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# PBGC: When Will the Cash Run Out?

The Pension Benefit Guaranty Corporation (PBGC) currently has over $30 billion in assets and could pay benefits through 2020, according to our base case. At the same time, it is insolvent on the basis of Generally Accepted Accounting Principles (GAAP) and would be shut down if it were a private insurer. It is possible to be simultaneously "cash rich" and insolvent, because of the structure of PBGC's pension guaranty. It takes over both the assets and liabilities of underfunded pension plans that are terminated when their sponsoring companies hit extreme financial distress. Since pension payments are spread over many years, even a severely underfunded plan usually brings enough assets to pay for a few years of benefits. But, once this cash runs out, payments must be made from premiums or assets taken over from other failed pension plans.

COFFI has developed a model to explore PBGC's financial condition, particularly when it will run out of cash. We supplement our analysis of PBGC's current condition by examining the impact of potential terminations at United Airlines and at other carriers. Despite the model's approximations, the general conclusions are clear and unlikely to change in a more sophisticated exercise, although the exact numbers and dates would vary.

We believe this is the first PBGC cash flow model in the public domain. We hope that this initial model will inspire others to create their own numerical analyses. The Social Security debate has been much enhanced by a focus on future cash flow projections and we believe the PBGC debate would similarly benefit. In line with Social Security analyses, we have chosen a 75 year projection period to show the implications of actions taken in the near future that have ramifications for many years to come, even though we recognize that the exact shape of the distant future is unknowable. Analyses of shorter periods, such as 40 or 50 years, lead to broadly similar conclusions.

All our analyses assume continuation of current law. This is particularly important in regard to calculations of required premium levels. Legislation that reduced PBGC's risk level would diminish the need for higher premiums, although the figures suggest that premiums would need to increase somewhat in any event.

Those unfamiliar with PBGC may wish to consult www.coffi.org, where we have detailed reports on PBGC and related pension issues, written in non-technical language. *PBGC: A Primer*, may be of particular value to newcomers to this area.

# Executive Summary

COFFI has created the first published cash flow model for PBGC's main program. Our key conclusions are:

- **PBGC would run out of cash in 2020, if our base case holds true**. PBGC's $34 billion of assets, as of the end of Fiscal 2003, would be exhausted by pension payments, despite premiums of $900 million per year and income on the investments. In the base case, new claims are assumed to come in each year with an underfunding of $2.7 billion, producing a present value of claims roughly equal to PBGC's median claims estimate for the next 10 years. Payments on each new claim start low and mount over time.
- **A root cause of the cash crisis is PBGC's existing insolvency.** The program started 2004 insolvent by $11.2 billion, or roughly a quarter of its obligations. Existing liabilities would exhaust existing investments, and future investment income, by 2018. This assumes PBGC were to be shut down, with no new premiums, claims, or the pension assets associated with new claims,
- **Filling the existing hole, without new claims, requires a $14 billion rescue now (or more later), or earmarking $720 million of annual PBGC premiums, or raising investment returns to 7.8% from 5.0%**. A $14 billion rescue covers the $11 billion accounting shortfall, plus additional projected expenses. Carving $720 million annually out of premiums could require higher premium rates, as it would not leave a cushion for future claims and expenses. Finally, raising returns to 7.8% would require a substantial, winning bet on the stock market or a sharp, sustained rise in market rates.
- **Factoring in new claims can either defer or accelerate the cash crisis, depending on claim specifics.** Failed pension plans initially add to cash and investments since they bring assets sufficient for some years of pension payments. For example, the base case projects an inflow of $26 billion in assets from new claims through 2015, in present value terms, versus $25 billion in pension payments and expenses on these new claims in the same period. After that, the net effect in the base case of years of new claims is to drain cash. This effect on the cash exhaustion date is more than offset in the base case by the benefit of assuming premium income, despite the ultimate inadequacy of those premiums.
- **Whether they defer or accelerate the cash crunch, new claims dig a bigger hole for PBGC, unless covered by adequate premiums.** Trying to defer the cash crisis through new claims is worse than "borrowing from Peter to pay Paul". Base case new claims bring assets over the 75 years with a present value of $57 billion versus benefit and administrative payments over the same period with a present value of $124 billion, even without counting the large tail of benefit payments beyond the 75$^{th}$ year.
- **Base case new claims would require a $67 billion rescue now (or more later), or PBGC premiums of $3.9 billion annually, or nearly doubling investment returns to 9.6% from 5.0%**, in order to pay pensions through 2080. An extra $3 billion in annual premiums would have a net present value approximately equal to the $67 billion shortfall.
- **Even if new claims were to drop to $1 billion per year, it would still require a $21 billion rescue, or $1.8 billion in annual premiums, or an increase in investment returns to 7.5% from 5.0%.**
- **Retirees would suffer strongly from cash exhaustion at PBGC, barring a government rescue.** $900 million in annual premiums would fail to cover all expenses, leaving nothing for retirees. Even if Congress separately allocated funds for expenses, premiums would cover only 9% of promised pensions. There would be a "cliff" effect, with pensions falling from the full guaranteed level to 9% of that level, or less, within two years. There is no mechanism at present for ramping down.

We supplemented the base case by examining three scenarios for airline terminations: (a) terminations at United Airlines; (b) terminations at United, American, Continental, Delta, Northwest and US Airways; and (c) terminations at all airlines with significant underfunding.

- **Terminations at United, on top of the base case, would require a cumulative $75 billion rescue, $4.2 billion in annual premiums, or a 9.8% investment return.** Absent offsets, the terminations would accelerate cash exhaustion by a few months.
- **Terminations at all airlines, added to the base case, would require a $109 billion rescue, $5.8 billion in annual premiums, or a 10.2% investment return.** Cash exhaustion would accelerate by two years to 2018.

Table 1 summarizes the implications of the base case and a number of alternative scenarios. Mathematically, there are four ways to offset cash shortfalls: (1) a taxpayer rescue; (2) higher premium levels; (3) higher investment returns; and (4) lower net claims on PBGC. This paper does not propose policy solutions. Instead, we show the mathematical results from our model for alternative ways of avoiding a cash shortfall over the 75 year projection period.

**Table 1: Key results of different scenarios ($ billions)**

| | | | | | | Potential Offsets | | |
|---|---|---|---|---|---|---|---|---|
| **Scenario** | **New Claims (Annual)** | **New Claims (One-off)** | **Premium (Annual)** | **Year of Exhaustion** | | **Rescue Required (2004 $)** | **Total Prem. Required (Annual)** | **Invest. Return Req.** |
| Base | $2.7 | None | $0.9 | 2020 | | $67 | $3.9 | 9.6% |
| Existing/Shutdown | None | None | None | 2019 | | $14 | $0.72 | 7.8% |
| Fewer claims | $1.0 | None | $0.9 | 2023 | | $21 | $1.8 | 7.5% |
| More claims | $3.7 | None | $0.9 | 2019 | | $94 | $5.1 | 10.3% |
| Base + United | $2.7 | $6.4 | $0.9 | 2019 | | $75 | $4.2 | 9.8% |
| Base + Legacy Air | $2.7 | $20 | $0.9 | 2018 | | $95 | $5.1 | 10.1% |
| Base + All Airlines | $2.7 | $30 | $0.9 | 2018 | | $109 | $5.8 | 10.2% |

Some results, such as raising premiums by 600%, seem very unlikely politically and have the potential to aggravate the situation by pushing healthier plan sponsors to leave the pension system. We do not attempt here to model the ultimate effects of complex policy choices, but only to show the size of action required by the arithmetic. Nor do we do mean to suggest that higher investment income can be procured "for free" or even guaranteed. Barring a sharp, sustained increase in market interest rates, investment income could only be increased significantly by taking on more risk, *and by winning the bet that riskier assets would perform better than low-risk assets.* A losing bet would aggravate the ultimate problem.

**Potential Objections**

The author benefited from the comments of numerous reviewers of earlier drafts. The process confirmed the mechanical soundness of the model, but brought up several comments worth addressing here.

**Is 75 years too long a projection period?** We chose 75 years for the same basic reason that Social Security models do. People are working today under the promise that the pension benefits they are earning will be protected. It will be many years before all existing vested pension benefits are paid.

**Will new PBGC claims continue that long?** Our model assumes current law. We do not believe that the weaker firms most likely to utilize PBGC's insurance will voluntarily exit the system, which would require them to find the cash to buy expensive group annuities to fund their plans. It is also difficult to imagine legislation that would shut PBGC down to new claims, since workers and retirees are relying on the promised coverage.

**Is it reasonable to assume claims continue at this decade's levels?** COFFI's base case actually assumes a steady decline in the value of future claims in today's dollars. A steady level of $2.7 billion per year in future dollars produces a net present value (NPV) for the first decade that matches the $22 billion produced by PBGC's PIMS model for the median case. The table below shows the decline in NPV after that.

**Table 2 NPV of base case new claims**

| Decade | Net Present Value |
|---|---|
| 2004-2013 | $22 billion |
| 2014-2023 | $14 billion |
| 2024-2033 | $ 8 billion |
| 2034-2043 | $ 5 billion |
| 2044-2053 | $ 3 billion |
| 2054-2063 | $ 2 billion |
| 2064-2073 | $ 1 billion |

**Would a probabilistic model be better?** We believe showing one case at a time, in detail, is a powerful tool to complement probabilistic models that summarize a wide range of potential cases. Private sector financial analyses of insurers are virtually always done with a deterministic model such as ours, even for major deals. The author himself has created several hundred such models while on Wall Street.

**Is a 5% investment return too low?** This figure is realistic given existing PBGC investment guidelines and current financial market conditions. We include sensitivity analyses for those who are confident that market rates will increase or who believe that PBGC should invest more in stocks and are sure of their stock market predictions.

**Is a 52% funding ratio too low?** A 52% ratio of pension assets to liabilities taken over by PBGC is consistent with last year's claims experience and the average over PBGC's life. The last half of the 1990's was better, but this could be due to the unprecedented rise in the stock market rather than to legislated funding changes that took effect. Higher ratios would have some effect, but do not change the overall picture.

**Will new claims pay out more slowly than historically?** New claims are likely to come from old-line companies with old workforces, as was true historically. If payouts turn out to be slower, this will affect the timing of cash exhaustion, but have much less effect on the size of the problem, at any given NPV of claims.

