

# The Impact of Pension Reform Proposals on Claims Against the Pension Insurance Program, Losses to Participants, and Contributions



Pension Benefit Guaranty Corporation  
October 26, 2005

# Contents

Introduction	1
Summary of Findings	3
Methodology	4
Results—Minimum Funding Requirements	6
Results—Funding to Avoid Benefit Freezes, Permit Payment of Lump Sums, and Allow for Benefit Increases	10
Explanation of Results	13
Appendices	
1. Impact of Premium Reform Proposals	17
2. Overview of Stochastic Modeling	18
3. Methodology and Assumptions used in Modeling	21
4. Background on Mortality Tables	28
5. Credit Balance Issues	29
6. Funded Ratios	34
7. Numerical Claims and Contribution Data	36

# The Impact of Pension Reform Proposals on Claims Against the Pension Insurance Program, Losses to Participants, and Contributions

## Introduction

In a White Paper issued April 6, 2005,<sup>1</sup> PBGC reported on the results of a series of simulations of the effects of the Bush Administration's proposal to reform the rules governing single-employer defined benefit plans ("Administration's Proposal").

As discussed in the April 6<sup>th</sup> report, reform is necessary to respond to the structural problems that have resulted in the large losses experienced by program participants, rapid deterioration in the financial condition of the pension insurance program administered by the PBGC, and the increased levels of underfunding in the defined benefit system. The single-employer program had a \$23.3 billion deficit at the end of FY2004. Total underfunding in the system is currently estimated to exceed \$450 billion notwithstanding compliance with current funding rules. Most importantly, when underfunded plans terminate, workers and retirees are at risk of losing benefits they were counting on for their retirement security.<sup>2</sup>

The April 6<sup>th</sup> White Paper showed that the Administration's Proposal will:

- Better protect the pension benefits earned by workers and retirees by requiring companies to fund fully their pension plans over a reasonable period of time,
- Strengthen the long-term solvency of the single-employer insurance program, and
- Produce stronger pension funding than current law, reducing losses to participants and the pension insurance program.

Since the earlier paper was issued, two bills have been reported. The House Education and Workforce Committee reported H.R. 2830. On the Senate side, the Finance Committee and the Health, Education, Labor and Pensions Committee reported a combined bill (S. 1783). These bills are consistent in several important respects with the Administration's Proposal. Specifically, they endorse the Administration's view that:

- Pension reform legislation must require the use of a single liability measure and funding target.
- Severely underfunded plans should be subject to benefit restrictions.

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<sup>1</sup> The original paper can be found at [www.pbgc.gov/docs/wp\\_040605.pdf](http://www.pbgc.gov/docs/wp_040605.pdf)

<sup>2</sup> The April 6<sup>th</sup> paper reported that when Bethlehem Steel's plan terminated, the participants lost about \$500 million in benefits. Since that time, PBGC has faced the largest termination in its history, United Airlines. In the case of United, employees and retirees stand to lose more than \$3 billion in promised benefits upon plan termination.

- Accrued liabilities in defined benefit plans should be funded fully over time.

This paper presents the results of simulations comparing each of the Congressional Proposals to the Administration's Proposal and current law. This paper focuses primarily on the proposed funding requirements provided under the various proposals. However, both *funding* reform and *premium* reform are needed to restore the single-employer program to solvency.

Increased premiums are needed to fund expected future claims and to amortize the existing deficit over a reasonable period of time. If premium increases, combined with enhanced funding requirements, are not sufficient to meet these goals, the PBGC will be unable to pay benefits required under current law unless Congress provides the additional funds. See Appendix 1 for a summary of premium reform issues.

## Summary of Findings

The Administration's Proposal would go the farthest of the three proposals toward eliminating systemic underfunding in the defined benefit pension system and, as a corollary, toward restoring the single-employer pension insurance program to financial health.

The simulations show that the Administration's Proposal would result in smaller losses to participants and smaller claims against the pension insurance system than alternative approaches. Assuming employers contribute the minimum required amount to their pension plans, the Administration's Proposal leads to smaller projected losses to participants and the pension insurance system in 483 of the 500 random economic scenarios run by the model (97 percent). Following the Administration's Proposal, in order of their effectiveness at reducing pension losses, are H.R. 2830 and S. 1783.

There are several key factors leading to the disparity of results:

- At-risk targets—Although all the proposals require at-risk plans to fund to a higher target, the rules for determining which plans are at-risk vary. In addition, the assumptions that actuaries would be required to use in calculating the higher funding target differ among the proposals.
- Transition rules—The transition provisions provided under the various proposals differ. Longer transition periods delay the effectiveness of needed reforms.
- Credit balances—While the Administration's Proposal eliminates credit balances, both of the Congressional Proposals continue to allow for credit balances.
- Asset and liability smoothing—The Congressional Proposals allow for smoothing; the Administration's Proposal does not.
- Required mortality assumptions—The mortality assumptions used to determine funding targets differ among the proposals.

These differences are described more fully in the “Explanation of Results” section.

## Methodology

The analysis was performed using the PBGC's Pension Insurance Modeling System (PIMS). PIMS has a database with detailed information on about 400 actual pension plans,<sup>3</sup> sponsored by nearly 300 firms. These plans represent about 50 percent of the liabilities and underfunding in the defined benefit system. PIMS extrapolates the results of the simulations to the universe of single-employer plans.

The model projects various economic scenarios over the 10-year period from 2006 through 2015 using the assumption that no large plans voluntarily leave the system and measures the impact of each scenario on the plans in the database for each year in the projection period.

The scenarios are stochastic which means interest rates, equity returns, and other variables are allowed to fluctuate randomly (within certain bounds based on historical experience). It is important to recognize that the stochastic results are useful to illustrate the full range of possible outcomes, but not a single best estimate. For an overview of how stochastic modeling works see Appendix 2.

A complete summary of the methodology and assumptions underlying the PIMS model can be found in Appendix 3. Key assumptions underlying the analysis include:

- Assumed contributions—The basic results in this paper assume that plan sponsors contribute only the minimum required contribution each year. The paper also includes results assuming the plan sponsors will make additional contributions to bring the assets up to the levels needed to avoid benefit restrictions.
- Current law projections—The “current law” projections assume that the current liability interest rate will revert to 105% of the 30-year Treasury rate after the end of 2005, which will occur if no pension legislation passes the Congress this year. For comparative purposes, results are also shown using the interest on long-term corporate bonds as the discount rate to compute current liability. This is the discount rate used in the Pension Funding Equity Act which will expire at the end of 2005.
- Effective date—Assumed effective dates are in accordance with bill language. The effective date for H.R. 2830 is 2006. Under S. 1783, PFEA relief is extended through 2006 and the new funding rules take effect in 2007. Premium changes under S. 1783 take effect in 2006. Projections involving the Administration's Proposal assume the new rules take effect in 2006.

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<sup>3</sup> Certain data on these plans comes directly from 4010 filings. It is worth noting that H.R. 2830 contains a proposed change in the criteria for determining which companies must report 4010 information to PBGC. As a result of the change, most current 4010 filers will become exempt from the filing requirement. If that happens, PBGC will have to rely on outdated 5500 data for some of the largest, most important plans it insures. S. 1783 also weakens the criteria for determining who must file, but to a lesser extent.

- Airline relief—The analysis does not reflect the optional relief available to airlines under S. 1783 because PIMS is not designed to model a single industry within the universe of plans.
- Changes since original White Paper—A few methodological changes have been made since the original paper was published (for example, the model was updated to reflect benefit restriction provisions and plan data was updated to reflect actual 2003 contributions). Appendix 3 documents changes in methodology.

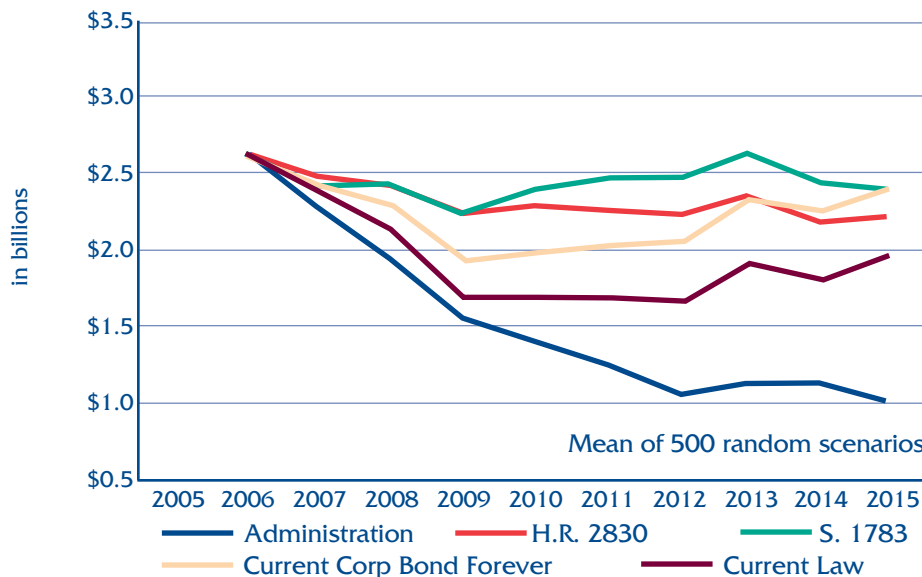
## Results—Minimum Funding Requirements

The model projects which plans will terminate without sufficient assets to meet benefit obligations (i.e., an involuntary or distress termination) each year. The number of plans that are expected to terminate varies among the 500 scenarios because these plan terminations are closely linked with sponsors’ financial health, which in turn, varies according to economic conditions. The model then calculates the amount of underfunding in the terminated plans and the portion of that amount that would be guaranteed by the PBGC. The unfunded guaranteed amount is referred to as a “claim” against the pension insurance system. While not every termination of an underfunded plan results in losses to plan participants, the level of claims is one indicator of the potential losses to participants.

