

July 2008

# PBGC ASSETS

## Implementation of New Investment Policy Will Need Stronger Board Oversight





Highlights of [GAO-08-667](#), a report to congressional requesters

### Why GAO Did This Study

The Pension Benefit Guaranty Corporation (PBGC) insures the retirement future of over 44 million people. As a federal guarantor of private defined benefit plans, PBGC finances its operations through insurance premiums, investment income, and funds from terminated pension plans. PBGC is governed by a board of directors comprised of the Secretaries of Commerce, Labor, and Treasury, who are responsible for providing policy direction and oversight but often rely on board representatives. In 2004, PBGC began reviewing its investment policy biennially and recently decided to broaden the range of asset classes in which it invests.

GAO reviewed PBGC's procedures for developing and implementing its investment policies, and examined PBGC's most recent investment policy. To address these issues, GAO reviewed and analyzed PBGC policies and data, assessed the analysis informing the recent policy change, and interviewed agency officials and other experts.

### What GAO Recommends

GAO recommends (1) improvements to the way that PBGC's board monitors progress in achieving investment policy goals, and (2) additional analyses on the new investment policy. In response, PBGC's board stated its informal guidance is appropriate oversight. GAO states this type of guidance is not strong enough for investing \$68 billion. Further, PBGC is conducting additional analysis on the new policy.

To view the full product, including the scope and methodology, click on [GAO-08-667](#). For more information, contact Barbara Bovbjerg at ([bovbjergb@gao.gov](mailto:bovbjergb@gao.gov)), (202) 512-7215, or Thomas J. McCool at ([mccoolt@gao.gov](mailto:mccoolt@gao.gov)), (202) 512-2642.

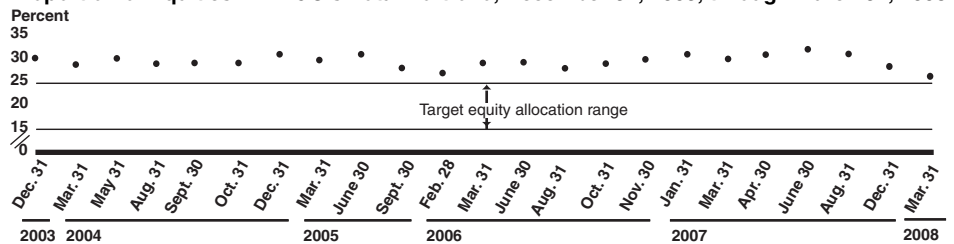
## PBGC ASSETS

### Implementation of New Investment Policy Will Need Stronger Board Oversight

#### What GAO Found

PBGC's directors collaborated with board representatives to reach consensus on a board-approved investment policy for each of the recent biennial reviews; however, it is not clear to what extent the board oversaw PBGC's efforts to implement its policy. Three different PBGC directors managed the policy reviews, which culminated in board ratification of the 2004, 2006, and 2008 policies. In 2004, the board instructed PBGC to limit its exposure to financial risk by reducing equity holdings to a range of 15 to 25 percent of its total investments; the board made the same requirements in 2006. The board has assigned responsibility to PBGC staff for implementing the investment program, monitoring investment managers, and reporting on investment performance. However, by 2008, the board's policy goal had not been attained. PBGC staff told us that high equity returns and low fixed-income returns made it difficult to reach the target allocation and that flexibilities built into the policy had allowed them to maintain a higher ratio, particularly since equity returns helped improve PBGC's overall financial condition. While PBGC's director and staff kept the board apprised of its investment performance and asset allocation, GAO found no indication that the board had approved the deviation from its established policy or expected PBGC to continue to reduce the proportion of equities to meet the policy objectives.

**Proportion of Equities in PBGC's Total Portfolio, December 31, 2003, through March 31, 2008**



• Actual equity level  
 Source: GAO's analysis of PBGC data.

Note: Data represent certain points in time and are not comprehensive.