# The Model

## Rationale

We created this model because there are many policymakers who are aware that PBGC is insolvent, but are uncertain as to the likely timing and implications of PBGC's exhaustion of its assets. We believe that quantification improves the quality of public policy debate.

Some argue that PBGC's future is inherently too uncertain to focus on a baseline case, even with sensitivity analyses and alternative cases. They believe that the core issue in understanding PBGC is that it is a "catastrophe insurer" that covers extreme adverse credit events that cause corporations with large pension underfunding to fail. Detailed analysis of a single case, or even a few cases, may distract from a proper focus on the variability of future results stemming from the range of potential claim volumes and interest rates. We understand this view.

However, the private sector has long relied virtually entirely on deterministic models, such as ours, to analyze major insurers as investments and for determining whether and how much to pay to buy an entire insurer or a major division. The author himself created several hundred such models while on Wall Street, including some used in multi-billion dollar deals. In this case, a deterministic model allows us to show the year-by-year effects on PBGC, and retirees, of alternative scenarios rather than solely to encapsulate probabilistic results in net present value numbers for claims and PBGC's net financial condition. Most people need to see the details in order to truly grasp the bigger picture. In addition, PBGC's present problems are of sufficient magnitude to make it worthwhile to explore what would happen if existing assets were used to pay existing liabilities, regardless of future claim developments.

Therefore, at the risk of false precision, we offer this model as a means of understanding the implications of PBGC's present situation and of possible future events, such as distress terminations of major airline pension plans. We believe one advantage of this model is that it demonstrates the inevitability of a cash crisis at PBGC, unless action is taken. It also allows policymakers to quantify the extent to which proposed reforms will need to alter the current situation in order to succeed in avoiding a cash crisis.

## Summary of the model

COFFI's model of PBGC cash flows is for the Single-Employer program, which accounts for 97% of PBGC's GAAP deficit. It is based on publicly available data, principally from PBGC's 2003 Annual Report, available at www.pbgc.gov. PBGC released a mid-year press release showing some improvement in its deficit, but without detailed financial information that would allow us to update the data in our model. It is our understanding that the improvement was primarily based on movements in the financial markets that have largely been reversed in the interim. For this and other reasons, we do not believe updated numbers would yield appreciably different results from our model.

The core equation of the model is:

**End of Year Cash & Investments = Beginning of Year Cash & Investments + Investment Income + Premiums + Assets Taken Over for New Claims – Benefits Paid – Net Other Expenses**

Naturally, the usefulness of the model depends on its ability to accurately estimate these key variables. A brief explanation of the modelling approach is given in this section, with considerably more detail available in the Appendix.

**Investment Income**: We assume a 5% annual return on average investments. This is up from the 4.4% discount rate used by PBGC at the end of 2003, due to a general rise in long-term interest rates in the interim. PBGC invests 75-85% of its assets in low-risk bonds and therefore earns an average return closely relective of market interest rates. PBGC generally owns bonds with long maturities, shown by a 10-year duration.

**Premiums**: We assume $1 billion of premiums in 2004, at the bottom end of the range projected by PBGC in its 2003 Annual Report. The low side appears likely given increased stock prices and interest rates since the end of Fiscal 2003, which should reduce underfunding at pension plans, and therefore the variable component of their premiums. Significant contributions by plan sponsors may also have reduced underfunding. 2005 is projected at $900 million, closer to the three-year average of $852 million for the single-employer program, based on the delayed effects of financial market movements and expectations of further corporate actions. Premiums are assumed to remain flat after 2005, since there is no inflation-adjustment mechanism in current law and there are forces pushing premiums in both directions, making it difficult to know whether to assume an increase or a decrease.

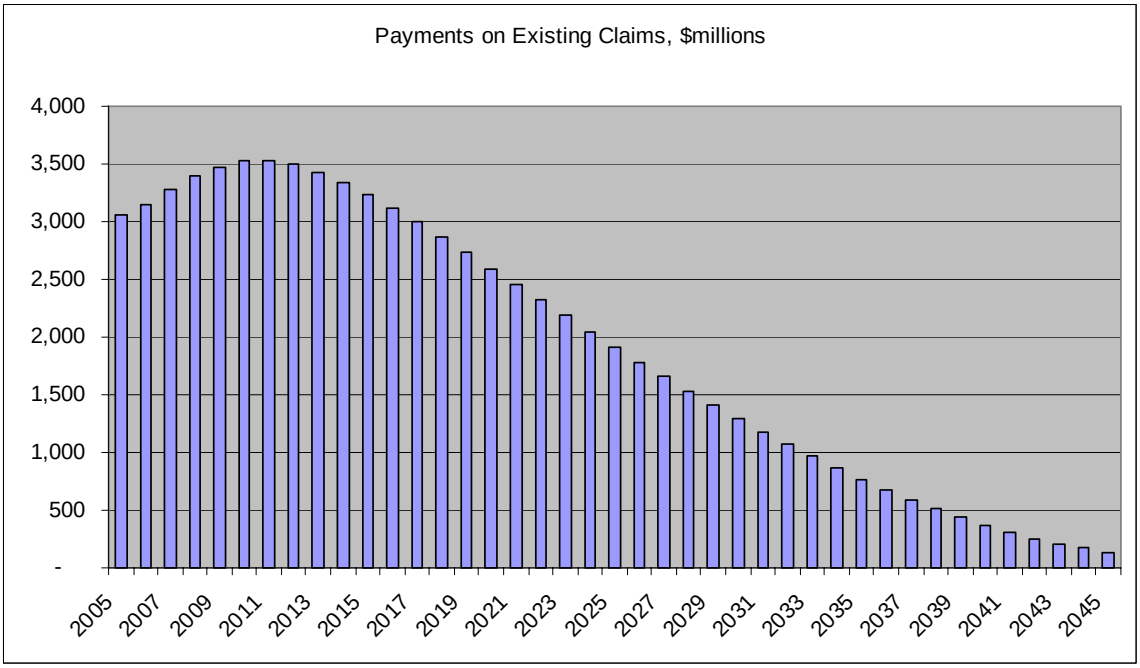
**New Non-Airline Claims**: An estimate of new claims on PBGC is required for two purposes: (1) benefits paid are based on an estimate of the total claims liability, including new claims, and (2) assets taken over as a result of new claims add to cash and investments. We use three scenarios. The base case assumes $2.7 billion in present value of underfunding taken over every year. This was the median estimate for the next 10 years from PBGC's PIMS model. (PBGC reports it as $2.2 billion in present value. Since our model uses dollar amounts in each future year without discounting them to a present value or dividing by an inflation factor, we multiplied the $2.2 billion to adjust for the average discount factor over the 10-year period.)

A more optimistic case was run with $1 billion of new underfunding each year, roughly in line with the inflation-adjusted average of the last 20 years. A more pessimistic case was constructed using $3.7 billion per year, the average new claim, net of recoveries, for the last 3 years. For comparison, net new claims were $6.4 billion in 2003, $3.5 billion in 2002, and $1.1 billion in 2001. (Note that PBGC reports claims on several bases. The "headline" number includes claims that are expected to occur shortly, as well as actual claims submitted. The figures just given are for actual claims only. The numbers should cumulate to similar levels, but will vary year by year.)

We convert the claims estimate into asset and liability figures by assuming 52% funding in the pension plans taken over, the average over PBGC's life. The payment pattern for benefits is assumed to equal that for existing PBGC claims, excluding "probable losses" which have not yet come in as claims to PBGC.

**Benefits Paid**: PBGC has published its expected pension payments for its existing liabilities, plus "probable losses", as of the end of Fiscal 2003. We take these payments as given. They rise in the beginning, as the effect of new retirements outweighs that of deaths. The net effect reverses as the years go by, since no new pension promises are being made. Figure 1 illustrates the payment pattern. Payout patterns for new claims were constructed by COFFI, as explained in the Appendix.

**Figure 1: Pension payments for existing claims**




**Net Other Expenses**: These totalled $359 million in 2003, of which $271 million were for administrative expenses. We assume administrative expenses grow one point slower each year than benefit payments do. This is intended to reflect the effect of economies of scale for PBGC. Other items are assumed to be similar to recent levels, except for an adjustment for an abnormal level of credit losses in 2003.

**Airline terminations**: We supplemented the base case by examining the effects of potential terminations at United Airlines. PBGC liabilities for United's plans were assumed to total $6.4 billion, in present value, based on a PBGC press release. As an additional case, we looked at adding potential terminations from the other major legacy airlines: American, Continental, Delta, Northwest, and US Airways. Including United, we estimated a total of $20 billion of PBGC liability, in present value terms. Our analysis was based on Form 10K filings with the SEC for these firms, plus certain assumptions based on the United case. These filings supplied figures for assets, net present value of benefit payments, and payments for the next 10 years.

Finally, we provide a rough analysis for the entire airline sector, based on reports that there is a total of over $30 billion of risk for PBGC, including the $20 billion analyzed here. Since we do not have specific information on the remaining $10 billion of potential PBGC claims, we assume payout patterns and funding levels are the same as for the legacy airlines analyzed here.