For example, the total amount of underfunding in the four largest terminations in PBGC history was approximately \$18 billion. About two-thirds of that shortfall was covered by the PBGC. The remaining one-third (about \$6 billion) represents the loss to plan participants. In other words, workers and retirees in these plans forfeited \$6 billion of earned pension benefits, losses that can never be recovered. This example is not intended to imply that a 2-to-1 ratio is the norm. In some terminations, the magnitude of participant losses is much less, and in others, it is more. However, in plans with more generous formulas, participants are more likely to be adversely affected.

The following chart shows mean, or average, claim amounts resulting from the 500 scenarios.<sup>4</sup>

Chart 1. Administration’s Proposal Reduces Claims and Losses to Participants<sup>4</sup>



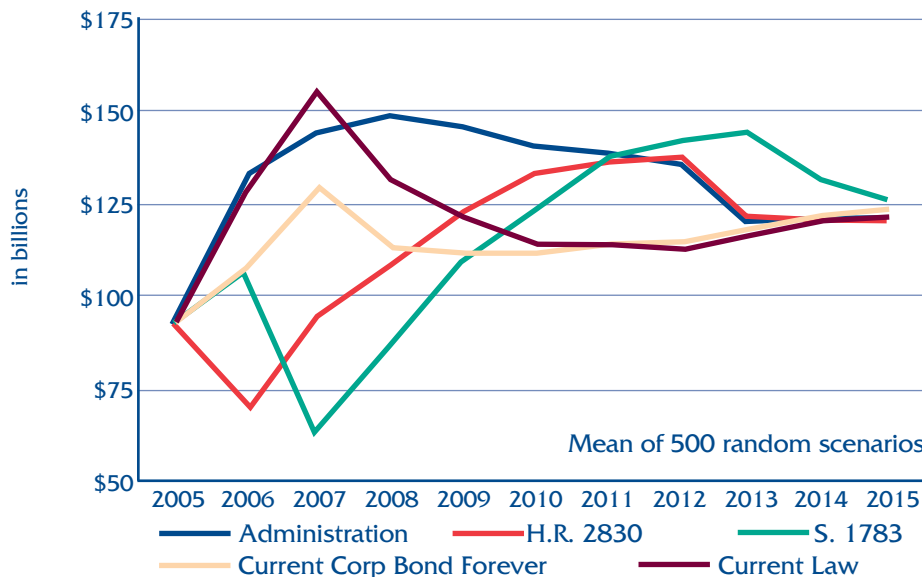
<sup>4</sup> PIMS does not calculate losses to participants, so the losses depicted on this chart include only those against the pension insurance system. However, as explained above, the level of claims is an indication of the magnitude of the loss to participants.



It is important to recognize that projections of claims and contributions vary significantly among the 500 scenarios. These mean results are presented solely to illustrate the relative difference among the proposals. **The mean is not intended to provide a single best estimate of future events.**<sup>5</sup> It is simply the average of the results from all 500 scenarios. The focus should be on the shape of the lines and the differences between the lines, not the absolute dollar amounts.

Aggregate required contributions for all plans under the same 500 scenarios are shown on the following chart:

Chart 2. Contribution Patterns Vary, Yet Ultimate Cost Over Life of Plan is the Same



A comparison of Charts 1 and 2 shows that the lower or more deferred the funding requirement, the higher the claim amount, and vice versa.

The chart also shows that the Administration’s Proposal will require larger contributions in the short run than either of the Congressional Proposals. This is because the Administration’s Proposal is designed to fund obligations within a reasonable time frame after those obligations are incurred. Timely funding is essential to ensure the plan is adequately funded in the event of a plan termination thereby minimizing benefit losses to plan participants.

Although the same seven-year amortization period is used under H.R. 2830 and S. 1783 as under the Administration’s Proposal, the Congressional Proposals phase in the higher funding requirements, delaying the timeframe for amortizing a portion of underfunding. As a result, existing unfunded obligations are funded over a longer period of time, and the risk of being underfunded upon plan termination increases.

<sup>5</sup> For an overview of how stochastic modeling works, including an explanation of why the graph depicts the mean result instead of some other metric, see Appendix 2.

Despite the fact that the contributions will initially be higher under the Administration’s Proposal, it is important to note that the ultimate cost to provide benefits under ongoing plans will be the same under any of the proposals because plan assets will eventually have to be used to cover the cost of the benefits provided. This is not shown on the chart because the lifetime of most plans is well beyond 10 years. The benefits that must be paid by a plan are determined by plan design and demographic factors and are independent of the pattern of contributions. Thus, while the contribution pattern varies among the proposals and current law, the ultimate cost of providing plan benefits will be the same.

The timing of contributions plays a major role, because when contributions are made sooner, they have more time to accumulate investment earnings. In addition, the longer funding is delayed, the more likely the plan will be underfunded upon plan termination. The importance of timing can be seen by comparing S. 1783 and the Administration’s Proposal. For the first part of the projection period, contributions are lower under S. 1783. In 2010, the lines cross and the pattern reverses. Despite S. 1783’s larger contributions in the second half of the projection period, claims are smaller under the Administration’s Proposal in all years (see Chart 1).

A summary of the numerical values from which Charts 1 and 2 were developed can be found in Appendix 7.

In addition to looking at year-by-year results, it is also useful to review the present value of aggregate results over the entire 10-year projection period. The following table presents these results. For comparative purposes, the 25<sup>th</sup> and 75<sup>th</sup> percentile results are included along with the mean. See Appendix 2 for more information on percentiles.

Table 1. Present value of results 2006-2015 (\$ in billions)

Aggregate claims	25 <sup>th</sup> percentile <sup>a</sup>	75 <sup>th</sup> percentile <sup>b</sup>	Mean	Mean as a percentage of current law
Current Law	\$7.0	\$19.7	\$14.8	100%
Administration’s Proposal	\$5.7	\$15.7	\$11.9	80%
Current Law – corporate bond forever	\$8.1	\$22.2	\$16.6	112%
H.R. 2830	\$8.4	\$22.7	\$17.3	117%
S. 1783	\$8.9	\$23.4	\$18.1	122%
<b>Aggregate required contributions</b>				
Current Law	\$645	\$1,155	\$ 913	100%
Administration’s Proposal	\$721	\$1,242	\$1,004	110%
Current Law – corporate bond forever	\$601	\$1,083	\$ 849	93%
H.R. 2830	\$596	\$1,059	\$ 844	92%
S. 1783	\$573	\$1,059	\$ 842	92%

Once again, the focus of this table should be the rankings of the various proposals and not the actual dollar amounts. The table shows that claims will be lowest under the Administration's Proposal whether looking at the 25<sup>th</sup> percentile, the mean or the 75<sup>th</sup> percentile.

## Results—Funding to Avoid Benefit Freezes, Payment of Lump Sums, and Allow for Benefit Increases

All the proposals provide incentives for contributing more than the minimum required amount. In some cases, sponsors will contribute additional amounts to avoid benefit freezes, to permit payment of lump sums, and/or to be permitted to increase benefits (i.e., to avoid the benefit restriction provisions). In others, sponsors may make additional contributions to reduce PBGC premiums or to build a funding cushion using tax deductible contributions.

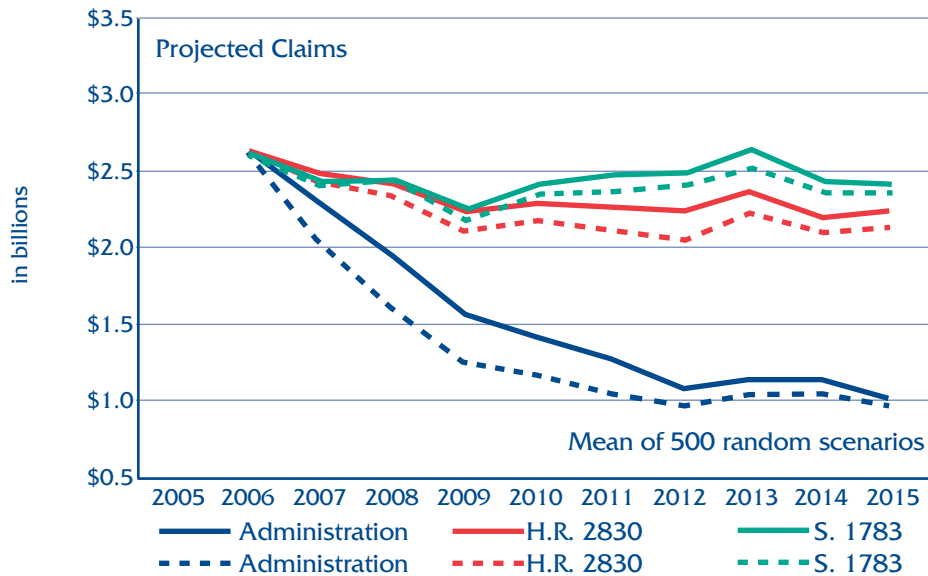
Whether sponsors will contribute more than the minimum amount required will depend on their unique business circumstances. Some healthy companies may choose to use cash in other parts of their businesses. Financially weak companies may be constrained from contributing above minimum requirements or may have little incentive to do so because the PBGC will be there to cover the losses.

