 0.1. Larger contributions, together with the usual 60-40 portfolio, help plan assets easily reach and exceed the value of liabilities, which in turn implies much lower average potential costs for the PBGC – \$0.06 million under current law and \$0.08 million under the proposal (Table 7). The funding threshold for reversion would guide plan assets to settle at around 120 percent of liabilities under the proposal and alternative 2, and at 125 percent of liabilities under alternative 1. The reform proposal in this situation would also give the federal government a greater gain – a \$2.1 million revenue recovery versus the \$1.5 million in Table 2 (similarly for state government, albeit by a smaller margin).

Table 7 here

Some plans may face a higher normal cost, so we also compare the proposal with current law for sponsors with a 5 percent gross annual benefit accrual. The asset portfolio is the common

60-40/equity-bond split. Clearly, faster-growing liabilities signify a greater need for continuous contributions, more income tax deductions on these contributions and less room for asset reversion, other things equal. In other words, plan sponsors now face a larger contribution cost and the government a larger revenue loss. Despite these quantitative differences, the tax reform would provide comparable gains, albeit of a somewhat smaller magnitude, to those in the other situations – a \$1.1 million gain for the sponsors and a \$2.1 million loss reduction for the government and the PBGC together (columns 1 and 2 in Table 8). Some other plans, particularly those frozen or shrinking plans, on the contrary, may face a lower normal cost. We consider a 2 percent annual benefit accrual and compare the proposal again with current law. Given this slower pace of liability accumulation, sponsors generally face a lower contribution burden and the government loses less tax revenue in the first place under current law. Nevertheless, the efficiency improvement implied by the proposal remains significant – a \$0.6 million gain for the sponsors and a \$1.1 million loss reduction for the government and the PBGC together (columns 3 and 4 in Table 8).

Table 8 here

Taken together, the results in the various situations convey the same key message: with pension plans now supported and guarded by the PPA, a lower reversion tax may introduce a slightly higher bankruptcy risk to the PBGC, but that would be overshadowed by the gains for plan sponsors, participants, and the government and the PBGC in combination.

Conclusions and Discussion

With the passage of the PPA, DB pension plan sponsors are more accountable for their funding obligations. The minimum contributions mandated by the PPA will boost plan funding.

A precautionary plan sponsor with a concern for its reputation may choose to contribute more than this minimum, which, along with common investment policies, will likely make its plan well- or even overfunded. In this better-funded plan universe, it becomes necessary to consider the best way to utilize excess assets in overfunded plans.

Lowering the excise tax rate and establishing a reasonable funding threshold for asset reversions would not only free up excess funds for other corporate needs, thereby lowering the cost of DB plan sponsorship, but also open a considerable revenue source for the government, with only a modest increase in bankruptcy cost projected for the PBGC. Alternatively, a lower reversion tax combined with a partial transfer of excess assets to plan participants would also improve the current system, providing benefits to all stakeholders. In short, with restored symmetric and positive incentives for plan sponsors, the reversion tax reform may help encourage rather than erode the establishment and maintenance of DB pension plans.

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Table 1. Benchmark Assumptions

Parameter	Value	Parameter	Value
Relative risk aversion	$\rho = 2$	Shortfall amortization & other rules	PPA
Elasticity of Intertemporal Sub.	$\eta = 0.1$	Yearly bankruptcy probability	0.49%
Payoff discount factor	$\beta = 0.95$	Funded status for termination by PBGC	40%
Payoff of contribution/reversion	$\gamma_1 = 0.5, \gamma_2 = 2$	Termination cost	20%
Equity share	$\alpha = 0.6$	Bankruptcy deficit recovery	10%
Equity return (mean, std. dev.)	(9.2%, 16.1%)	Federal corp. income tax rate	35%
Bond return (mean, std. dev.)	(5.7%, 11.9%)	State corp. income tax rate	5%
Average liability duration	12 years	Excise tax rate	50%
Liab. discount rate (mean, std.)	(6.1%, 0.6%)	Initial pension accrued liabilities	\$5m
Annual benefit accrual (% of liab.)	4%	Initial funded status	80-100%
Annual benefit payout (% of liab.)	3%	(uniform distribution)	

Source: Authors' assumptions based on data, literature and current law.