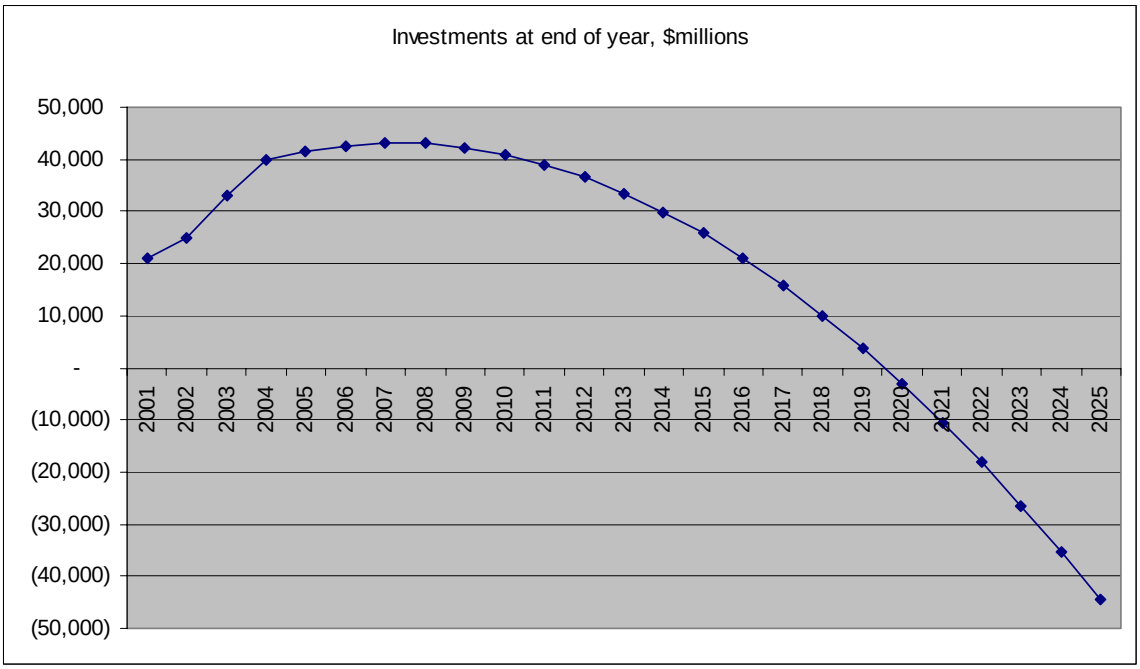
There are potential interactions between the airline termination assumptions and the base assumptions as to new annual claims. PBGC's PIMS model, from which we drew the assumptions for the base case claims level, includes airlines in its analysis. A portion of the $2.7 billion of new annual claims would likely represent airline claims, leading to some double-counting. It is impossible to determine the extent of double-counting based on public information. A second potential overlap is that $1.3 billion of PBGC's net probable losses at the end of 2003 represented airlines. The name of the relevant airline(s) was not disclosed.

# Base Case Results

The base case represents our best estimate for PBGC's future financial position, in the absence of legislative or regulatory changes and assuming present financial market conditions hold. As noted in the previous section, PBGC premiums are assumed to run at $900 million annually, after $1 billion in 2004. New claims are assumed to come to PBGC each year with pension payments spread over many years into the future. The net present value of those payments is assumed to be $2.7 billion greater than the assets that exist in the pension plans that are taken over each year. The $2.7 billion figure is based on the median case from PBGC's model of future claims activity, with adjustments explained in the previous section.

PBGC runs out of cash and investments in 2020, under this scenario.

**Figure 2: Cash exhaustion with $2.7 billion of new claims annually and $900 million of premiums**




**Net Present Value (NPV) of unfunded liabilities: $67 billion**

Mathematically, four options exist to erase the expected shortfall:

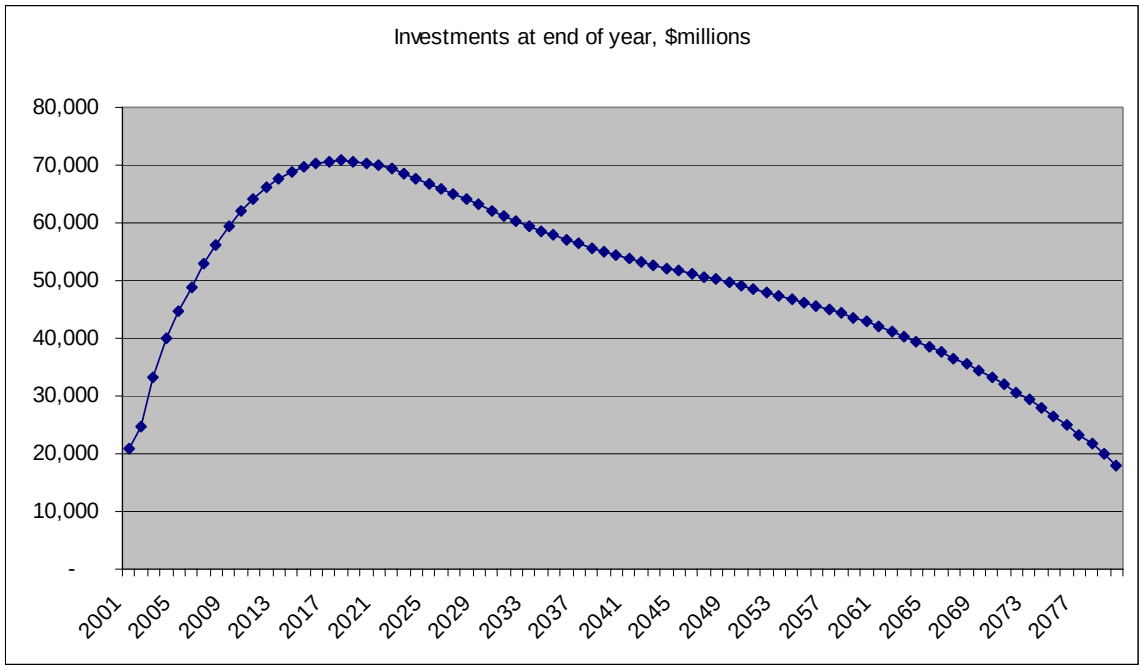
- Transfer $67 billion from taxpayers.
- Increase annual premiums to $3.9 billion, from $900 million.
- Raise annual investment returns to 9.6%
- Reduce new claims to $200 million of present value each year.

**Transfer from taxpayers**. We do not model the transfer option for this, or any other, case. The money could be infused in many different ways and times, making it meaningless to illustrate the cash flow effects. The constant factor is that the value in today's dollars would need to be $67 billion. The cost in future dollars would rise the longer the infusion was delayed.

**Increase in annual premiums**. Figure 3 illustrates the effects on cash and investments of increased premiums sufficient to avoid cash exhaustion over the 75 year projection period.

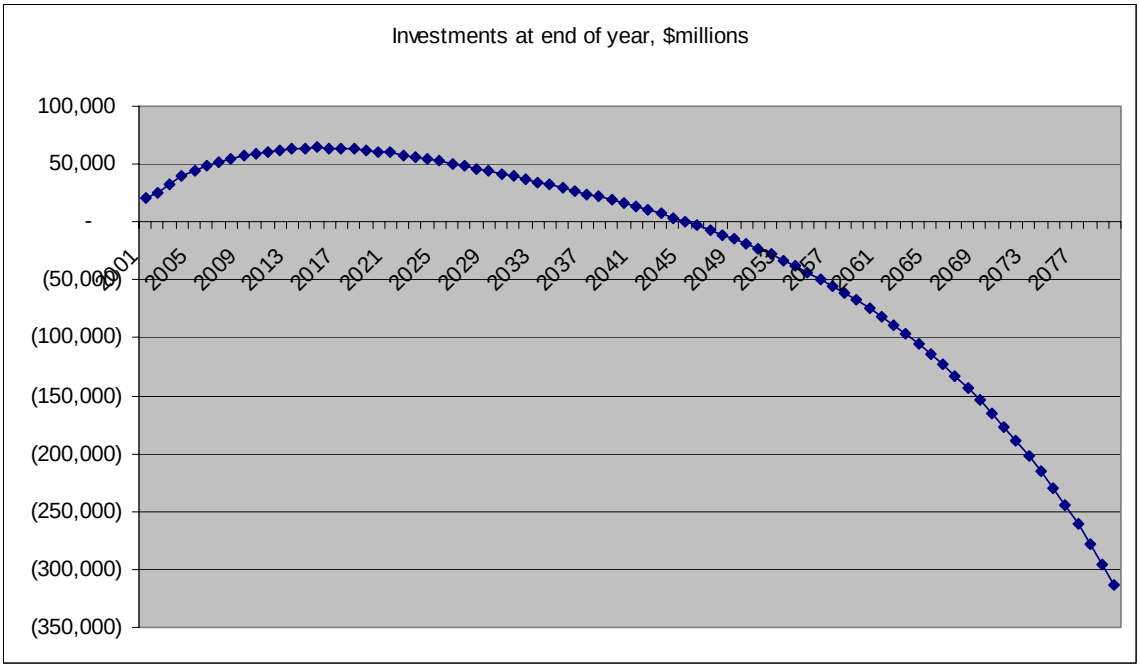
Our model does not account for changes in corporate and employee behavior, such as might occur if PBGC raised premiums to this extent. Altering the premium level or structure raises many complex policy issues that cannot be fully explored here. Among them are the possibility that a quadrupling of premiums might produce an exodus of healthy companies from the defined benefit system, which is voluntary. However, as noted in *PBGC: Fundamental Questions*, (see www.coffi.org) there are substantial disincentives to outright termination of pension plans. The more common practice of freezing pension plans decreases PBGC premiums only moderately, compared to continuing operation, since most of the premium is based on a fixed charge for each participant, including those whose pension accruals are frozen. (This is not to dismiss the policy implications of encouraging plan freezes, but only to say that they may not have much effect on PBGC's finances.) Premium increases could be targeted on less healthy companies, in an attempt to keep healthy companies in the pension system, but there would be the risk of pushing troubled companies into bankruptcy, with an increase in PBGC claims.