While the investment policy adopted in 2008 aims to reduce PBGC's \$14 billion deficit by investing in assets with a greater expected return, GAO found that the new allocation will likely carry more risk than acknowledged by PBGC's analysis. According to PBGC officials, the new allocation will be sufficiently diversified to mitigate the expected risks associated with the higher expected return. They also asserted that it should involve less risk than the previous policy. However, GAO's assessment demonstrates that the risks are likely higher in the new allocation. Although it is important that the PBGC consider ways to optimize its portfolio, including higher return and diversification strategies, the agency faces unique challenges, such as PBGC's need for access to cash in the short-term to pay benefits, which could further increase the risks it faces with any investment strategy that allocates significant portions of the portfolio to volatile or illiquid assets.

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## Abbreviations

ERISA	Employee Retirement Income Security Act of 1974
PBGC	Pension Benefit Guaranty Corporation
PPA	Pension Protection Act of 2006

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United States Government Accountability Office  
Washington, DC 20548

July 17, 2008

The Honorable Max Baucus  
Chairman  
The Honorable Charles E. Grassley  
Ranking Member  
Committee on Finance  
United States Senate

The Honorable Edward M. Kennedy  
Chairman  
The Honorable Michael B. Enzi  
Ranking Member  
Committee on Health, Education, Labor and Pensions  
United States Senate

The Pension Benefit Guaranty Corporation (PBGC) insures the pensions of more than 44 million private sector workers and retirees who participate in approximately 30,000 employer-sponsored pension plans. Created in 1974 as a federal guarantor of private defined benefit plans, PBGC finances its operations through insurance premiums paid by the plan sponsors, money earned from investments, and funds received from terminated pension plans. PBGC shares many traits with both insurance companies and pension plans—it was established to insure the pension benefits of participants in qualified plans and to pay participants' benefits when plans could not. However, unlike insurance companies, it cannot set premiums and, unlike pension plans, it cannot adjust plan terms; it must also take on new beneficiaries regardless of the level of funding accompanying terminated plans.

PBGC holds approximately \$68 billion in assets, making it, by that measure, one of the largest federal government corporations. PBGC also holds approximately \$82 billion in liabilities from underfunded pension plans—many of which have been terminated in the past decade. As a result, PBGC has an accumulated deficit that currently stands at about \$14 billion. Recognizing the long-term vulnerabilities facing PBGC's insurance

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program, its single-employer program<sup>1</sup> is on GAO's high-risk list of federal programs needing attention and congressional action.<sup>2</sup>

PBGC is governed by a three-member board of directors that is ultimately responsible for providing policy direction and oversight of PBGC's finances and operations, but often relies on board representatives to conduct much of the work on their behalf.<sup>3</sup> The board approves the Corporation's investment policy and is responsible for overseeing its implementation. After years of limited investment policy review, the board began reviewing the policy biennially in 2004. As a part of the 2004 and 2006 reviews, the board instructed PBGC to limit its exposure to financial risk by reducing equity holdings to a range of 15 to 25 percent of its total investments—and maintaining the rest of PBGC's assets mostly in fixed income investments. In February 2008, the board lifted these limitations and approved investments in a broader range of asset classes, including more international equities and other asset classes, such as private equity and emerging market debt. In response to the changes in PBGC's investment policy, you asked us to assess (1) PBGC's procedures for developing and implementing its investment policies and (2) PBGC's most recent investment policy for its potential risks and benefits.

To conduct our work, we reviewed PBGC's recent investment policies and supporting documentation, paying particular attention to the process used during recent biennial reviews (2004, 2006, and 2008). We reviewed policy statements that outlined PBGC's goals, minutes from board and advisory committee meetings, and memos discussing the rationale and process used to implement strategies. In addition, we reviewed PBGC's published annual reports, investment performance reports, and other related documents. For the 2008 policy, we assessed the study that informed PBGC's new investment policy and discussed the outcomes of the study

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<sup>1</sup>PBGC administers two insurance programs: the single-employer and multiemployer insurance programs. A single-employer plan is established and maintained by one employer. Single-employer plans can be established unilaterally by the sponsor or through a collective bargaining agreement with a labor union. 29 U.S.C. § 1002(41). A multiemployer plan is a collectively bargained arrangement between a labor union and a group of employers in a particular trade or industry. Management and labor representatives must jointly govern multiemployer plans. 29 U.S.C. § 1002(37).