Table 2. Redistribution of Excess Assets – Payoff-Maximizing Plans (\$ millions, PDV)

	<u>Current Law</u> (Excise tax 50%)	<u>Proposal</u> (Excise tax 20%; reversion trigger 120%)	<u>Alternative 1</u> (Excise tax 20%; reversion trigger 125%)	<u>Alternative 2</u> (Excise tax 15%; transfer 10%; reversion trigger 120%)
1) Contribution cost for sponsors	4.53	3.75	3.77	3.85
2) Cost for government & PBGC	3.08	1.48	1.55	1.58
Federal revenue loss	2.62	1.13	1.20	1.23
State revenue loss	0.38	0.26	0.26	0.25
PBGC bankruptcy cost	0.08	0.09	0.09	0.09
3) Transfer to participants	--	--	--	0.27

Source: Authors' calculations.

Table 3. Redistribution of Excess Assets – Contribution-Minimizing Plans (\$millions, PDV)

	<u>Current Law</u> (Excise tax 50%)	<u>Proposal</u> (Excise tax 20%; reversion trigger 120%)	<u>Alternative 1</u> (Excise tax 20%; reversion trigger 125%)	<u>Alternative 2</u> (Excise tax 15%; transfer 10%; reversion trigger 120%)
1) Contribution cost for sponsors	2.62	2.42	2.44	2.53
2) Cost for government & PBGC	1.86	1.36	1.42	1.42
Federal revenue loss	1.52	1.05	1.11	1.10
State revenue loss	0.22	0.18	0.19	0.19
PBGC bankruptcy cost	0.12	0.13	0.13	0.13
3) Transfer to participants	--	--	--	0.06

Source: Authors' calculations.

Table 4. Redistribution of Excess Assets – Varying Asset Allocations (\$ millions, PDV)

	<u>Payoff-Maximizing Plans</u>		<u>Contribution-Minimizing Plans</u>	
	Current Law (Excise tax 50%)	Proposal (Excise tax 20%; reversion trigger 120%)	Current Law (Excise tax 50%)	Proposal (Excise tax 20%; reversion trigger 120%)
1) Contribution cost for sponsors	4.55	3.83	2.62	2.44
2) Cost for government & PBGC	3.09	1.70	1.84	1.44
Federal revenue loss	2.63	1.33	1.52	1.13
State revenue loss	0.38	0.27	0.22	0.19
PBGC bankruptcy cost	0.08	0.10	0.11	0.12

Source: Authors' calculations.

Table 5. Redistribution of Excess Assets – Payoff-Maximizing Plans with Effective Federal Corporate Income Tax Rate of 25% (\$ millions, PDV)

	<u>Current Law</u> (Excise tax 50%)	<u>Proposal</u> (Excise tax 20%; reversion trigger 120%)
1) Contribution cost for sponsors	5.16	4.06
2) Cost for government & PBGC	2.29	0.99
Federal revenue loss	1.82	0.65
State revenue loss	0.37	0.25
PBGC bankruptcy cost	0.08	0.09

Source: Authors' calculations.

Table 6. Redistribution of Excess Assets – Contribution-Minimizing Plans with Conservative Investment Portfolio (20% equity and 80% bonds, \$ millions, PDV)

	<u>Current Law</u> (Excise tax 50%)	<u>Proposal</u> (Excise tax 20%; reversion trigger 120%)	<u>Alternative 1</u> (Excise tax 20%; reversion trigger 125%)	<u>Alternative 2</u> (Excise tax 15%; transfer 10%; reversion trigger 120%)
1) Contribution cost for sponsors	3.11	3.01	3.03	3.07
2) Cost for government & PBGC	2.21	1.92	1.97	1.94
Federal revenue loss	1.81	1.54	1.59	1.55
State revenue loss	0.26	0.24	0.24	0.24
PBGC bankruptcy cost	0.14	0.14	0.14	0.15
3) Transfer to participants	--	--	--	0.02

Source: Authors' calculations.