Notwithstanding the uncertainty of sponsor behavior, it is appropriate to examine whether these additional contributions would reduce losses to participants and claims against the pension insurance system, and more importantly, to see if the magnitude of the reduction might vary among the proposals. The following chart compares mean claims under the three proposals under two contribution scenarios:

- Assuming employers contribute only the minimum required amount, and
- Assuming employers contribute enough to avoid benefit restrictions. For this purpose, that means enough to continue benefit accruals, pay lump sums, and provide for benefit improvements (including negotiated multiplier increases in the case of collectively bargained plans and any other type of benefit increase at the employer's discretion).

The solid lines are from Chart 1 (claims assuming employers contribute only the minimum required amount). The dotted lines show how those amounts will change if all employers contribute the amount needed to avoid benefit restrictions. For this purpose, the term “restrictions” includes the restrictions on additional accruals, payment of lump sums, and benefit increases.

Chart 3. The Administration’s Proposal Results in Lower Claims Even if Employers Fund Up to Avoid Restrictions (as defined above)

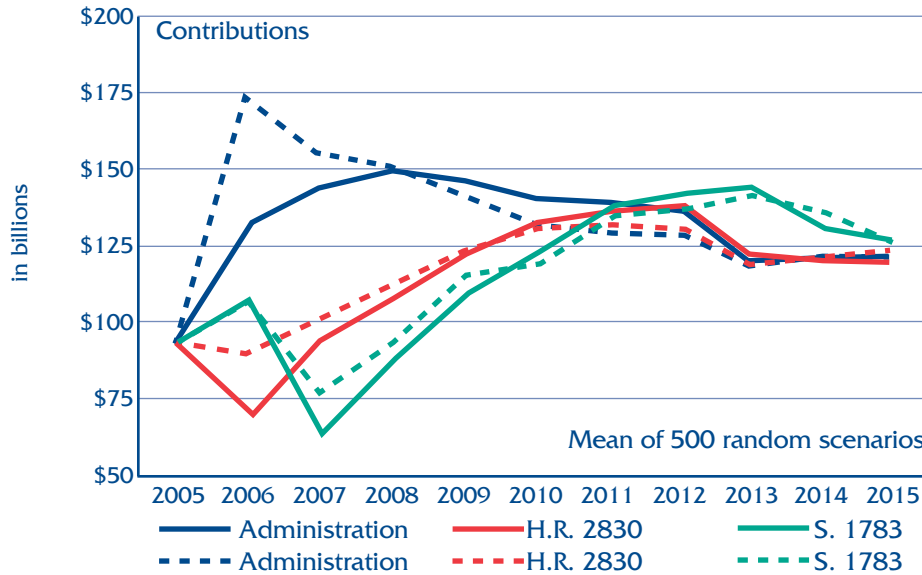


As expected, mean claims will be lower if employers contribute more than the minimum amount required. This is because additional contributions reduce the amount of underfunding so, if the plan terminates, it will be in a better funded position.

To avoid all benefit restrictions, all of the proposals require the same funded percentage (at least 80 percent). However, the way in which assets and liabilities are determined varies significantly among the proposals. So, the amount needed to get to 80% funded also varies.

Aggregate required contributions under this scenario are shown in Chart 4. The solid lines are from Chart 2 (required contributions). The dotted lines show how those amounts will change if all employers contribute the amount needed to avoid benefit restrictions.

Chart 4. Contribution Pattern if Employers Choose to Fund Up to Avoid Benefit Restrictions



The graph shows a sharp increase in contributions under the Administration’s Proposal from 2005 to 2006 under this scenario. This is because under the Administration’s Proposal, 2006 is the first year smoothing will be eliminated and the first year some plans will use the more conservative at-risk assumptions to determine liability. The Administration’s Proposal does not require or expect that all plans will fund up to the 80% level in the first year. Unless an employer wants to improve benefits (or is obligated to do so in accordance with a collective bargaining agreement), there is no need to fund up to 80% so rapidly.

These “avoid restrictions” calculations are based on the assumption that all plan sponsors will choose to fund up to the 80% level, thereby avoiding all the restrictions. This assumption is used to illustrate the “best case” scenario. Notwithstanding the uncertainty of whether employers will contribute to this level, it is interesting to note that the relative differences between the proposals remain fairly consistent.

## Explanation of Results

The Congressional Proposals are similar to the Administration's Proposal in many important respects (see introduction). However, there are also some key differences that weaken their effectiveness, as evidenced in the modeling results. Some of the factors underlying the results are due to permanent features of the bills and others are attributable to transition rules. A summary of the factors that make the Administration's Proposal stronger than either Congressional Proposal follows.

### Permanent Funding Rules

#### The rules related to at-risk funding targets

Under H.R. 2830, the sole criterion for determining whether a plan is at-risk is the plan's funded status. Plans that are over 60% funded (using regular assumptions) are not considered at-risk, regardless of the sponsor's financial health. The bill also requires that a plan be less than 60% funded for five consecutive years before the at-risk assumptions are fully utilized. However, the minimum funding requirements make it very unlikely that a plan will stay below 60% funded for more than a year or two. As a result, few plans will be considered at-risk under H.R. 2830.

S. 1783, like the Administration's Proposal, uses sponsors' credit ratings to determine which plans are more likely to terminate because experience has shown a high degree of correlation between poor financial health of the sponsor and the likelihood of a termination.<sup>6</sup> However, S. 1783's rules for at-risk plans are weaker than those in the Administration's Proposal in a few key areas. Specifically, S. 1783:

- Allows at-risk plans to stop using at-risk assumptions as soon as they reach a 93% funding level, using regular (i.e., not at-risk) assumptions. This rule means that at-risk plans will never actually reach the at-risk target unless they contribute more than required.
- Provides that a plan does not begin the 5-year phase-in to at-risk status unless the credit rating has deteriorated in two out of the prior three years, and for this purpose, pre-enactment years do not count.
- Dilutes the at-risk funding target by not including a loading factor,<sup>7</sup> a part of the true cost of plan termination.

S. 1783 further dilutes the at-risk funding target by modifying the at-risk early retirement and assumed form of payment assumptions required by

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<sup>6</sup> Historically, over 90 percent of claims incurred by PBGC have been from plans sponsored by companies that had below investment grade credit ratings. Many of these claims came from plans that were over 60% funded.

<sup>7</sup> Under H.R. 2830 and the Administration's proposal, at-risk assumptions include a loading factor to reflect the additional administrative cost of purchasing a group annuity if the plan were to terminate.

the other proposals. All three proposals require that at-risk plans use more conservative assumptions with respect to when employees will retire and what form of payment they will select.

Under the Administration's Proposal and H.R. 2830, the actuary must assume that all employees in at-risk plans will retire at the earliest permitted age and will elect the most valuable payment form (usually a lump sum). Under S. 1783, the conservative assumptions apply only to employees eligible to retire during the plan year or the seven succeeding years.

### The elimination of credit balances

Unlike the Congressional Proposals, the Administration's Proposal eliminates all credit balances. H.R. 2830 prohibits plans from using credit balances unless their funded percentage is at least 80%. S. 1783 provides that plans with funded percentages below 80% cannot use the credit balance to satisfy the *entire* funding requirement. Appendix 5 discusses issues related to credit balances in more detail.

### The required mortality assumptions

Both Congressional Proposals require the use of a table published by the Society of Actuaries which reflects mortality experience in the year 2000, adjusted to reflect mortality improvements through 2006, but no further.<sup>8</sup> This table does not reflect the standard actuarial practice of projecting mortality improvements. For example, the expected lifetime for someone who is 60 years old is assumed to be the same whether he is already age 60 or whether he won't reach age 60 for 30-40 years. Without mortality improvements, the calculated funding targets will systematically understate the actual amount that will be needed to pay promised benefits (i.e., plan liabilities). The result is an understated liability measure. See Appendix 4 for more information on mortality assumptions.