**Figure 3: Cash adequacy with $2.7 billion in annual claims and $3.9 billion in annual premiums**



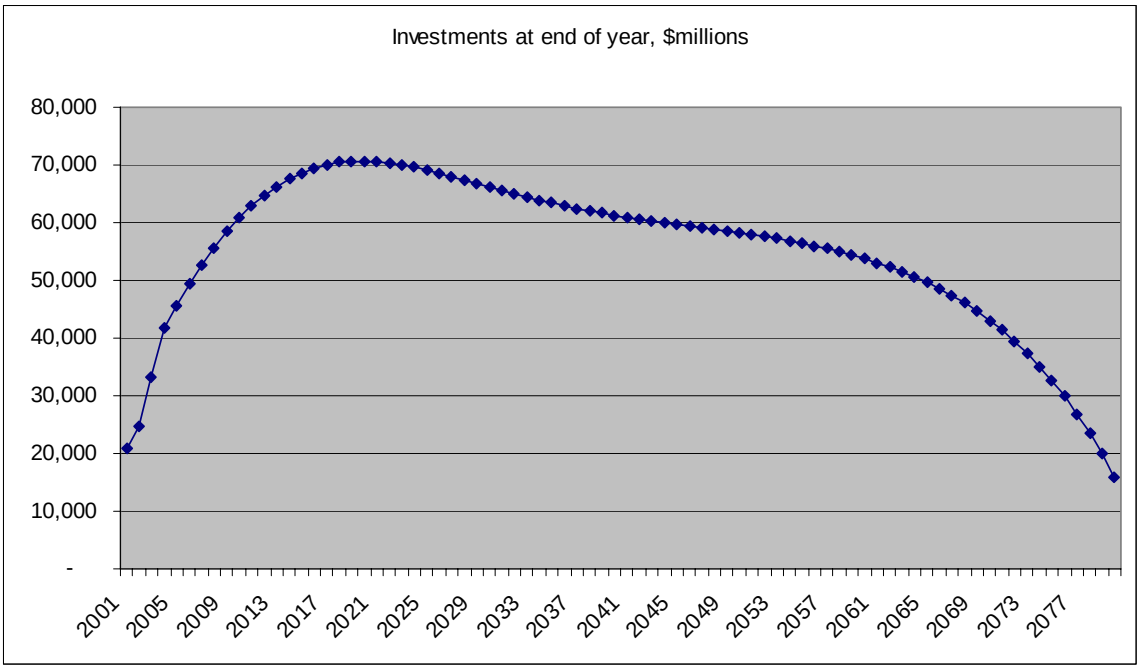
This graph may seem to indicate that the use of a 75-year horizon is heavily skewing the calculation of the required premium, since the investments fall off so much in the final years. However, figure 4 shows that the breakeven premium level is only 10% lower, at $3.5 billion annually, if a 40-year time horizon is used.

**Figure 4: 40-Year Horizon: $2.7 B in annual claims and $3.5 billion in annual premiums**



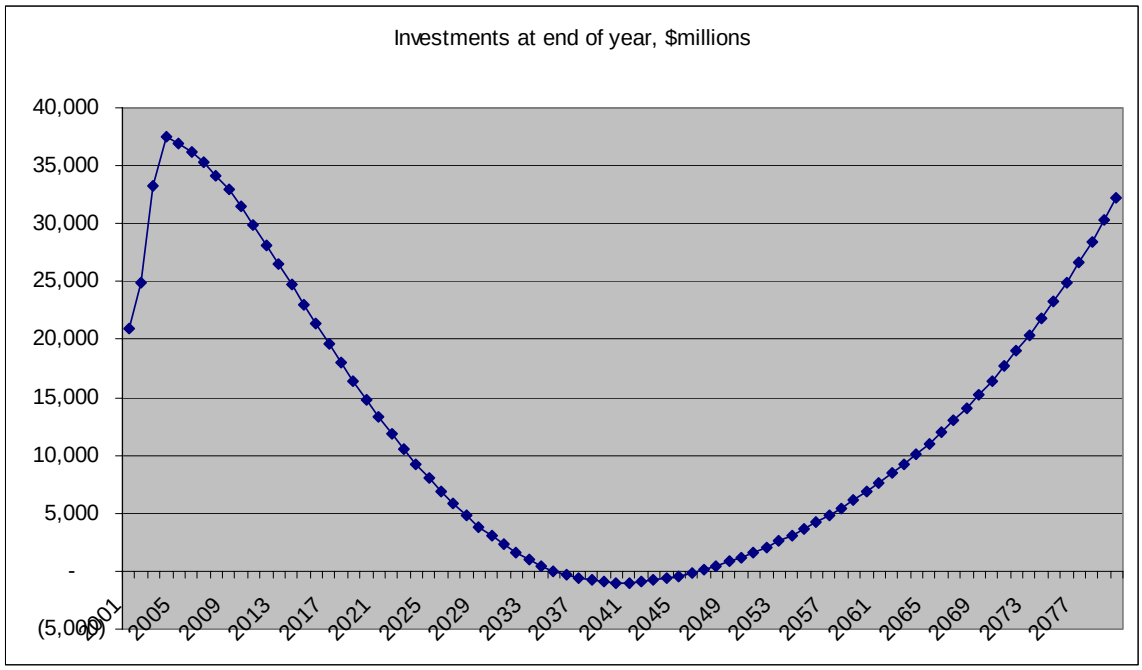
**Raise annual investment returns to 9.6%**. Figure 5 illustrates the effects of raising investment income. An increase of this magnitude would require either a heavy, and winning, bet on the stock market or a very strong rise in market interest rates. There has been only one extended period in history when conservative U.S. bonds have yielded this high, which was triggered by inflationary shocks in the early-1970's and continued off and on through the early 1990's.

**Figure 5: Cash adequacy with $2.7 B of new claims p.a., $900 M of premiums p.a., and 9.6% returns**



**Reduce new claims to $200 million in net present value annually**. Figure 6 illustrates the effects. Limiting new claims to this level would be a major achievement, since claims have averaged almost $4 billion in the last three years and roughly $1 billion, in today's dollars, over the last twenty years.

**Figure 6: Cash adequacy with $200 million in annual new claims and $0.9 billion in annual premiums**



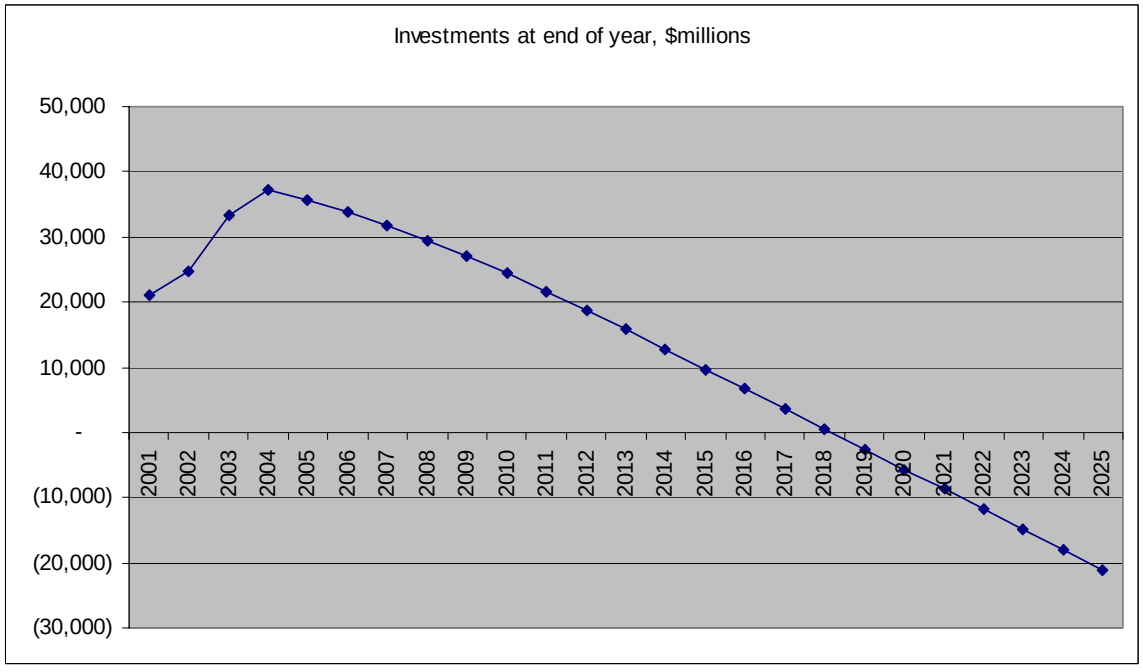
## Breakdown of Base Case into Component Pieces

PBGC's situation can be understood better by starting with a shutdown scenario, in which there are no new claims or premiums, and building up to the base case of continuing operations. Four conclusions stand out:

- **PBGC would run out of cash in 2019 in a shutdown scenario** where only existing assets, and investment income on those assets, was available to pay existing claims. This is not a surprise, since the program's financial position at the end of fiscal 2003 registered a negative $11.2 billion of net worth.
- **Premiums of $720 million per year would just suffice to avoid cash exhaustion**. This can be interpreted as meaning that 80% of PBGC's existing premiums are going to fill the hole dug in past years. The remaining 20% provides a thin cushion for future claims and expenses.
- **Base case new claims modestly accelerate the cash exhaustion date. However, the real problem is that they store up future trouble**. Underfunded pension plans do bring significant assets, although they are not enough to pay the full liabilities. Their assets cover the first years of their own pension payments, sometimes lasting beyond when PBGC would otherwise exhaust its cash and sometimes contributing to the problem by running out first. In the base case, the effect is to accelerate PBGC's cash crisis. Worse, they also bring massive liabilities to be paid in later years, after the associated assets run out.
- **Projected annual premiums of $900 million slightly more than offset the acceleration caused by the new claims themselves**. The cash exhaustion date moves from 2019 in the shutdown case, and 2017 with new claims but no premiums, back out to 2020.

Figure 7 illustrates that existing liabilities would exhaust existing assets, and investment income, by 2019.