Table 7. Redistribution of Excess Assets – Payoff-Maximizing Plans with $\eta = 0.2$ (\$ millions, PDV)

	<u>Current Law</u> (Excise tax 50%)	<u>Proposal</u> (Excise tax 20%; reversion trigger 120%)
1) Contribution cost for sponsors	5.00	4.08
2) Cost for government & PBGC	3.35	1.11
Federal revenue loss	2.87	0.78
State revenue loss	0.41	0.26
PBGC bankruptcy cost	0.06	0.08

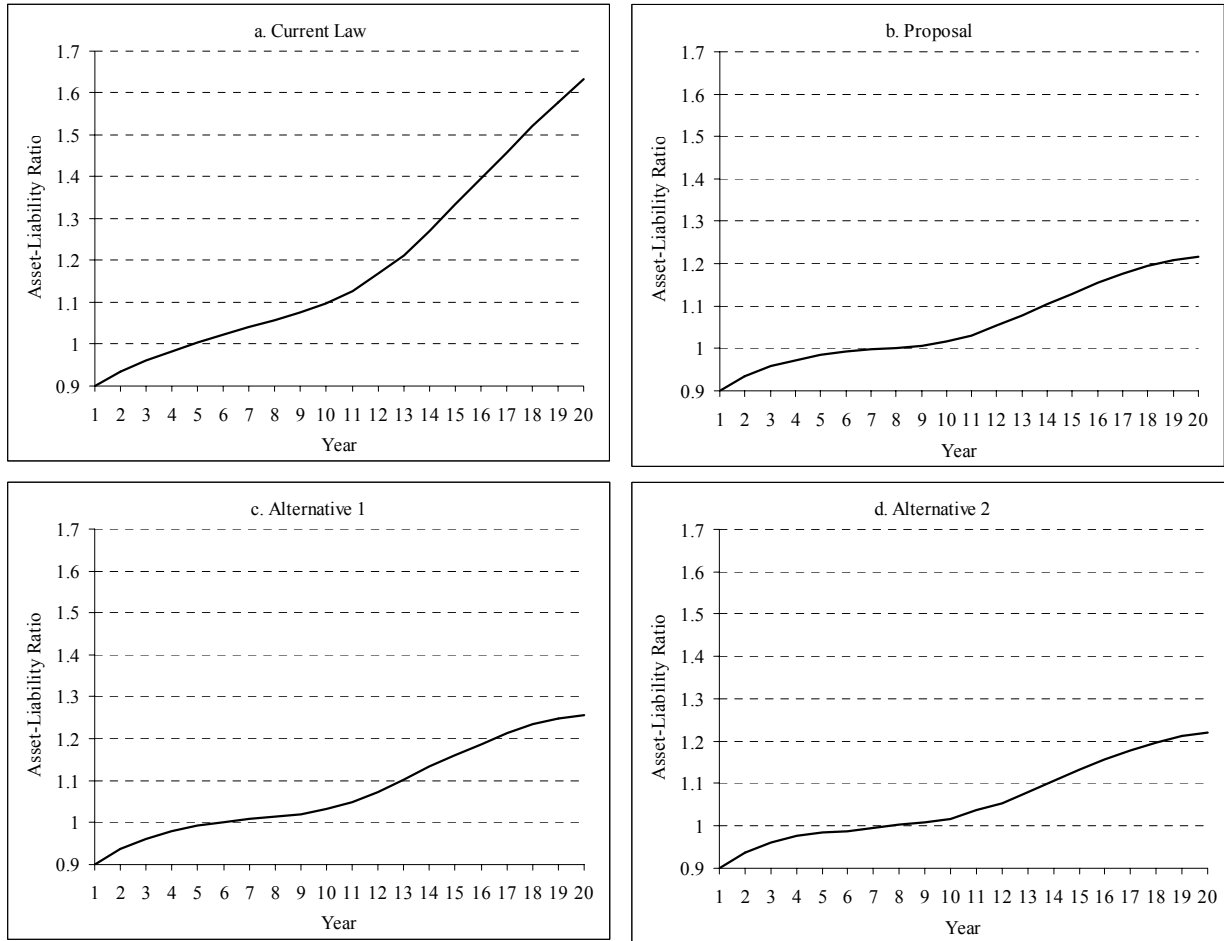
Source: Authors' calculations.