### The use of "smoothing" mechanisms for assets and liabilities

Smoothing mechanisms mask the current funded status of pension plans and have contributed to the large levels of underfunding in terminated plans.<sup>9</sup> Both Congressional Proposals provide for smoothing of both assets and liabilities. Liability smoothing results from using "back-averaged" discount

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<sup>8</sup> H.R. 2830 and S. 1783 require that Treasury issue a new mortality table no later than 2016. This is not the same as adjusting the current table to anticipate mortality improvements. See Appendix 4.

<sup>9</sup> See the United States General Accountability Office, "Recent Experiences of Large Defined Benefit Plans Illustrate Weaknesses in Funding Rules" GAO-05-294, p. 22 (May 2005).



rates instead of using current rates. Under H.R. 2830, the smoothing period is three years.<sup>10</sup> Under S. 1783, the smoothing period is 12 months.

## Transition Rules

All the proposals provide a transition period before the new rules become fully effective. For example, they all provide a three-year phase-in to the yield curve approach (“modified” yield curve in the case of the H.R. 2830 and S. 1783). The Congressional Proposals, however, provide additional transition rules that significantly reduce the contribution requirements in the first few years after enactment. These additional transition rules include:

### The delay in using a 100% funding target

Under the Administration’s Proposal, the 100% funding target applies to all plans the first year the new rules take effect. Under S. 1783, the first year the new rules apply the funding shortfall is based on 93% of the target liability instead of 100%. This percentage increases to 96% the next year and reaches 100% the third year.

Under H.R. 2830, the transition rule applies only to plans that were exempt from Deficit Reduction Contributions under current law. Under the transition rule, the first year the new rules apply, the funding shortfall is based on 92% of the liability instead of 100%. The percentage increases two percentage points each year until reaching 100% the fifth year.

### Not counting pre-enactment years for five-year phase-in to at-risk status

All the proposals provide a five-year phase in of the at-risk funding assumptions beginning when a plan first meets the proposal’s at-risk criteria. Under this transition rule, the more conservative at-risk assumptions are phased in ratably over five years. Under the Administration’s Proposal, all years count towards the five-year rule. For example, if a plan’s sponsor was rated below investment grade for the five years before enactment, the plan’s liability in 2006 would be determined using only the at-risk assumptions.

In contrast, the Congressional Proposals contain transition rules under which a plan’s status before enactment is disregarded. As a result, even a plan that met the applicable at-risk criteria for the five years before enactment will not fully use the at-risk assumptions until five years after enactment, (i.e., 10 years after first meeting the criteria).

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<sup>10</sup> As drafted, H.R. 2830 provides that the value of plan assets may be determined on the basis of any reasonable smoothing method except that “any such method providing for averaging of fair market values may not provide for averaging of such values over more than the 3 most recent plan years (including the current plan year).” Because the current plan year is included in the 3-year limit, and, in general, the valuation date is the beginning of the plan year, the bill language could be interpreted to restrict the averaging period to 25 months (the two full plan years preceding the current year and the first day of the current year). The PIMS calculations for H.R. 2830 use 3-year smoothing.

Under S. 1783, the delay is exacerbated because unless the sponsor's rating continues to deteriorate or is already at the lowest rating, the plan will cease to be at-risk.

For plans that continue indefinitely, a funding delay caused by the transition rules may pose less of a risk of loss to the insurance program. However, for underfunded plans that terminate, transition rules result in increased losses to participants and larger claims against the system because these plans will be less funded upon termination.

# Appendix 1

## Impact of Premium Reform Proposals

Under the Administration’s Proposal, the role of risk-based premiums is two-fold:

- To generate revenue—in addition to that derived from flat-rate premiums and investment income—sufficient to meet expected future claims and to retire the deficit in the single-employer program over a reasonable time period. The premium rate per dollar of underfunding will be reviewed and revised periodically by the PBGC Board consistent with meeting these goals.
- To set the price paid by the company so that it more closely reflects the risk posed by the company’s pension plan. This is a basic aspect of insurance and creates an appropriate incentive to encourage companies to fund their plans properly.

The Congressional Proposals also provide for risk-related premiums based on the plan’s level of underfunding. But, under these proposals, the premium rate is fixed at \$9 per \$1000 dollars of underfunding.

PBGC estimates that to eliminate the PBGC deficit in ten years (including expected claims arising in the period), \$28.3 billion of additional premium revenue must be generated over the next ten years. This calculation assumes the Administration’s Proposal is enacted. If a weaker funding proposal is enacted, the amount needed to eliminate the deficit will be larger. For example, PBGC estimates<sup>11</sup> that if the funding provisions of S. 1783 are enacted, the amount needed to eliminate the deficit in ten years will be about \$35 billion. If H.R. 2830’s funding provisions are enacted, the amount needed will be about \$34 billion.

PBGC has not estimated how much additional premium revenue will be generated under the bills over the next ten years. However, given the fixed risk-related premium rate and the expectation of larger future claims under the bills, it is clear that the bills will not raise sufficient revenue to eliminate the deficit in ten years (including claims arising in the ten-year period).<sup>12</sup>

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<sup>11</sup> Because of the inherent complexities involved in projecting premium revenue and the projected deficits, these estimates are not as sophisticated as the stochastic modeling results included in the body of the paper.

<sup>12</sup> To fulfill the Joint Budget Resolution adopted in April, any proposal will need to generate an additional \$6.6 billion of premium income over the next five years. PBGC estimates that to be on track to meet the Administration Proposal’s ten-year goal of \$28.3 billion, an additional \$15.5 billion must be generated over the next five years.

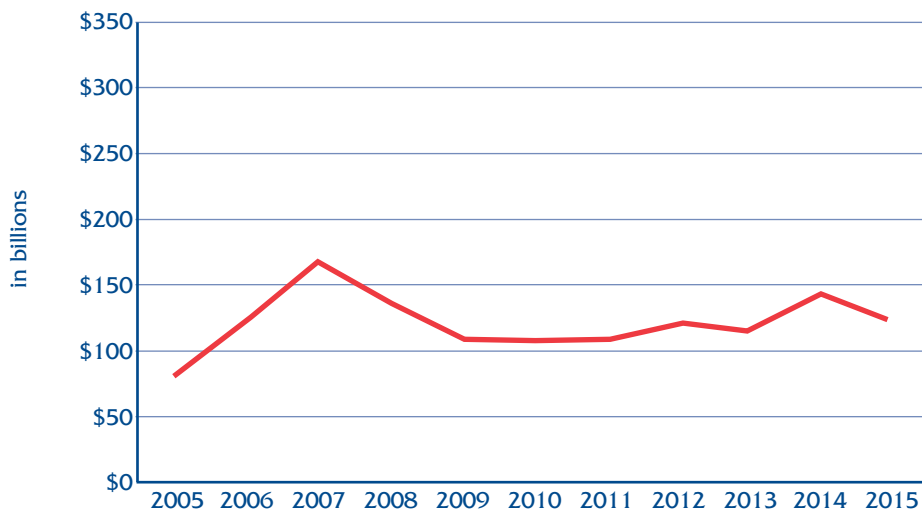
## Appendix 2

### Overview of Stochastic Modeling

This appendix uses current law to illustrate how stochastic modeling works, how to interpret the results of a stochastic simulation, and why this paper focuses on stochastic results.

Chart 1 shows the aggregate amount of required pension contributions under a stable economy scenario for each year through 2015. This scenario assumes that economic variables remain constant over the entire 10-year period. This is considered a “*deterministic*” projection because the outcome is *determined* based on one set of assumptions.

Chart 1. Projected Contributions Under Current Law (Stable Economy)



The above chart shows that a fairly level pattern of contributions will arise (under current law) if the economy remains stable. However, because the likelihood of having a static economy for the next decade is very slim, it’s important to look at alternate scenarios.

Chart 2 shows how the aggregate required contributions would differ if the economic assumptions underlying Chart 1 were replaced by a set of assumptions based on a hypothetical economy closely resembling the 1995-2004 economy. This time period was chosen because its latter years were characterized by major asset losses due to the stock market decline and by a simultaneous increase in plan liabilities due to declining interest rates.