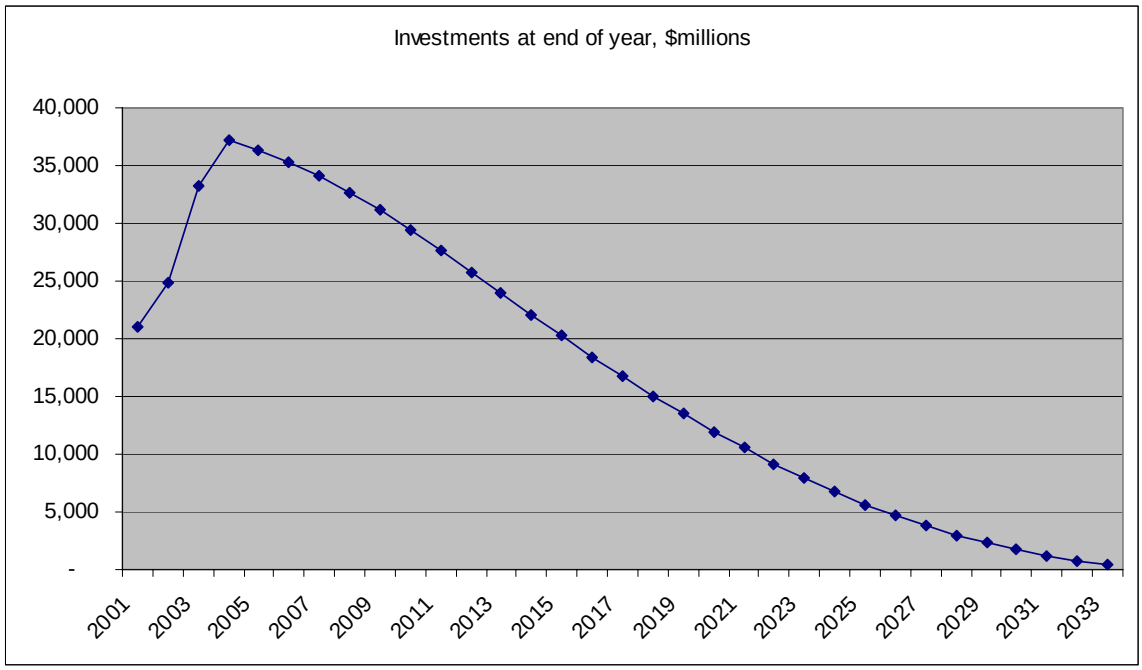
**Figure 7: Cash exhaustion with no new premiums or claims**




**NPV of unfunded liabilities: $14 billion**

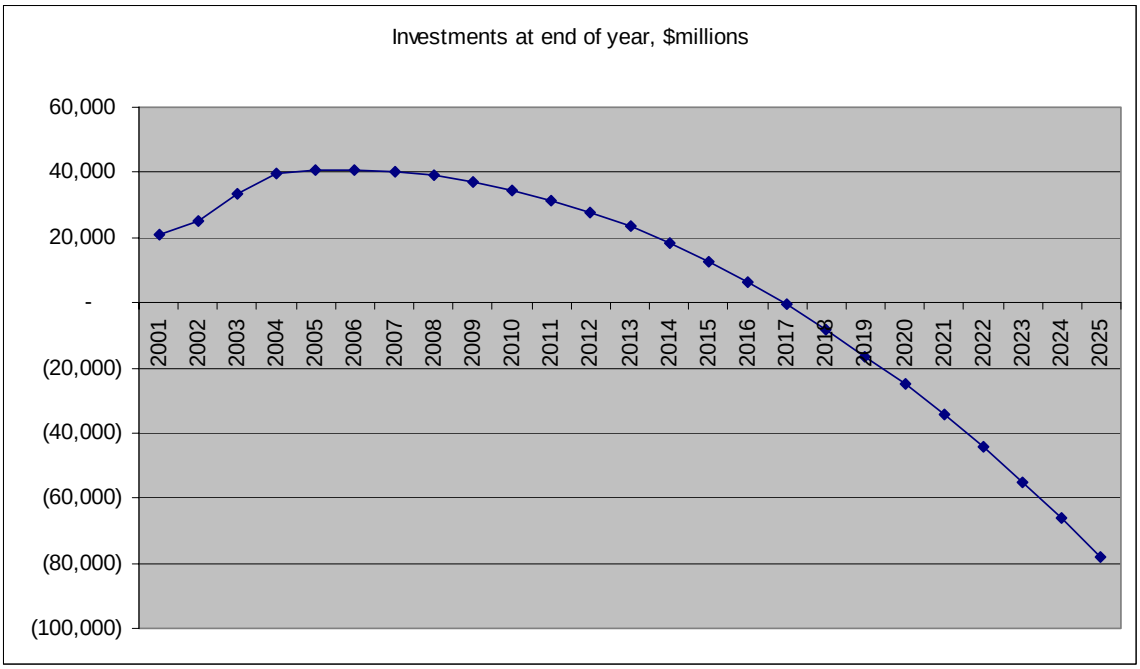
**The hole could be filled by earmarking $720 million of annual PBGC premiums** from 2005 through 2033. This would just suffice to avoid running out of cash for existing liabilities. PBGC's total insurance premiums in 2003 were $948 million, which would leave little in the way of undedicated premiums to cover future claims. Our projections imply that 80% of our projected $900 million of average PBGC premiums would be required to deal with past problems. This would leave only a thin cushion to cover future claims and related administrative and other expenses.

**Figure 8: Cash adequacy with no new claims and $720 million annually in premiums**



**Base case new claims, ignoring premiums, accelerate the cash crisis by two years. More importantly, they make the ultimate hole much bigger**. New claims can fund themselves for a number of years in the base case, but still run out of cash faster than PBGC would in a shutdown case. Our base case projects an inflow of $26 billion in assets from new claims through 2015, in present value terms, compared to $25 billion in present value of benefits payments on new claims, plus additional expenses, over the same period. Unfortunately, the new claims bring an additional $86 billion of pension payments, in today's dollars, to be made beyond 2015. Enough of these payments fall before 2019 to accelerate PBGC's cash crisis.

**Figure 9: Cash exhaustion with $2.7 billion of new claims annually and no premiums**




**NPV of unfunded liabilities: $87 billion**

**Adding the current level of premiums stretches cash exhaustion out three years to 2020**. The current level of premiums ($900 million per year) is not enough to avoid cash exhaustion given $2.7 billion of new claims annually. However, the premiums do buy more time compared to taking on new claims without premiums. (See figure 2, above.)

**As shown earlier, in figure 3, factoring in the expectation of new claims on PBGC sharply increases the necessary premium level** to keep PBGC solvent over the projection period. The amount of the increase varies with the assumed level of future claims. Premiums would need to more than quadruple from their current levels, rising to $3.9 billion, if our base estimate of $2.7 billion of annual claims were to hold true. This result intuitively fits with our other modelling. If $720 million of premiums is needed for old claims, then $2.7 billion per year (in present value) of new claims would suggest a total need of $3.4 billion. The $500 million difference with our calculated result is principally due to increased administrative costs from new claims.

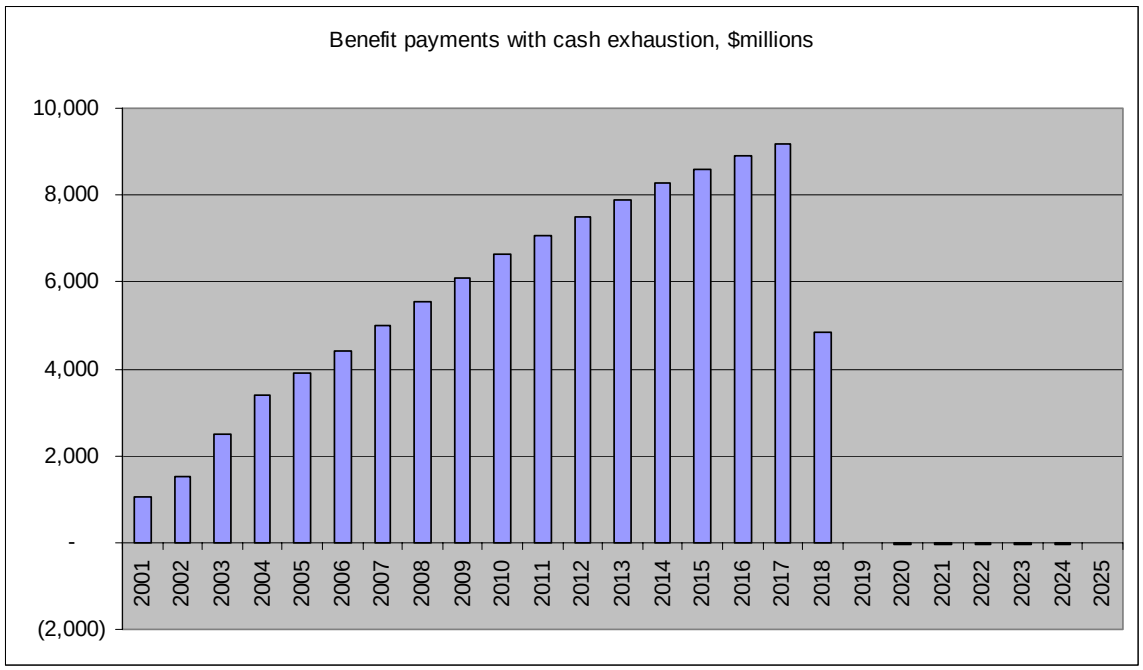
If we use a lower bound of $1 billion of new claims per year (roughly the inflation-adjusted average for the last 20 years for PBGC), the premium level needed is $1.8 billion. A higher claims estimate, of $3.7 billion per year, results in a need for $5.1 billion of premiums.

**Retirees would suffer greatly from cash exhaustion at PBGC, barring a government bailout.** The present level of premiums would not cover expenses, much less promised pension payments, once invested assets were exhausted. (This assumes exhaustion in 2020, based on $2.7 billion in annual new claims and the present premium level.) This is very different from Social Security, where future payroll taxes have been estimated to cover two-thirds or more of the scheduled benefits.

In the absence of investments, and therefore investment income, the only source of cash would be premiums, which would be eaten up by administrative expenses. Even without such expenses, premiums would cover only about 9% of promised pension payments. (We assume that no new pension terminations would occur once PBGC was insolvent, since any pension fund assets would be used immediately to pay benefits for other past claims, rather than benefits to retirees of the newly terminated plans. Therefore, there would be much more resistance to an employer terminating its plan in bankruptcy.)

Current law does not provide a clear mechanism to lower payments prior to cash exhaustion, resulting in a "cliff" effect, in which years of full payment would be immediately followed by reductions of 91% or more.