Table 8. Redistribution of Excess Assets – Payoff-Maximizing Plans (\$ millions, PDV)

	<u>5% Annual Benefit Accrual</u>		<u>2% Annual Benefit Accrual</u>	
	Current Law (Excise tax 50%)	Proposal (Excise tax 20%; reversion trigger 120%)	Current Law (Excise tax 50%)	Proposal (Excise tax 20%; reversion trigger 120%)
1) Contribution cost for sponsors	6.09	4.96	2.33	1.69
2) Cost for government & PBGC	4.11	2.00	1.62	0.51
Federal revenue loss	3.52	1.56	1.34	0.31
State revenue loss	0.51	0.34	0.19	0.11
PBGC bankruptcy cost	0.08	0.09	0.08	0.09

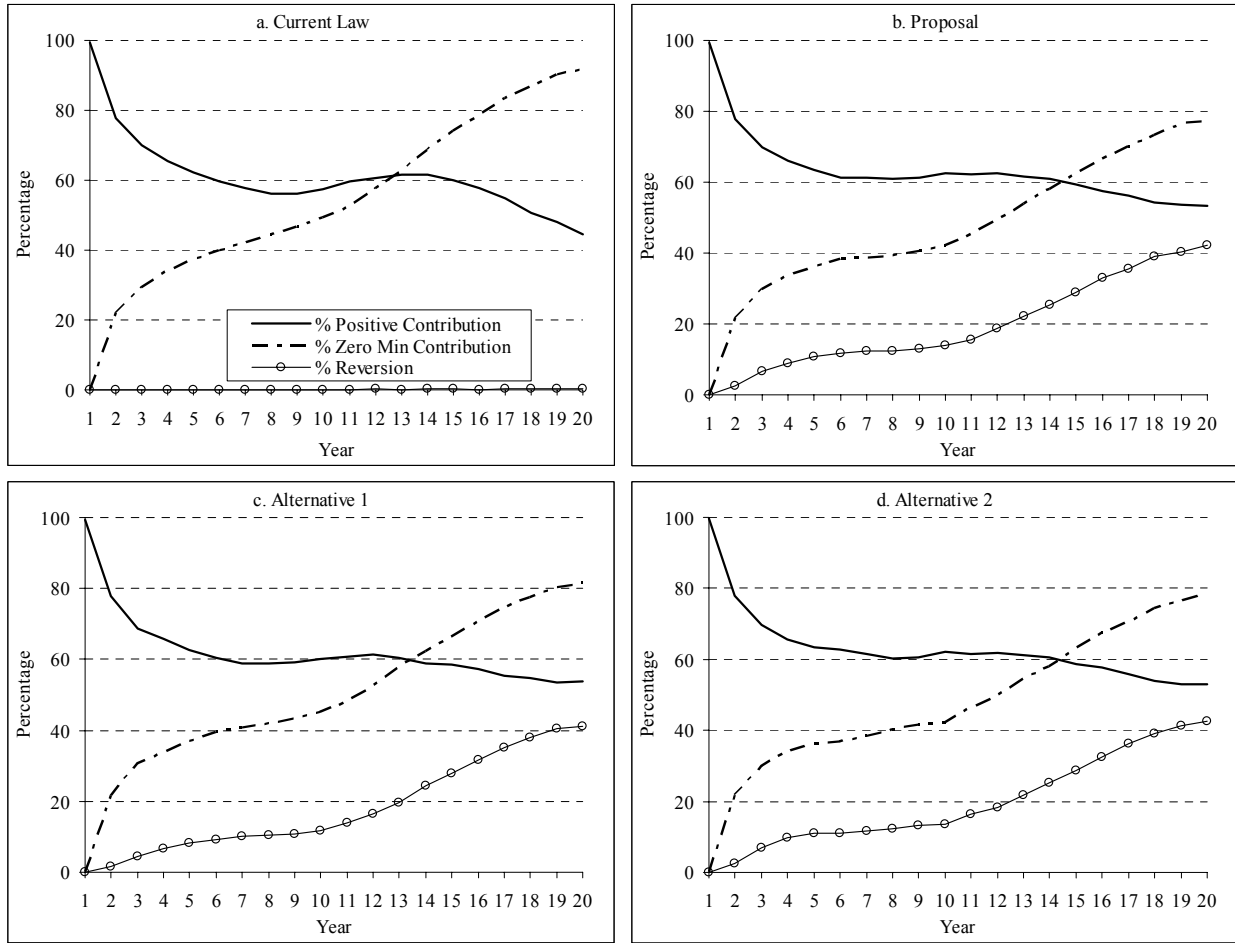
Source: Authors' calculations.