Chart 2. Projected Contributions Under Current Law  
(Stable Economy vs. 1995-2004 Economy)

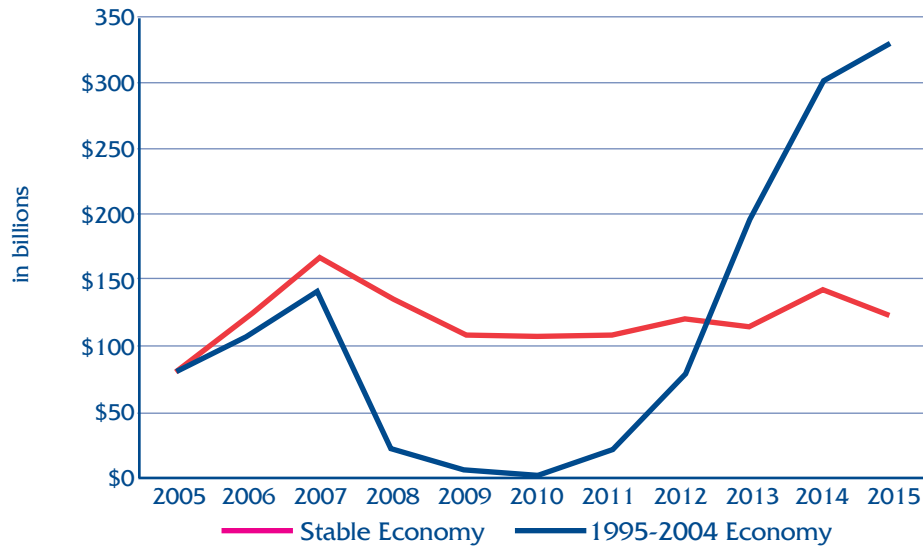
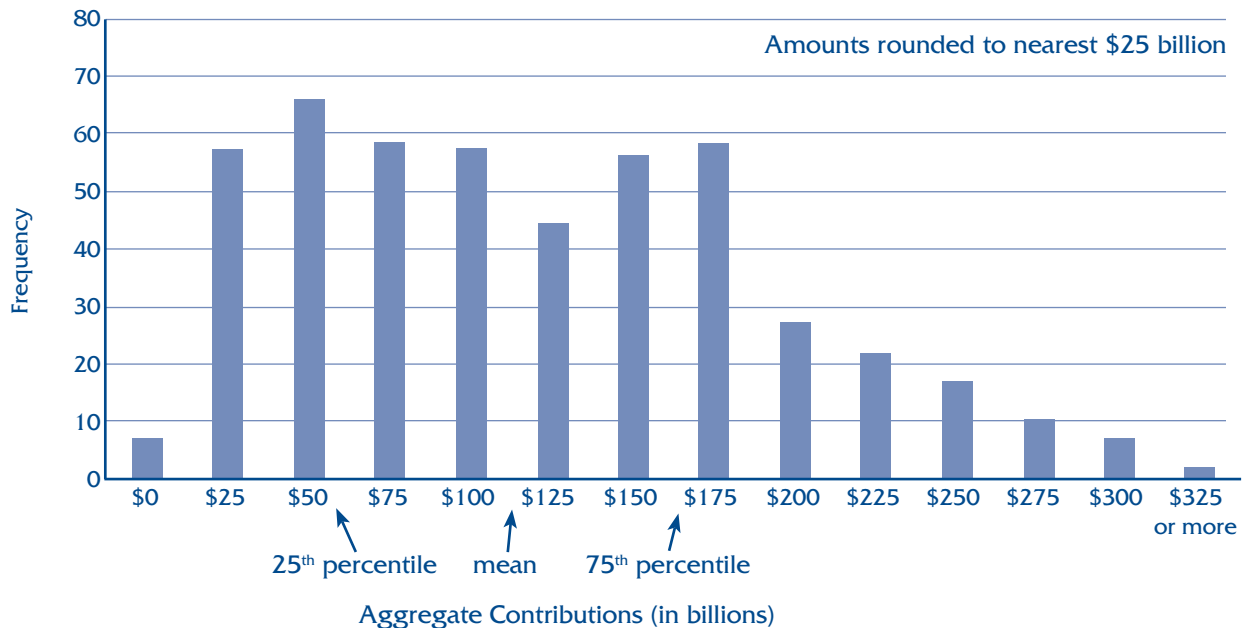


Chart 2 shows that results vary a great deal based on which underlying economic assumptions are used. This raises the question of which set of results better reflects what will actually happen. Of course, no one can answer that question accurately, but it's fair to say that the likelihood of either of these two scenarios actually happening is very low.

The next step is to use stochastic modeling techniques to run 500 random scenarios. The stochastic run projects contributions on a year-by-year basis. The following chart uses the year 2010 for illustrative purposes.

Chart 3. Current Law – 2010 Required Contributions



The left-most bar indicates that in 8 of the 500 scenarios, the projected minimum required contribution on an aggregated basis, rounded to the nearest \$25 billion is \$0 (i.e., actual amount is less than \$12.5 billion). Similarly the next bar indicates that in 58 of 500 scenarios aggregate minimum required contributions are between \$12.5 billion and \$37.5 billion. The 75th percentile is \$170 billion. That means in 75% of the scenarios (375 out of 500), aggregate required contributions in 2010 are \$170 billion, or less. Similarly, the 25<sup>th</sup> percentile is \$59 billion.

The mean (or average) of the 500 scenarios is \$115 billion. Although the mean is a useful statistic, it is important to recognize the wide distribution of results as shown above. The mean should not be considered the “best guess” scenario as if it were an actual estimate of anticipated future funding requirements. That said, when reviewing a 10-year period of time, we cannot graphically illustrate the frequency of each outcome for each year in the projection period. Accordingly, the next step is to plot the mean result under the current law scenario over the 10-year projection period.

The final step is to expand the above chart to show the mean results for the various proposals. See Chart 2 in the body of paper (page 7).

## Appendix 3

### Methodology and Assumptions Used in Modeling

The analysis in this paper was performed using the PBGC's Pension Insurance Modeling System (PIMS). PIMS has a detailed database of about 400 actual plans, sponsored by nearly 300 firms, which represent about 50 percent of liabilities and underfunding in the single employer defined benefit system. The database includes the plan demographics, plan benefit structure, asset values by type, liabilities, and actuarial assumptions. It also includes key financial information about the employer sponsoring the plan.

The PIMS database contains pension plan information from Schedule B, generally from the 2002 plan year. In addition, for certain large underfunded plans more recent data available from 4010 filings is reflected.

PIMS simulates contributions and underfunding for these plans using the minimum funding rules under the Administration's Proposal and current law, and then extrapolates the results to the universe of single-employer plans. It also uses the employer's financial information as the starting point for assigning probabilities of bankruptcy, from which it projects losses to the insurance program under both current law and the proposals.

The PIMS model is not predictive. That is, it is not intended to provide a single best estimate of future events. When used in a stochastic (random) mode, PIMS provides a range of possible future outcomes and quantifies the likelihood of these outcomes. Behavioral responses to economic conditions, such as the possibility that a company will seek to terminate its pension plan in response to its competitors terminating their pension plans, are not incorporated.

The PIMS projections are performed in either a fixed path (deterministic) or random (stochastic) mode, and the assumptions depend on which mode is used. Results are in nominal dollars (not discounted to today's value) unless specifically noted to the contrary.

#### Assumptions for Stochastic Runs

Projections of claims against the insurance program are made stochastically. Claims against the pension insurance program are modeled by simulating the occurrence of bankruptcy for plan sponsors. The model reflects the historical relationship between the probability of bankruptcy and the firms' financial health variables (equity to debt ratio, cash flow, firm equity, and employment). For each period, the model assigns a random change in each of these variables to each firm correlated with changes in the economy. The simulated financial health variables determine the probability of bankruptcy for that year.

The model runs 500 economic scenarios (varying interest rates, equity returns, employment levels, bankruptcy probabilities, etc.) on the plans in the database for each year in the projection period. PIMS then extrapolates the results of these simulations to the universe of insured single-employer plans.

All the following variables were stochastically projected:

- Interest rates, stock returns and related variables (e.g., inflation, wage growth, and multiplier increases in flat dollar plans are determined by interest rates in PIMS).
- Sponsor financial health variables (equity to debt ratio, cash flow, firm equity, and employment).
- Asset returns. At the beginning of each scenario, each plan's asset allocation is randomly selected from a pool of allocations that reflects historic differences across plans in investment strategies. Each plan's asset return also has a stochastic element that is uncorrelated with the simulated market rates and is uncorrelated across plans.
- Plan demographics. The number of active participants for a plan varies with its sponsor's total employment level. Age and service also varies over time due to retirement and hiring assumptions. The number, age, and benefits of retired and terminated vested participants varies depending on mortality, separation and retirement assumptions.
- Probability of bankruptcy. Sponsors are subjected to an annual stochastic chance of bankruptcy. A plan presents a loss to participants and/or the pension insurance program if its sponsor was simulated to experience bankruptcy and the plan was less than 80% funded for termination liability. Losses to the insurance program are calculated by averaging the losses in all simulations across all scenarios.

The most important variables in the stochastic simulations are stock returns and interest rates. Stock returns are independent from one period to the next. To determine a simulated sequence of stock returns, the model randomly draws returns from a distribution that reflects historical experience going back to 1926. Unlike stock returns, interest rates are correlated over time. With the model, the interest rate for a given period is expected to be equal to the interest rate for the prior period, plus or minus some random amount. The random draws affecting the bond yield and stock returns are correlated according to an historical estimate. Stock returns are more likely to be high when the bond yield is falling and vice versa.



## Assumptions for Deterministic Runs (used only in Appendix 2)

Projections of required contributions and funded ratios were made for a given economic scenario in a “non-random” or “deterministic” manner.

- Interest rates, stock returns and related variables were set to a fixed path. For the stable economy projections, interest rates and equity returns were set (approximately) to their median values from the stochastic simulations.