**Figure 10: Pension payments with $2.7 billion of annual claims and $900 million of premiums**

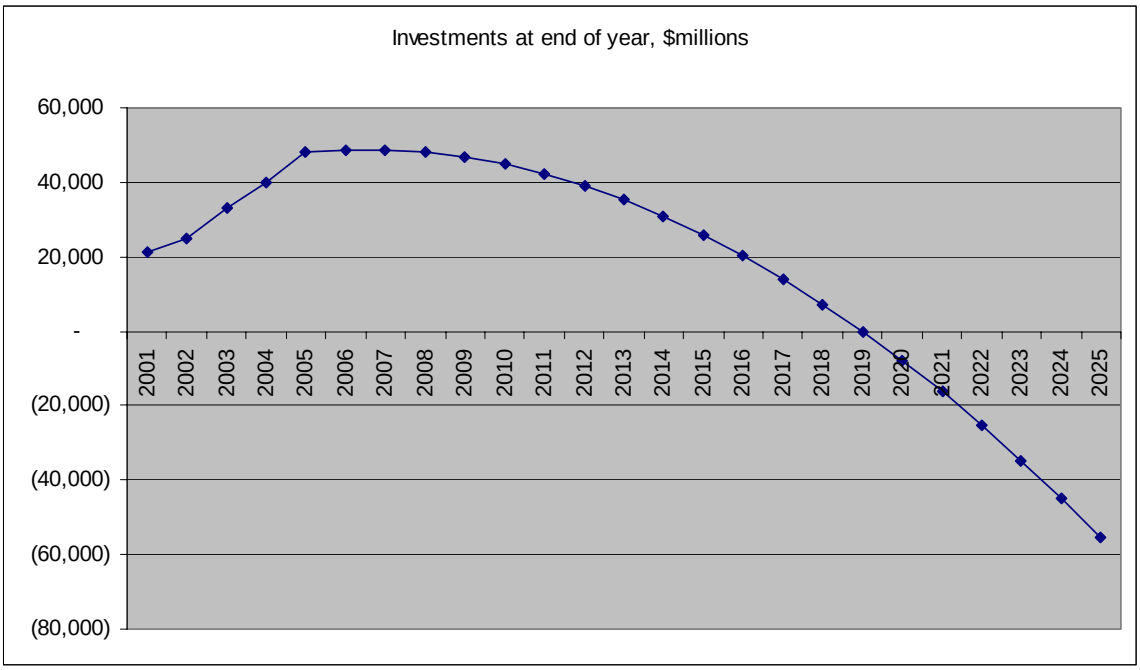


# Effects of Airline Terminations

We next examined the impact of potential terminations in the airline sector, starting with the terminations of United Airlines' pension plans, which now appear probable. All the airline termination scenarios accelerate the cash crisis, primarily because they are assumed to hit PBGC next fiscal year, leaving enough time for them to run out of assets to pay their claims prior to the 2020 base case cash exhaustion date.

**Terminations at United would accelerate the cash exhaustion year to 2019**. United's pension assets could fund a number of its own annual pension payments, but these assets will run out earlier than PBGC would otherwise exhaust its cash, at which point United's pension needs would draw down other PBGC assets. We continue to assume $2.7 billion per year in new claims other than United and $900 million in annual premiums.

**Figure 11: Cash exhaustion with United termination, $2.7 B of other claims, and $900 M of premiums**

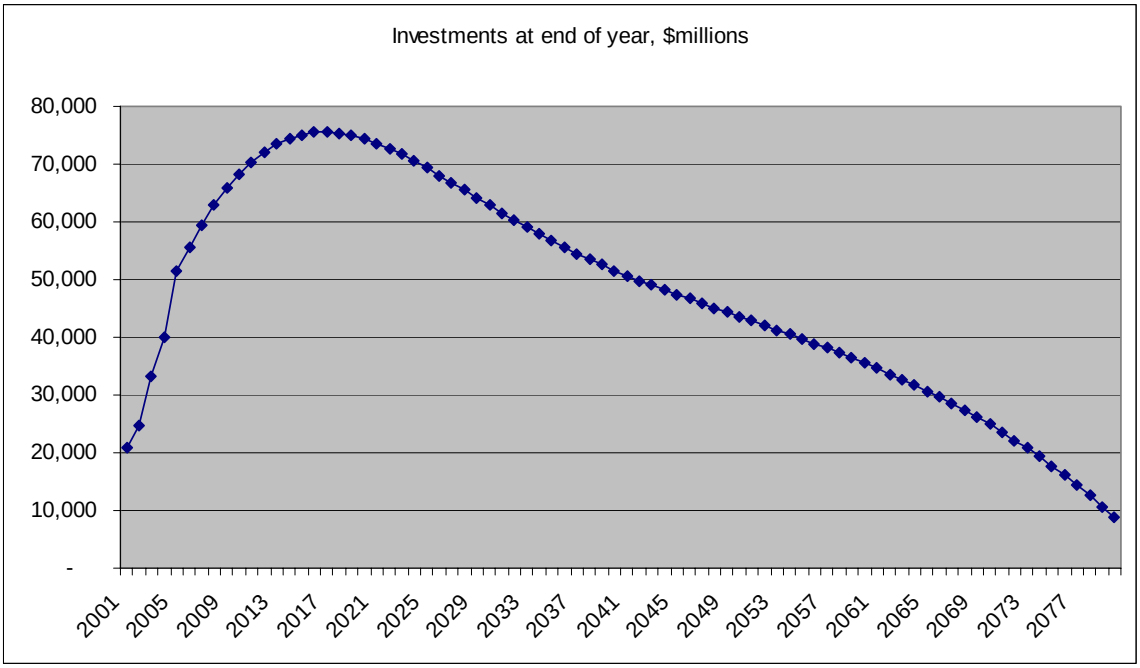



**NPV of unfunded liabilities: $75 billion**

**Moreover, a United termination would increase required annual PBGC premiums by $300 million for the 75 year projection period.** This is intuitively reasonable, since the net present value of the premium increase approximates the assumed $6.4 billion claim against PBGC, taking account of administrative costs and rounding premiums to the nearest $100 million.

**Alternative solutions, mathematically, would be a taxpayer rescue of $68 billion or an increase in investment returns to 9.8%**

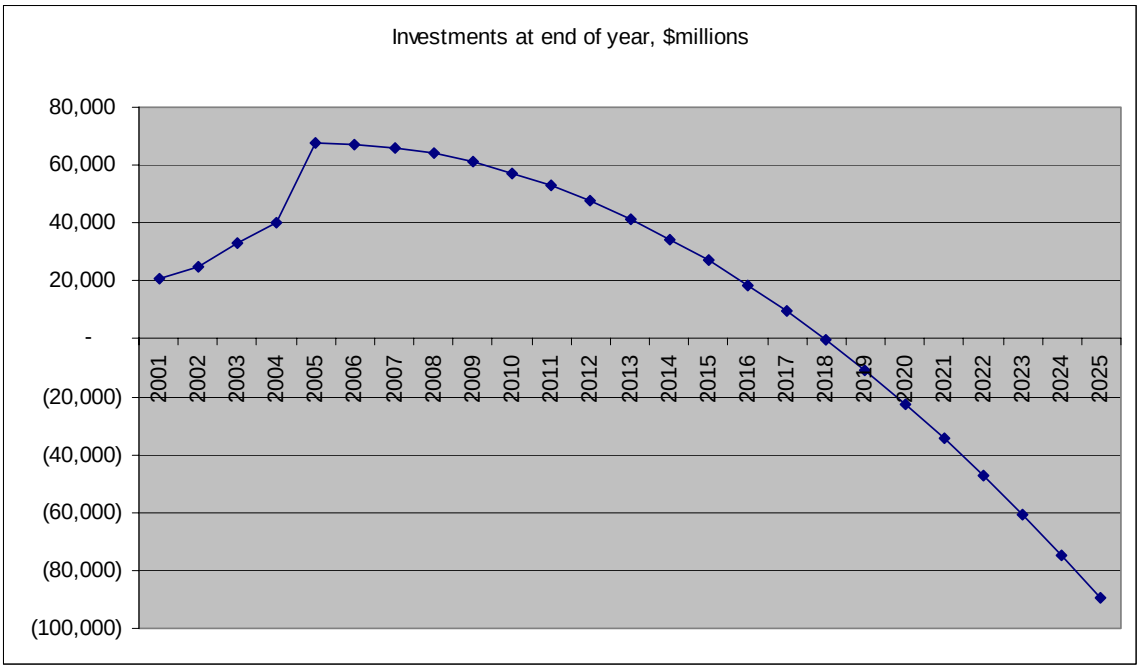
**Figure 12: Cash adequacy with United termination, $2.7 B of other claims, and $4.2 B of premiums**



Finally, PBGC's problems become substantially worse if the entire "legacy airline" sector (United, American, Continental, Delta, Northwest, and US Airways) were to terminate, bringing an estimated $20 billion of underfunding to PBGC.

**Legacy airline terminations would bring the cash exhaustion date forward by one more year**, to 2018. The exact date could, of course, vary, given all the variables associated with an entire set of terminations.

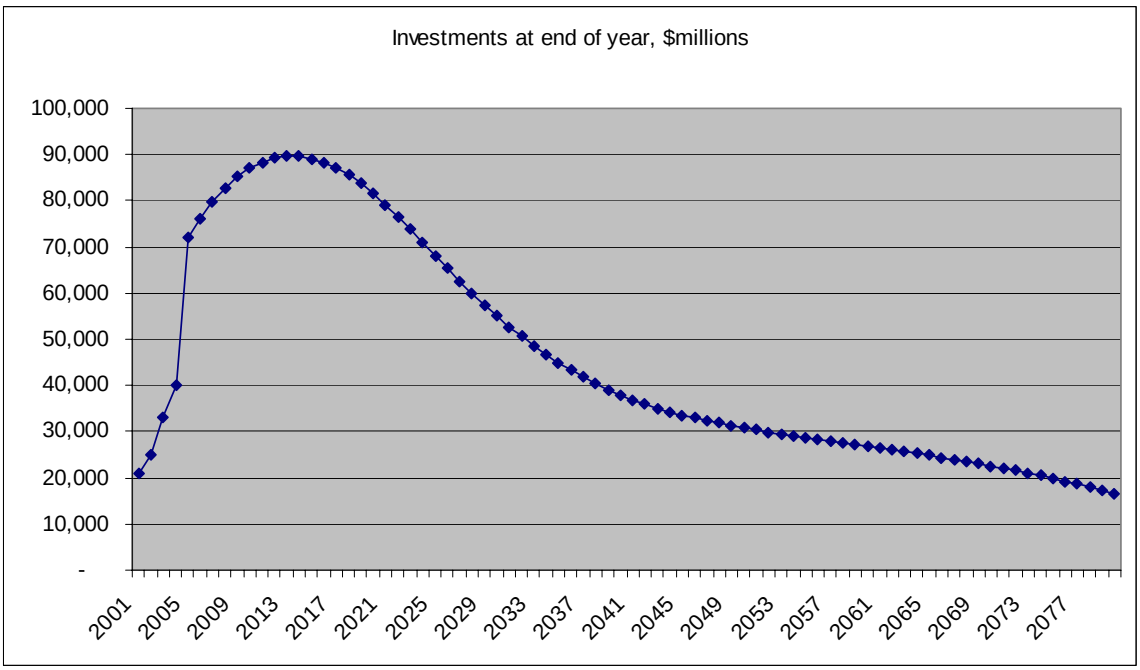
**Figure 13: Cash exhaustion for legacy airline claims, $2.7 B of other claims, and $900 M of premiums**




**NPV of unfunded liabilities: $95 billion**

**Absent a taxpayer rescue of $95 billion, or a 10.1% investment return, required PBGC premiums would rise to $5.1 billion per year** from 2005 through 2080 to avoid running out of cash. There would be more limited room to reduce the premium increase through risk-reduction, since much of these premiums would be needed for claims that had, at that point, already occurred.