Figure 1 Average Funding Ratios – Payoff-Maximizing Plans



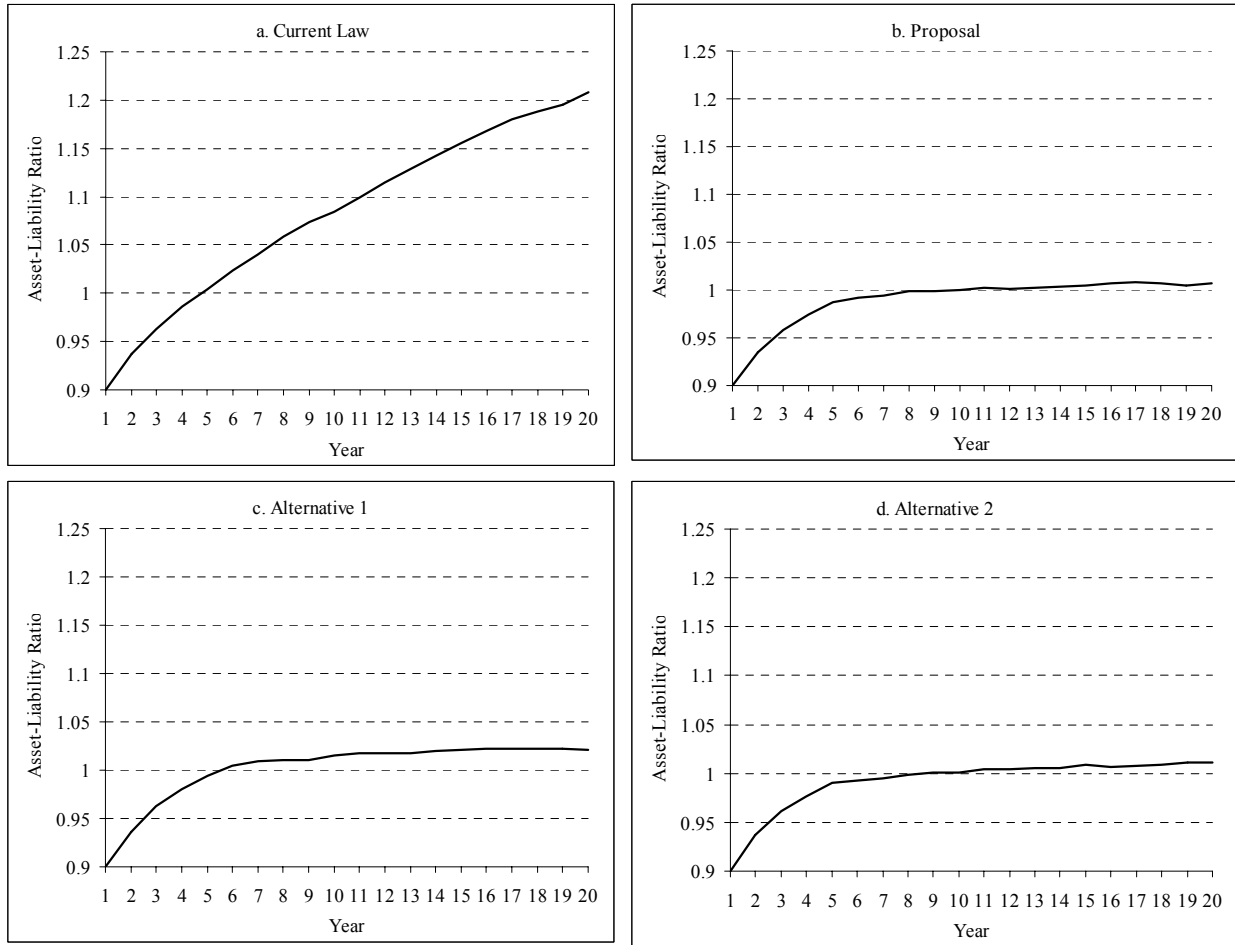
Source: Authors' simulations.