Those rates, and other key parameters, were set as follows:

30-year Treasury yield	5.0%	Equity return	9.0%
Plans’ return on assets	6.9%	Inflation	2.5%
Wage and benefit growth	4.2%		

- Sponsor financial health variables were fixed at their initial values.
- Plan asset allocations were fixed at mean values for all plans.
- Plan demographics. The number of active participants is fixed at the initial value, but age and service varies depending on retirement and hiring assumptions. The number, age, and benefits of retired and terminated vested participants varies depending on mortality, separation and retirement assumptions.

## Mortality

- For purposes of projecting plan population—the 1994 Group Annuity Mortality table (94 GAM).
- For determining the amount of underfunding at termination—94 GAM set forward<sup>13</sup> one year and projected to valuation year plus 10. Note, in the initial white paper, the projection was to 2019. Projecting to 10 years beyond the valuation date is a more accurate measure.
- For determining funding targets (liabilities)

### H.R. 2830 and S.1783

For the first four effective years, a blend of 83 GAM and RP-2000 projected to 2006 was used. The blend was in accordance with the bills’ phase-in provisions. For the fifth year and later, the RP-2000 table projected to 2006 was used to determine funding targets.

The bills provide that the Secretary of Treasury must revise tables to reflect actual experience and projected trends at least every ten years. For modeling purposes, it was assumed that tables were not revised during the ten-year projection period.

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<sup>13</sup> Setting a mortality table forward one year means that the table’s life expectancy for someone who is X+1 years old is used to represent the life expectancy of someone who is X years old. For example, the life expectancy of a 65 year old is what the table would assign to a 64 year old.

## Administration's Proposal

The modeling was performed using a static approximation to a generational table and assumed liability duration of 10 (for example, for 2006, UP94 was projected to 2016, for 2007, UP94 was projected to 2017, etc.).

## Current Law (including corporate bond forever scenario)

For current liability purposes, the current table (1983 GAM) is assumed to remain in effect until 2007. For 2007 and later years, the UP94 table projected with scale AA to 2005 was used to determine current liability.

For 412(b) purposes, the actuary's selected table is assumed to remain unchanged throughout the projection period.

## Benefit Improvements

For flat-dollar plans, benefit multipliers are assumed to increase annually by the rate of inflation and productivity growth. For salary-related plans, the benefit formula is assumed to remain constant, but annual salary increases are reflected.

## Credit balance at beginning of 2006

The credit balance at the end of the 2003 plan year was derived by reflecting actual contributions made for 2002 and 2003. From there, the credit balance was increased each year by the valuation interest rate and decreased by the amount assumed to be used to satisfy minimum funding requirements for 2004 and 2005.

## Contributions in and after 2006

Many of the plans in the PIMS database have large credit balances at the end of 2003 and are projected to still have large credit balances when the new rules take effect (notwithstanding the fact that PIMS assumes credit balances will be used to the maximum extent possible in 2004 and 2005).

Under the Administration's Proposal, any remaining credit balance will be disregarded after the new rules take effect. H.R. 2830 and S. 1783 provide for the continuation of a credit balance system with the prior law credit balance carrying over to the new rules.

For modeling purposes, it is assumed that employers will contribute the minimum required amount each year and that any credit balance remaining when the new rules take effect will be used to the maximum extent permitted under the applicable proposal until the balance is completely depleted.

Note – under H.R. 2830, the credit balance may not be used unless the funded percentage is at least 80 percent. Under S. 1783, if the funded percentage is less than 80%, the credit balance may be used to satisfy some, but not all, of the funding requirement.

For example, if the minimum required contribution (before reflecting the credit balance) is \$200 and the plan has a \$200 credit balance, the model shows the following cash contribution requirements:

- If the funded percentage is at least 80 percent,
  - ▲ \$0 under H.R. 2830 or S. 1783, and
  - ▲ \$200 under Administration’s Proposal.
- If the funded percentage is less than 80 percent,
  - ▲ The greater of normal cost or \$50 (25% of the otherwise calculated minimum) under S. 1783, and
  - ▲ \$200 under Administration’s Proposal or H.R. 2830.

### At-risk assumptions

S. 1783 provides for the use of modified early retirement and assumed payment form assumptions for at-risk plans only with respect to employees eligible to retire within the plan year or the seven succeeding years.

It also provides that a plan does not begin the 5-year phase-in to at-risk status unless the credit rating has deteriorated in two out of the prior three years, and for this purpose, pre-enactment years do not count. So, the earliest the phase-in could begin is 2009, and for that to happen the sponsor would have had to have been rated below investment grade in 2007, 2008, and 2009 with at least two of those years being “deterioration years.”

Our analysis indicates that few plans will be considered at-risk under these criteria.

Furthermore, because the at-risk assumptions affect only two assumptions (retirement age and payment form) and apply only to employees eligible to retire within the seven-year period following the valuation year, the impact on required contributions is immaterial. Because of these factors the at-risk provisions of S. 1783 were not reflected in the PIMS runs. The at-risk provisions of the Administration’s Proposal and H.R. 2830 were reflected in accordance with the rules provided in the proposals.

To the extent “declassifying” part of a credit balance will increase the funded percentage to 60% in the H.R. 2830 calculations, the model assumes the sponsor will choose to do so to avoid being classified as at-risk.

## Discounting future contributions/claims

For calculations involving discounting future amounts, future amounts are discounted using the 30-year Treasury rate assumed to be in effect for the particular year and economic scenario.

## Airline relief

The analysis does not reflect the optional relief available to airlines under S. 1783.

## Benefit restrictions

In the “contribute only the minimum required amount” runs, benefit restrictions are reflected to the extent they would apply under the various proposals assuming that only the minimum required contribution was made.

For example, under the Administration’s Proposal, at-risk plans with funded percentages below 60% must cease benefit accruals. For purposes of modeling this proposal, in scenarios where an at-risk plan’s funded percentage is below 60%:

- In the “contribute only the minimum” runs, the model assumes benefit accruals cease.
- In the “fund up to avoid benefit restrictions” runs, the model assumes the employer will contribute the amount necessary to avoid this benefit restriction as well as any other restrictions. Therefore, benefit accruals continue.

Similar logic applies to the other benefit restriction rules.

Additional assumptions are needed to model the benefit restriction rules under H.R. 2830. H.R. 2830 provides that assets are reduced by credit balances when determining funding percentages for triggering benefit restrictions, but gives employers the option of “de-classifying” credit balance assets at any time. By de-classifying a credit balance, a sponsor may be able to raise the funded percentage without making an additional contribution to the level needed to avoid a benefit restriction.

For purposes of modeling H.R. 2830:

- In the “contribute only the minimum” runs, it is assumed that sponsors will choose to “de-classify” credit balances to the extent necessary to avoid the benefit freeze restriction.
- In the “fund up to avoid benefit restrictions” runs, it is assumed that any credit balance will be “de-classified” before additional amounts are contributed to fund up to the necessary level.

## Changes since original white paper

The mortality assumption under the Administration's Proposal scenario changed from 94 GAM projected to valuation year plus 10 years to UP94 projected to valuation year plus 10 years (see Appendix 4 for details on mortality assumptions).

The database has been updated to reflect actual contributions made for the 2003 plan year. Doing so gives a more accurate picture of credit balances available at the beginning of the projection period.

The model has been updated to reflect the benefit freeze provisions that are triggered when the funded status drops below a specified threshold (not applicable for scenarios where sponsors are assumed to contribute the amount necessary to avoid benefit restrictions).

## Other

For further background on the PIMS methodology, see page 10 of the 1998 PBGC Data Book on the PBGC's Web site: [www.pbgc.gov/publications/databook/databk98.pdf](http://www.pbgc.gov/publications/databook/databk98.pdf)

## Appendix 4

### Background on Mortality Tables

It is generally accepted that mortality will continue to improve and improvement should be anticipated. The UP 94 Task Force of the Society of Actuaries states that “the actuary would have to demonstrate significant factors that would justify not using an improvement trend...under a particular pension plan.”

Mortality rates in a “static” table reflect anticipated experience in a particular year. For example:

- RP-2000 table reflects mortality rates for the year 2000, and
- RP-2000 projected to 2020 reflects mortality rates for the year 2020.

Mortality is expected to improve in each future year. For example, a 65-year old in 2020 will have a lower mortality rate than a 65-year old in 2010 who will have a lower mortality rate than a 65-year old in 2000. A table that takes these improvements into account is called a “generational” table. A generational table is constructed from a group of static tables (see illustration on next page). The Retirement Plans Experience Committee of the SOA recommends the use of a generational mortality table to take into account long-term trends in mortality improvement. However, many valuation programs are not currently able to reflect generational tables. To circumvent this problem, the Society of Actuaries published guidelines for adjusting a static table to approximate a generational table.

Under one approximation method, the static table is projected “d” years beyond the year of the valuation where “d” is the liability duration. For example, if duration is 10 years, for the 2006 valuation, the table should be projected to 2016. For a 2007 valuation, the table should be projected to 2017, etc. Results obtained using this methodology are very close to those obtained with the full generational table, but computations are much easier to do and check.

Another benefit of using this methodology is that the mortality table is automatically updated each year. The annual impact on results is small, and no legislation is needed to reflect mortality improvements.