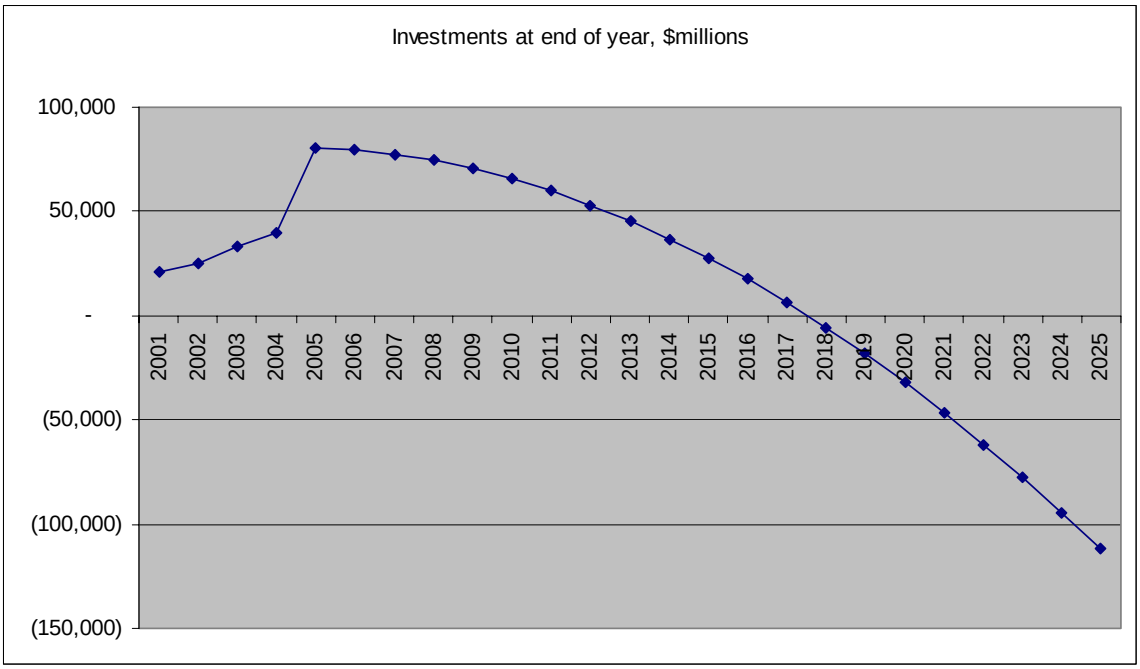
**Figure 14: Cash adequacy with Legacy Airlines, $2.7 B other, and $5.1 B of premiums**



PBGC exposure to the entire airline sector is reported to exceed $30 billion. Figure 15 shows the implications of $30 billion in net present value of claims on PBGC from this sector, assuming that the base case remains the same otherwise.

Default of the entire airline sector would accelerate cash exhaustion by a few more months, but still leave the date within Fiscal 2018.

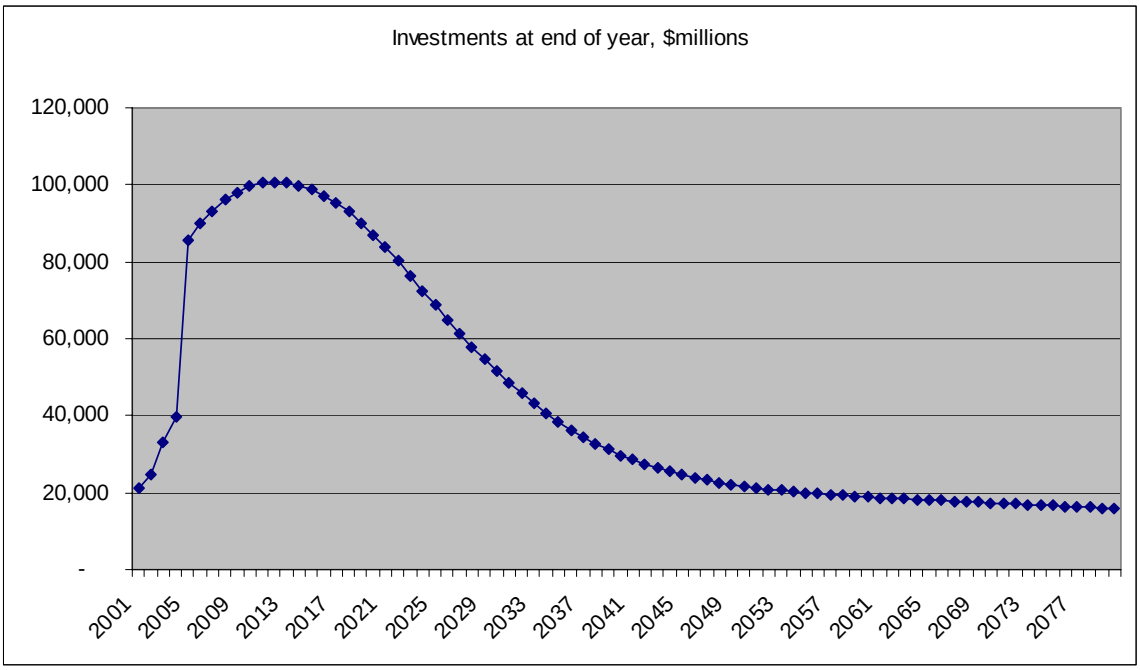
**Figure 15: Cash exhaustion with all airline claims, $2.7 B of other claims p.a., and $900 M of premiums**




**NPV of unfunded liability: $109 billion**

**Filling the hole would require $109 billion from taxpayers, annual PBGC premiums of $5.8 billion, or an investment return of 10.2%.** Figure 16 shows the level of cash and investments with the premium increase.

**Figure 16: Cash adequacy with All Airlines, $2.7 B other, and $5.8 B of premiums**



# Sensitivity Analyses

The model's conclusions are most sensitive to three independent variables. One of these, premiums, we have already explored thoroughly, as a number of the charts have shown the effect of different premium levels. The other two are the rate of investment returns to PBGC and the level of annual new claims.

**Rate of Investment Return**

Each 1 point rise in investment returns lowers needed premiums by about $500 million annually compared to the base case, as shown in the table below. The base case assumes $2.7 billion in new claims annually.

**Table 3: Effect of Rate of Return on Base Case ($ billions)**

| | | | Potential Offsets | |
|---|---|---|---|---|
| **Rate of Return** | **Year of Exhaustion** | | **Rescue Required (2004 $)** | **Total Prem. Required (Annual)** |
| 2% | 2017 | | $188 | $5.5 |
| 3% | 2018 | | $132 | $5.0 |
| 4% | 2019 | | $94 | $4.5 |
| **5%** | **2020** | | **$67** | **$3.9** |
| 6% | 2022 | | $47 | $3.3 |
| 7% | 2024 | | $31 | $2.6 |
| 8% | 2027 | | $18 | $2.0 |

**Rate of Annual New Claims**

Each dollar of annual new claims adds slightly over one dollar of annual premium requirement. The excess is partly due to administrative costs associated with new claim volume. (The "N.A." shown in the chart when there are no new claims is because, at the base premium level of $900 million annually, there is no need for a rescue if there are no new claims, as only $720 million of annual premiums would be needed to clear up existing claims.) Alternatively, an extra $20 to $25 billion, in today's dollars, would need to be added to the rescue for each extra billion dollars in annual claims.

**Table 4: Effect of Annual New Non-Airline Claims on Base Case ($ billions)**

| | | | Potential Offsets | | |
|---|---|---|---|---|---|
| **Annual New Non-Airline Claims** | **Year of Exhaustion** | | **Rescue Required (2004 $)** | **Total Prem. Required (Annual)** | **Investment Return Required** |
| None | N.A. | | N.A. | $0.7 | N.A. |
| $1.0 | 2023 | | $21 | $1.8 | 7.5% |
| $2.0 | 2021 | | $48 | $3.0 | 9.0% |
| **$2.7** | **2020** | | **$67** | **$3.9** | **9.6%** |
| $3.0 | 2020 | | $75 | $4.2 | 9.9% |
| $4.0 | 2019 | | $101 | $5.4 | 10.5% |
| $5.0 | 2019 | | $128 | $6.6 | 11.0% |

# Appendix

The inputs for COFFI's model of PBGC cash flows are based on publicly available information, principally from PBGC's annual reports, which can be obtained online from www.pbgc.gov. All figures are for PBGC fiscal years ending in September, unless otherwise stated, and are for the Single-Employer program only. All figures are in nominal dollars (i.e. not adjusted for inflation), unless otherwise stated.

The core equation of the model is:

**End of Year Cash & Investments = Beginning of Year Cash & Investments + Investment Income + Premiums + Assets Taken Over for New Claims – Benefits Paid – Net Other Expenses**

**Investment Income**: We assume a 5% annual return on average investments, based on current market rates. This is up from the 4.4% discount rate used by PBGC at the end of 2003, due to a general rise in long-term interest rates in the interim. PBGC targets an allocation of 75-85% of its assets in bonds, with an average duration of 10 years at the end of 2003. The remaining investments are largely in stocks. Premium income and all outlays are assumed to take place mid-year, to represent the average of cashflows spread throughout the year. Assets taken over by PBGC from claims are assumed to be available to earn income for the full year.