Figure 2. Distributions of Contributions/Reversions – Payoff-Maximizing Plans



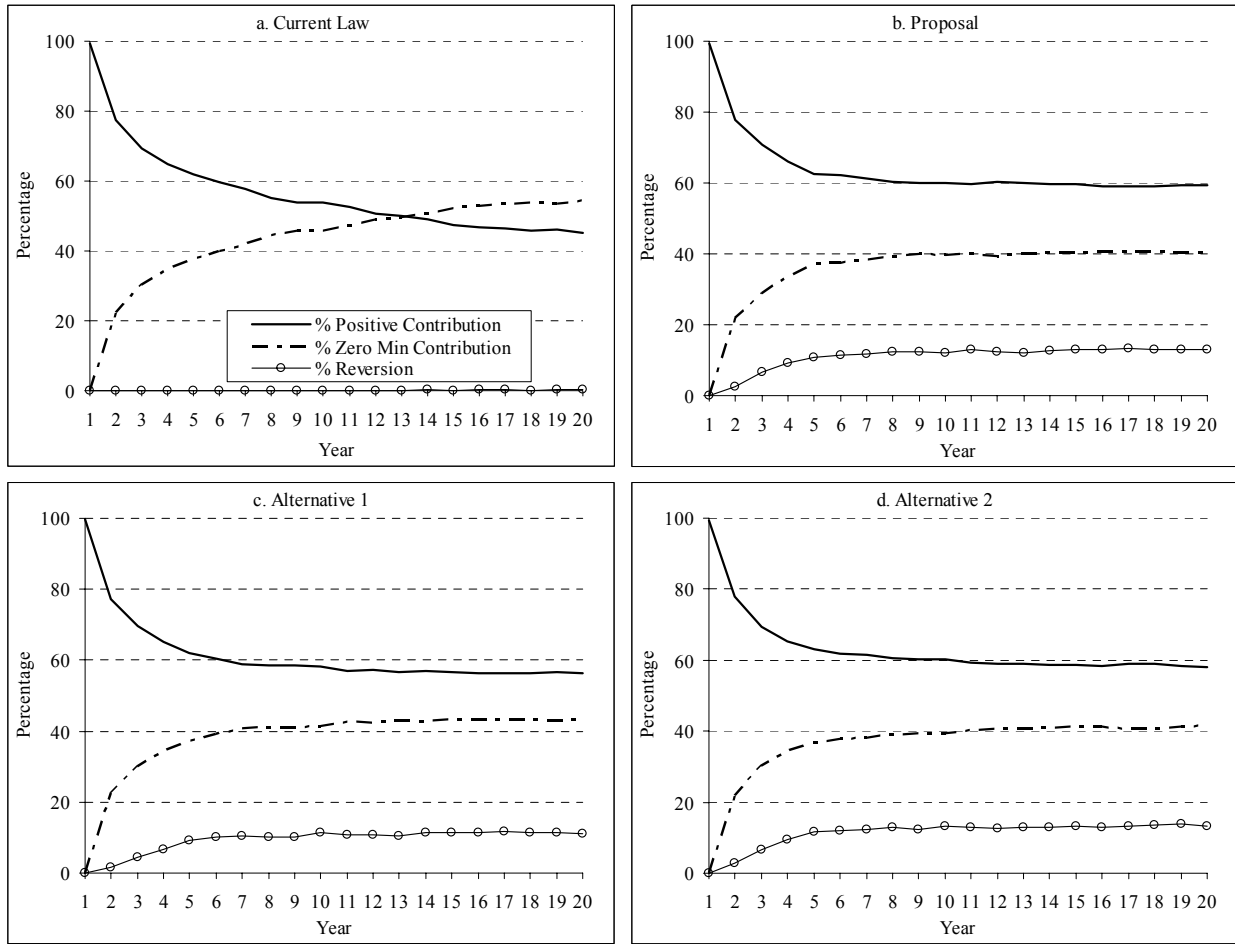
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Figure 3. Average Funding Ratios – Contribution-Minimizing Plans