Another option for reflecting mortality improvements is to use the same table for several years and periodically update it. In this case, it is suggested that the static table be projected to the middle year of the period for which that table will be used plus the duration.

For example, if the table will be updated every five years, the initial table should be projected three years plus the duration. The following example shows how the table could be adjusted assuming the table is updated every five years, the duration is 10 and that the table is first mandated for 2006 valuations:

- For 2006-2010 valuations, the mandated table is projected to 2018 (2008 + 10), and
- For 2011-2015 valuations, the mandated table is projected to 2023 (2013 + 10).

This requires periodic regulation/legislation and will create a “cliff effect” when the new table becomes effective.

### Illustration of the Development of a Generational Mortality Table From Static Mortality Tables

Age	Year of Static Table									
	1994	1995	1996	1997	1998	1999	2000	2001	...	2052
65	$q_{65}^{1994}$	$q_{65}^{1995}$	$q_{65}^{1996}$	$q_{65}^{1997}$	$q_{65}^{1998}$	$q_{65}^{1999}$	$q_{65}^{2000}$	$q_{65}^{2001}$	...	$q_{65}^{2052}$
66	$q_{66}^{1994}$	$q_{66}^{1995}$	$q_{66}^{1996}$	$q_{66}^{1997}$	$q_{66}^{1998}$	$q_{66}^{1999}$	$q_{66}^{2000}$	$q_{66}^{2001}$	...	$q_{66}^{2052}$
67	$q_{67}^{1994}$	$q_{67}^{1995}$	$q_{67}^{1996}$	$q_{67}^{1997}$	$q_{67}^{1998}$	$q_{67}^{1999}$	$q_{67}^{2000}$	$q_{67}^{2001}$	...	$q_{67}^{2052}$
68	$q_{68}^{1994}$	$q_{68}^{1995}$	$q_{68}^{1996}$	$q_{68}^{1997}$	$q_{68}^{1998}$	$q_{68}^{1999}$	$q_{68}^{2000}$	$q_{68}^{2001}$	...	$q_{68}^{2052}$
69	$q_{69}^{1994}$	$q_{69}^{1995}$	$q_{69}^{1996}$	$q_{69}^{1997}$	$q_{69}^{1998}$	$q_{69}^{1999}$	$q_{69}^{2000}$	$q_{69}^{2001}$	...	$q_{69}^{2052}$
.	.	.	.	.	.	.	.	.	...	.
.	.	.	.	.	.	.	.	.	...	.
.	.	.	.	.	.	.	.	.	...	.
120	$q_{120}^{1994}$	$q_{120}^{1995}$	$q_{120}^{1996}$	$q_{120}^{1997}$	$q_{120}^{1998}$	$q_{120}^{1999}$	$q_{120}^{2000}$	$q_{120}^{2001}$	...	$q_{120}^{2052}$

The orange-shaded cells would be used to calculate the value of an annuity in 1997 to a participant age 65.

## Appendix 5

### Credit Balance Issues

The Administration cites funding holidays caused by large credit balance build-ups as one of factors that led to the current crisis. Under the Administration's Proposal the credit balance system would be eliminated.

Both Congressional Proposals retain the credit balance system subject to a few modifications:

- Interest credited to balances will be tied to actual market returns.
- When determining the funding shortfall to be amortized as part of the minimum funding requirements, the credit balance is subtracted from assets.
- There are some restrictions as to when underfunded plans can use the credit balance to offset a required contribution.

The Administration believes these modifications will not fix the problems caused by the credit balance system in the past. In addition, the Administration believes there will be ample incentives for plan sponsors to contribute more than the minimum required amount even after the credit balance system is eliminated.

#### Pre-funding incentives exist without credit balances

Under the Administration's Proposal and the Congressional Proposals, if a sponsor contributes more than required, the funding target will be reached sooner. Once that happens, amortization charges are eliminated and the minimum required contribution is reduced to the normal cost (the cost of benefits accruing in the coming year). If excess contributions result in a plan exceeding its funding target (i.e., put the plan into a surplus position), the surplus can be used, dollar for dollar, to offset the normal cost.

In addition to shortening the amortization period, more contributions mean less underfunding and less underfunding has many positive *immediate* consequences under all of the proposals. For example:

- PBGC risk-related premiums are directly tied to the amount of underfunding. Thus, contributing more than required one year results in lower premiums the next year.
- The size of new shortfall amortization bases is tied to the amount of underfunding. Thus, contributing more than required one year may result in lower funding requirements the next year.

Finally, it's important to note that the increased tax-deductible limits under all of the proposals enable sponsors to contribute and deduct amounts in excess of the required amount.



## Current credit balance system leads to inadequately funded plans

Under current law, plans that have built up credit balances can take a contribution holiday regardless of the current funded status of the plan. During these “holidays,” a plan’s funding level may drop significantly. Many of PBGC’s largest claims came from plans in this situation. For example, neither Bethlehem Steel nor US Airways were required to make cash contributions in the few years leading up to their terminations. And remarkably, notwithstanding the fact that the United Airlines pilots’ plan is underfunded by almost \$3 billion (on a termination basis), the company was not required to make a cash contribution to that plan for the years 1996 through 2004. In fact, during that time period, the pilots’ plan credit balance was used in lieu of cash to satisfy over \$350 million in funding requirements.

United Airlines, and most other plans that used credit balances in lieu of making contributions in the years leading up to a termination, were severely underfunded upon plan termination, and as a result participants lost (or will lose) a significant portion of their promised benefits. Allowing companies to stop making contributions when their plans are underfunded does not make business or policy sense and runs counter to the whole notion of steadily improving the funded status of underfunded plans. Funding holidays will not go away if either of the Congressional Proposals becomes law.

## Marking credit balances to market does not solve the problem

The Administration acknowledges that part of the current problem stemmed from letting credit balances grow with a specified rate of interest regardless of actual market returns. However, the problems noted above did not stem from interest credits alone. In fact, had interest been marked-to-market since 1996, the United Airline’s Pilots’ Plan contribution holiday would have lasted almost as long as it did under current law. Under a mark-to-market approach (keeping all other components of current law unchanged), the contribution holiday would have ended in 2004, just one year sooner than when it actually did end and still much too late to ensure adequate funding upon termination.

## Disregarding credit balance when determining shortfall does not solve the problem

The Congressional Proposals require that credit balances be disregarded when determining the amount of shortfall that needs to be amortized. Doing so eliminates “double counting”, an issue often cited as a problem with current law. However, other problems will remain. For example:

- Contributing the minimum amount required can lead to a decrease in funded percentage.
- Plans with the same amount of underfunding may have different funding requirements.

These issues are best illustrated by example. Consider two pension plans that are both 90% funded. Both have funding targets of \$100 million, assets with a market value of \$90 million and a normal cost of \$12 million. Let us assume further that, although both plans have the same amount of assets, they have very different contribution histories. Plan A's sponsor has always contributed only the minimum required amount, while Plan B's sponsor usually contributed more. The accumulated value of excess contributions to Plan B (i.e., the credit balance) is \$10 million.

The Administration contends that both plans should be required to contribute the same amount because both plans are currently in the same situation. How they got there is irrelevant. Whether assets grew to \$90 million because of favorable investment performance or because of additional contributions, the result is the same: there are \$90 million of assets currently available to pay benefits with a present value of \$100 million. Therefore, the required contribution for both plans should be the sum of the normal cost plus a seven-year amortization of the \$10 million shortfall. Under the Congressional Proposals, Plan B's funding requirement would be different than that of Plan A solely because excess contributions were made in the past. An illustration follows:

Minimum Required Contribution	Administration's Proposal		Congressional Proposals	
	Plan A	Plan B	Plan A	Plan B
1. Normal Cost	\$ 12.0	\$ 12.0	\$ 12.0	\$ 12.0
2. Funding Shortfall				
a. Funding Target	\$100.0	\$100.0	\$100.0	\$100.0
b. Assets				
i. Value	\$ 90.0	\$ 90.0	\$ 90.0	\$ 90.0
ii. Credit Balance	<u>N/A</u>	<u>N/A</u>	<u>- 0.0</u>	<u>- 10.0</u>
iii. Adjusted value	\$ 90.0	\$ 90.0	\$ 90.0	\$ 80.0
c. Funding Shortfall [(a) – (biii)]	\$ 10.0	\$ 10.0	\$ 10.0	\$ 20.0
3. Amortization charge				
[7-year amortization of (2c)]	\$ 1.5	\$ 1.5	\$ 1.5	\$ 3.0
4. Minimum required contribution				
a. Before reflecting credit balance				
[(1)+(3)]	\$ 13.5	\$ 13.5	\$ 13.5	\$ 15.0
b. Credit balance	<u>N/A</u>	<u>N/A</u>	<u>- 0.0</u>	<u>- 10.0</u>
c. After reflecting credit balance	\$ 13.5	\$ 13.5	\$ 13.5	\$ 5.0
Year-end Funded Percentage <sup>14</sup>				
5. Funding Target [((1)+(2a)) x 1.05]	\$118	\$118	\$118	\$118
6. Assets [(\$90 +(4c)) x 1.05]	\$109	\$109	\$109	\$100
7. Funded percentage	92%	92%	92%	85%

<sup>14</sup> Assumes minimum required contribution is made and asset performance is in line with yield curve (5% for this example).