**Premiums**: The bulk of PBGC premiums, (69%, on average, for the last 10 years), come from a charge of $19 per participant, which includes employees, retirees, and former employees with vested benefits. Additional variable rate premiums are based on the extent of underfunding at each pension plan. The latter are highly variable, totalling $306 million in 2003, but only $133 million in 2002 and $147 million in 2001. They averaged $287 million over the last 10 years.

We assume $1 billion of premiums in 2004, up from $948 million in 2003. Our estimate is near the bottom end of the $1.0 to $1.1 billion range projected by PBGC in its 2003 Annual Report for both programs combined. (Multiemployer premiums were $25 million in 2003.) The low side appears likely given increased stock prices and interest rates since the end of Fiscal 2003, which should reduce underfunding at pension plans, and therefore the variable component of their premiums. Significant contributions by plan sponsors may also have reduced underfunding.

2005 premiums are projected at $900 million, closer to the three-year average of $852 million, based on the delayed effects of financial market movements and our expectations of further corporate actions to reduce underfunding. Premiums are assumed to remain flat after 2005, since there is no inflation-adjustment mechanism in current law and there are forces pushing premiums in both directions, making it difficult to know whether to assume an increase or a decrease.

As noted in the text, the increasing frequency of plan "freezes" that halt the accrual of new pension benefits has no immediate effect on PBGC premiums. Participant numbers will decrease slowly over many years after a freeze, as retirees die and are not replaced by new employees participating in the plan. Plan terminations, on the other hand, would immmediately reduce premiums by taking participants out of PBGC coverage. However, such terminations are rare for large corporations, outside of the bankruptcy process, since they must buy group annuities. These generally require large additional contributions and create a significant accounting hit. Annuity pricing is based on corporate bond rates, rather than the considerably higher rates of return assumed by plan sponsors when they estimate their pension liabilities for accounting purposes.

Nor are the increasing number of distress terminations likely to significantly reduce premiums. For example, UAL paid only a total of $50 million in premiums since PBGC's foundation, despite potentially generating a $6.4 billion loss to PBGC.

**New Non-airline Claims**: An estimate of new claims on PBGC is required for two purposes: (1) benefits paid are based on an estimate of the total claims liability, including new claims, and (2) assets taken over as a result of new claims add to cash and investments. We use three scenarios. The base case assumes $2.7 billion in present value of underfunding taken over every year. This is based on the median estimate for the next 10 years from PBGC's PIMS model, as presented on pages 10-11 of its 2003 Annual Report. PBGC reports a median of $2.2 billion in net present value as of the end of Fiscal 2003, which we roughly approximate by a nominal dollar figure of $2.7 billion for each of the next 10 years, calculated by backing out the average present value discount used by PBGC.

A more optimistic case was run with $1 billion of new underfunding each year, roughly in line with the inflation-adjusted average of the last 20 years. A more pessimistic case was constructed using $3.7 billion per year, the average new claim, net of recoveries, for the last 3 years. For comparison, net new claims were $6.4 billion in 2003, $3.5 billion in 2002, and $1.1 billion in 2001. (Note that PBGC reports claims on several bases. The "headline" number includes "probable claims" that are expected to occur shortly, as well as actual claims submitted. The figures just given are for actual claims only. The numbers should cumulate to similar levels, but will vary year by year.)

We convert the claims estimate into asset and liability figures by assuming 52% funding in the pension plans taken over, the average since PBGC's founding. Two simple algebraic formulas convert the underfunding level and the funding ratio into the implied levels of liabilities and assets: liabilities = underfunding divided by (1 minus .52) and assets = liabilities minus underfunding.

The payment pattern for benefits is assumed to equal that for existing PBGC claims, excluding "probable losses". The duration of existing claims is approximately 9 years, based on the 2003 Annual Report. We cannot know what future claims will come in, but it seems likely that they will have similar characteristics to past claims, which have come principally from heavy industry and the airlines. Existing PBGC claims are for somewhat more mature populations, since claims have occurred over many years. However, the large majority of existing PBGC liabilities are for plans that terminated in 2001 or later, suggesting that the payout patterns should not be strongly affected by the aging of claims.

We constructed a payout pattern for new claims that rises initially, reflecting the greater effect of new retirements, as compared to retiree deaths, and then falls as deaths gain in importance. The pattern was chosen to produce the right net present value and to match the 9 year duration.

Technical note: The reported figures from the PIMS model are for 10 years only. Faced with a complete absence of estimates for new claims for the remaining 65 years, we have chosen to assume a steady level of new claims at the average for the first 10 years. Assuming a steady level of new annual claims provides a critical computational shortcut that allows us to estimate benefit payouts each year for the cumulated new claims. Normally, we would expect that failing to grow a key variable by an inflation factor would skew the results, in this case towards a more favorable picture of PBGC finances by understating later-year claims in real terms. However, the shrinkage of the defined benefit system may partially, fully, or more than fully offset this bias. On still another hand, PBGC is a "catastrophic" insurer that protects against extreme credit events. These events may become more likely within a given universe of insured pension plans, as years of

deterioration of the weaker firms may produce eventual bankruptcy that would not occur in the 10-year period modelled by PIMS.

**Benefits Paid**: PBGC has published its expected pension payments for its existing liabilities, plus "probable losses", as of the end of Fiscal 2003. We take these payments as given. They rise in the beginning, as the effect of new retirements outweighs that of deaths. The net effect reverses as the years go by, since no new pension promises are being made.

**Net Other Expenses**: These totalled $359 million in 2003, of which $271 million were for administrative expenses. We assume administrative expenses grow one point slower each year than benefit payments do. This is intended to reflect the effect of economies of scale for PBGC. Other items are assumed to be similar to recent levels, except for an adjustment for an abnormal level of credit losses in 2003. As a result of the adjustment, the total of net other expenses rises 5% from 2003 to 2004.

Technical note: the $44.6 billion of net present value of benefit liabilities (net of assets coming in from "probable claims") includes a reserve for administrative expenses related to claims. It is described on page 30 of the 2003 Annual Report as "1.18% of benefit liabilities [that is, $526 million] plus additional reserves for cases whose plan asset determinations, participant database audits and actuarial valuations were not yet complete." We have assumed $750 million of total reserves. This is consistent with the difference between the net present value of the payment stream given by PBGC and the total net present value stated in the 2003 Annual Report. Thus, there is no double-counting of administrative expenses.

**United Airline Terminations**: Potential claims for United plans were assumed to total $6.4 billion, based on a PBGC press release. This represents an $8.3 billion total liability, in present value terms, of which $1.9 billion would be absorbed by employees and retirees whose promised pensions exceed PBGC's guarantee levels. United's pension assets were $6.9 billion at the end of the second quarter of 2004.

Benefit payout patterns for United are based on considerable information available from UAL's 10-K filings with the SEC, see www.sec.gov, and from the PBGC press release. UAL's 10-K for calendar 2003 lists its expected pension payments by year for the next five years and in total for the subsequent five years. In addition, it lists a projected benefit obligation of $13.1 billion, which is the present value of those payments plus the remainder of its future pension payments. We extended the 10 years of specific benefit payment projections by choosing a payout pattern that appears reasonable and matches available information. In particular, we matched the $13.1 billion net present value, using the 6.25% discount rate chosen by UAL. We were not given a duration figure that could be matched.

As part of the bankruptcy court filings, PBGC calculated a higher net present value, of $15.2 billion, resulting in the $8.3 billion underfunding figure. This is based on different actuarial assumptions, particularly the use of a lower discount rate. A 5.19% discount rate would account for the entire net present value difference, so we assumed that PBGC does not significantly differ on the projected future payments, but only on the net present value of those payments. Our final adjustment was to uniformly reduce each year's payments by 12.5%, representing the $1.9 billion in net present value of payments that exceed the PBGC guarantee levels.

The UAL pension liabilities have a duration of 14.2 years, according to our estimates, using PBGC's discount rate. This appears reasonable given a roughly 1:1 ratio of retirees to employees, compared to about 8:1 for Bethlehem Steel.

Technical note: the projected benefit obligation and the 10 year payment projections from UAL assume pension increases resulting from salary increases for current workers. The salary increases accounted for about $450 million of net present value. We backed this out of the calculations by assuming it had the same effect in every year, although the effect should actually cumulate over time. This seemed a reasonable approximation, since $450 million is only 3% of the liability amount.

**Legacy Airline Terminations**. Although the airline sector may have roughly $30 billion in underfunding that could come to PBGC, we chose to make projections based on a subset of legacy airlines for whom we could obtain information from SEC 10-K filings. These airlines are: United, American, Continental, Delta, Northwest, and US Airways. We estimated $20 billion in total PBGC claims from these airlines, representing the excess of the net present value of their pension payments covered by PBGC over the assets in the pension plans. Pension assets, taken from the 10-K, proved to be 58% of the estimated net present value of obligations taken on by PBGC.

10-K filings provided figures for pension plan assets, the net present value of obligations, and (with the exception of Continental) the expected pension payments over the next 10 years. We assumed that the share of the first 10 years' of pension payments that would be picked up by PBGC was the same as for the UAL case (87.5% minus a 3.4 point adjustment to back out salary increase effects.) Lacking specific 10 year projections for Continental, we assumed that it would add the same 4% to each year's payments that it does to the total benefit liability for the group.

We performed calculations similar to those described for United in order to model the annual benefit payments in a manner that matched the target net present value. The resulting duration of pension liabilities was 12.4 years, using a 5% discount rate.

Finally, we provide a rough analysis for the entire airline sector, based on reports that there is a total of over $30 billion of risk for PBGC, including the $20 billion analyzed here. Since we do not have specific information on the remaining $10 billion of potential PBGC claims, we assume payout patterns and funding levels are the same as for the legacy airlines analyzed here.

There are potential interactions between the airline termination assumptions and the base assumptions as to new annual claims. PBGC's PIMS model, from which we drew the assumptions for the base case claims level, includes airlines in its analysis. A portion of the $2.7 billion of new annual claims would likely represent airline claims, leading to some double-counting. On the other hand, this could be offset if a series of highly publicized distress terminations in the airline industry encouraged such terminations in other industries.

A second potential overlap is that $1.3 billion of PBGC's net probable losses at the end of 2003 represented airlines. The name or names of the relevant airline was not disclosed.