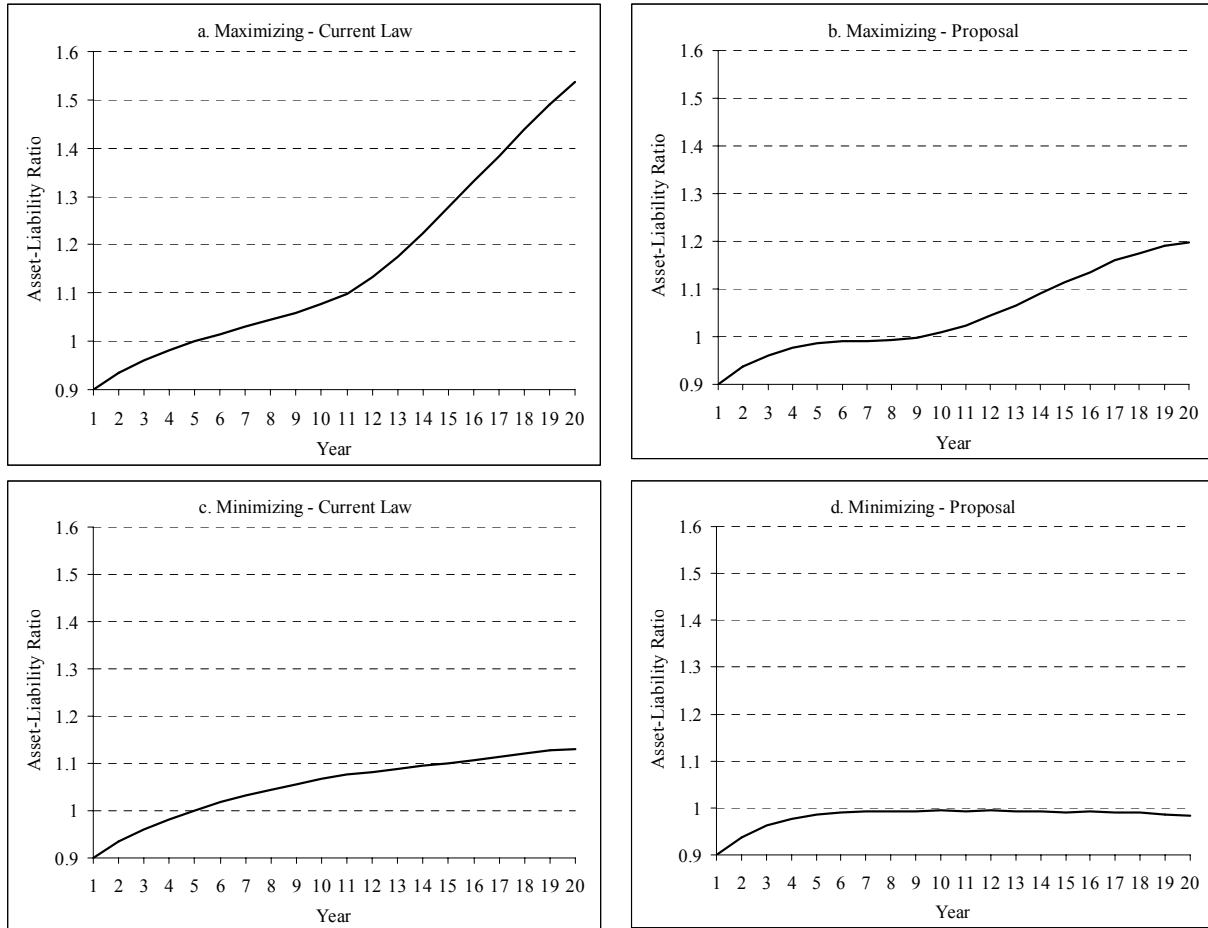
Source: Authors' simulations.