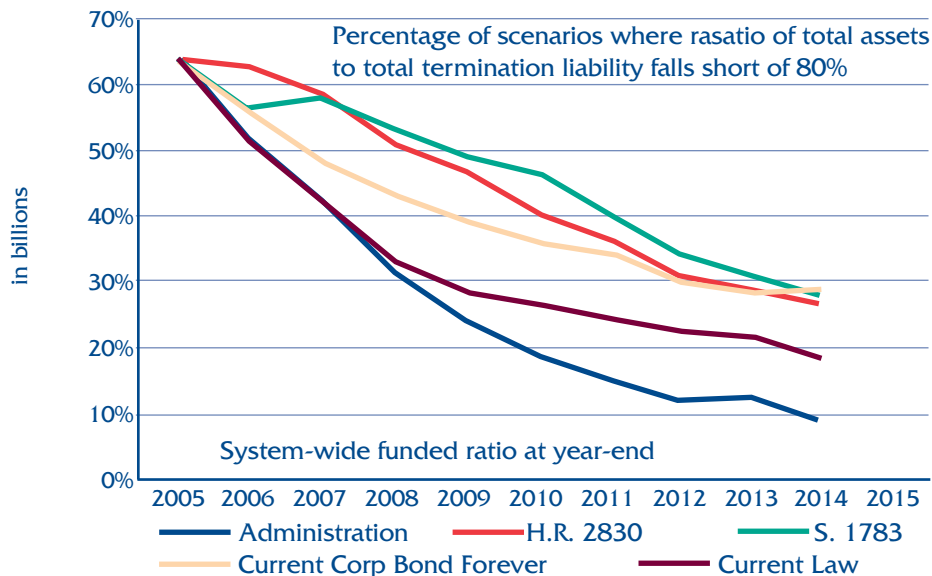
Under the Administration's Proposal, both plans are treated the same and both have required contributions that result in an increase in their funded percentage (from 90% to 92%). Under the other proposals, the plans funding requirements differ even though they have exactly the same amount of actual underfunding at the beginning of the year. The different treatment results in a lower funding requirement for Plan B. As a result, Plan B's funded percentage drops from 90% this year to 85% next year.

## Appendix 6 Funded Ratios

The April 6th White Paper included charts illustrating aggregate projected funded ratios at year-end from the deterministic runs. As explained in that White Paper, the “funded ratio” charts showed the ratio of total assets (combined for all plans) to total liabilities measured on a termination basis.<sup>15</sup> Because one plans’ assets cannot be used to cover another plan’s unfunded benefit promise, it is important to note that the aggregate funded ratio does not represent the average of each individual plan’s funded ratio. Now that PIMS has been enhanced to include stochastic modeling on all calculations, more useful measures can be provided.

The measure of how well a proposal performs is not determined by what happens just under favorable economic conditions, but by how well the system is protected when the climate is not favorable. Therefore, it is useful to examine the likelihood that system-wide underfunding could reach considerable levels. The following chart shows how often (out of the 500 scenarios) the mean aggregate ratio was less than 80 percent. This threshold was chosen because a system-wide ratio below 80 percent indicates a considerable problem. For example, over the past few years, while PBGC has been taking on record numbers of claims, the system-wide ratio has been below 80%.

**Chart 1. The Administration’s Proposal Results in Greatest Probability That System-wide Funding will reach at least 80%**

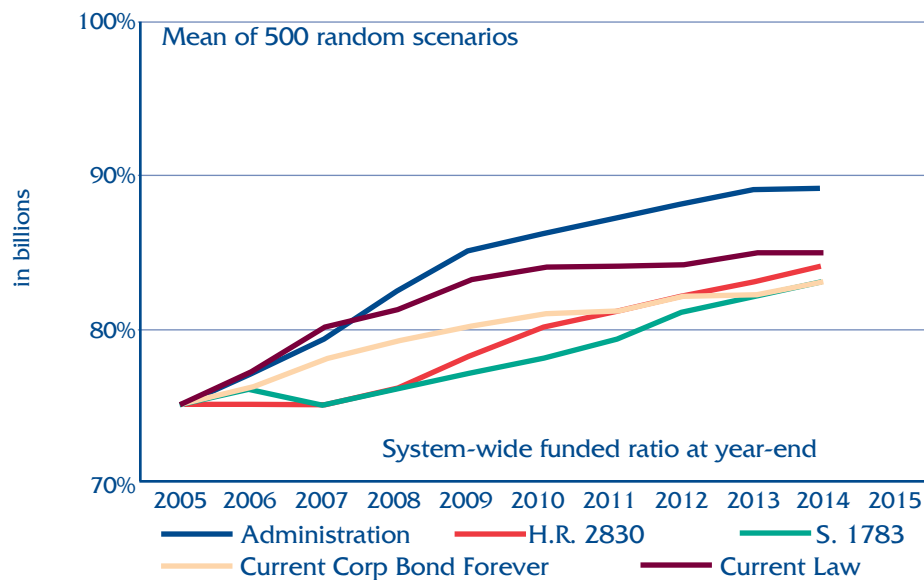


<sup>15</sup> “Termination basis” means assets at fair market value and liabilities measured using PBGC’s methodology for valuing the liabilities of an underfunded, terminated plan taken over by the PBGC. The PBGC’s methodology is market-based: the agency conducts surveys of the prices charged by private-sector insurance companies to write group annuity contracts, and sets its assumptions to match those prices. Thus, termination liability replicates the cost of paying a private insurer to provide the promised benefits.

The above chart shows that at the end of 2005, in 64 percent of the scenarios (320 out of 500) the aggregate ratio was less than 80 percent. At the end of 2014, only 9 percent of the scenarios result in an aggregate ratio of less than 80 percent under the Administration's Proposal. For H.R. 2830 and S. 1783, the percentages are 27 percent and 28 percent, respectively.

The next chart shows the mean aggregate ratio of assets to liabilities in the universe of DB plans. Because this ratio is intended to illustrate the projected amount of underfunding in the total DB universe, projected plan surpluses were excluded from the calculation.

**Chart 2. Ratio of Total Assets (excluding surpluses) to Total Termination Liability**



The above chart shows that system-wide there will be less underfunding if the Administration's Proposal is enacted than under either of the Congressional Proposals.

When 500 scenarios are run, a few outlier results can have a significant impact on the mean funded ratio. So for comparative purposes, we examined the median results (each year's median is the result for that year for which half of the 500 results produce higher ratios and half produce lower ratios). The median results are very similar to the mean results.

## Appendix 7

### Numerical Claims and Contribution Data

Mean claim amounts resulting from the 500 scenarios (as shown on Chart 1 on pg. 6)  
(\$ in billions)

Year	Administration	H.R. 2830	S. 1783	Current corp bond forever	Current Law
2006	\$2.6642	\$2.6642	\$2.6642	\$2.6642	\$2.6642
2007	\$2.2975	\$2.4989	\$2.4306	\$2.4468	\$2.3996
2008	\$1.9693	\$2.4361	\$2.4547	\$2.3166	\$2.1582
2009	\$1.5746	\$2.2490	\$2.2442	\$1.9404	\$1.7153
2010	\$1.4233	\$2.3030	\$2.4143	\$1.9957	\$1.7034
2011	\$1.2792	\$2.2711	\$2.4830	\$2.0358	\$1.7070
2012	\$1.0787	\$2.2450	\$2.4773	\$2.0604	\$1.6601
2013	\$1.1400	\$2.3623	\$2.6441	\$2.3398	\$1.9212
2014	\$1.1410	\$2.2017	\$2.4583	\$2.2663	\$1.8154
2015	\$1.0171	\$2.2384	\$2.4066	\$2.4160	\$1.9686

Mean required contributions resulting from the 500 scenarios (as shown on Chart 2 on pg. 7)  
(\$ in billions)

Year	Administration	H.R. 2830	S. 1783	Current corp bond forever	Current Law
2005	\$92.6	\$92.6	\$92.6	\$92.6	\$92.6
2006	\$131.9	\$70.2	\$106.6	\$106.6	\$127.4
2007	\$144.6	\$94.2	\$62.4	\$129.5	\$155.2
2008	\$148.9	\$107.7	\$86.3	\$114.0	\$132.3
2009	\$146.2	\$122.1	\$108.8	\$112.1	\$122.3
2010	\$140.7	\$132.9	\$122.2	\$111.3	\$114.8
2011	\$139.0	\$136.5	\$137.4	\$113.6	\$113.9
2012	\$138.2	\$138.3	\$142.3	\$114.3	\$112.8
2013	\$120.0	\$121.8	\$144.2	\$118.5	\$116.6
2014	\$121.4	\$120.7	\$131.5	\$122.1	\$120.3
2015	\$120.9	\$119.3	\$125.9	\$123.9	\$122.1



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