Figure 4. Distributions of Contributions/Reversions – Contribution-Minimizing Plans



Source: Authors' simulations.

Figure 5. Average Funding Ratios – Varying Asset Allocations



Source: Authors' simulations.

Endnotes

¹ As shown in Warshawsky (2007), the PPA establishes a much-improved environment for the sponsorship of DB plans; that paper also includes a summary of the new funding rules and the perspective of a former administration official describing the policy goals sought through reform.

² Reports, from a variety of sources, based on 2006 financial accounting disclosures, already show a significant improvement in plan funding compared to a couple of years ago.

³ This observation does not apply to a small number of plans that provide, by plan document language, for the allocation of excess plan assets to participants upon termination.

⁴ Sponsors must file IRS Form 5330 to report the excise tax paid on reversion of qualified plan assets and, in particular, an explanation for an excise tax rate other than 50 percent, if applicable.

⁵ The excise taxes on reversions of qualified plan assets to employers amounted to \$22 million in 1999 and \$46 million in 2000, and then declined to zero in 2004 and thereafter. Source: Table 21. Federal Excise Taxes Reported to or Collected by the Internal Revenue Service, Alcohol and Tobacco Tax and Trade Bureau, and Customs Services, 1999-2006.

⁶ Alternatively, if allowed by the plan, lump-sum payouts can be made.

⁷ It may be reasonable, in order to further enhance benefit security, to require plan sponsors to adjust their funding “credit balances” to take account of an asset reversion.

⁸ In the interest of parsimony, the model ignores employee contributions, plan expenses, actuarial gains and losses other than investment and discount, and other presumably non-significant items.

⁹ One defining feature of the Epstein-Zin form is the separation of EIS and RRA which facilitates modeling corporate behavior. The constant relative risk aversion (CRRA) function, another common form in the literature, is a special case of Epstein-Zin where RRA is the reciprocal of EIS, i.e., $\eta = 1/\rho$. With the CRRA form, however, a low value of EIS that is reasonable to reflect plan sponsors desiring gradual improvement in funding would imply unrealistically high risk aversion for corporations.

¹⁰ Some sponsors in financial distress might purposefully take a more aggressive investment portfolio, which implies risk for the PBGC. This betting behavior, however, is unlikely to be affected by a reversion tax reform because the reform releases excess assets only when the pension plan is overfunded.

¹¹ Funding rules in PPA are more complex than indicated here; in particular, we ignore smoothing, credit balances, exemptions, elections, and transition rules.

¹² Pension plan contributions are income tax deductible. For instance, a sponsor’s real cost for a \$1 million contribution is $\$1(1 - 0.4) = \0.6 million at a 40 percent combined federal and state income tax rate.

¹³ If the effective corporate income tax rate fluctuates and plan sponsors have the timing flexibility, they may choose to contribute heavily when the tax rate is high and make a reversion when it is low. This would imply that the gain from the reversion tax reform would be somewhat greater for sponsors and smaller for the government than estimated here.

¹⁴ Given a set of alternative allocations and a set of individuals, a movement from one allocation to another that can make at least one individual better off, without making any other individual worse off, is called a Pareto improvement, after Vilfredo Pareto, an Italian economist who used the concept in his studies of economic efficiency and income distribution.

¹⁵ The effective corporate income tax rate varies widely from industry to industry. The GAO (1989) refers to 21 percent as one of the lowest effective tax rates among its 18 termination cases.