<sup>2</sup>GAO, *High-Risk Series: An Update*, [GAO-07-310](#) (Washington, D.C.: January 2007).

<sup>3</sup>Currently, the board representatives for each agency are the Under Secretary for Economic Affairs at the Department of Commerce, the Assistant Secretary of Labor for the Employee Benefits Security Administration, and the Under Secretary of the Treasury for Domestic Finance.

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with PBGC staff and the consultant hired to conduct the study. As a part of our assessment, we tested some of the consultant's assumptions on asset risks and returns to determine how sensitive outcomes were to changes in the assumptions. We did not review the process to implement the 2008 policy because it was approved by the board in February and PBGC had not yet devised its strategy for implementing the changes. In addition, we attended an advisory committee meeting where investment options for the recent policy change were presented. We also interviewed current and former officials from PBGC; the Departments of Commerce, Labor, and Treasury; and the PBGC advisory committee. To gain the perspective of the board, we interviewed the board representatives and their staffs. We also interviewed PBGC's current investment managers to discuss their role in implementing the investment strategy and managing PBGC's assets. In addition, we reviewed relevant literature, statutes, and data and interviewed experts knowledgeable of PBGC and investment approaches.

We conducted this performance audit between November 2007 and July 2008, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. For additional discussion of our scope and methodology, see appendix I.

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## Results in Brief

PBGC's directors collaborated with board representatives to reach consensus on a board-approved investment policy for each of the recent biennial reviews; however, it is not clear to what extent the board oversaw PBGC's efforts to implement its policy. Three different PBGC directors managed the policy reviews, which culminated in board ratification of the 2004, 2006, and 2008 policies. In 2004, the board instructed PBGC to limit its exposure to financial risk by reducing equity holdings to a range of 15 to 25 percent of its total investments, and repeated these expectations in 2006. The board has assigned responsibility to PBGC staff for implementing the investment program, monitoring investment managers, and reporting on investment performance. However, by 2008, the board's policy goal had not been attained. PBGC staff told us that high equity returns and low fixed-income returns made it difficult to reach the target allocation and that flexibilities built into the policy had allowed them to maintain a higher ratio, particularly since equity returns helped improve PBGC's overall financial condition. While PBGC's director and staff kept the board apprised of its funds' investment performance and asset allocation, we found no indication that the board had approved the

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deviation from its established policy or expected PBGC to continue to reduce the proportion of equities to meet the policy objectives.

While the new investment policy aims to reduce PBGC's \$14 billion deficit by investing in assets with a greater expected return, we found that the new allocation will likely also carry more risk than acknowledged by PBGC's analysis. According to PBGC officials, the new allocation will be sufficiently diversified to mitigate the expected risks associated with the higher expected return. They also asserted that it should involve less risk than the previous policy. Based on our analysis that tested the sensitivity of the PBGC's results to the underlying assumptions, we found that the expected returns could be higher than the previous allocation, but the risks may also be higher. Although it is important that the PBGC consider ways to optimize its portfolio, including higher return and diversification strategies, the agency faces unique challenges, such as PBGC's need for access to cash in the short term to pay benefits, which could further increase the risks it faces with any investment strategy that allocates significant portions of the portfolio to volatile or illiquid assets.

To ensure accountability for the full implementation of the board's new investment policy decisions and its appropriate oversight of an investment policy that carries more risk, we are recommending that the PBGC board require the director to formally submit PBGC's plan for implementing its new investment policy, develop accountability measures to monitor progress in achieving the policy goals, and request periodic reports on the status of implementation. In addition, to gain a better understanding of the risks involved in the new investment policy, we are recommending that PBGC conduct sensitivity analyses before implementing the new investment policy.

In response to our draft report, the PBGC board of directors emphasized the board's commitment to providing strong oversight of the PBGC investment policy to ensure that the policies are implemented appropriately. During the implementation of the previous investment policy, board members received reports on PBGC's efforts and determined that PBGC had taken prudent measures to comply with the investment policies. The chair of the PBGC board did not specifically address our recommendations, but stated that the current combination of presentations by PBGC, verbal agreements, and informal guidance provided from the board and its representatives offered an appropriate level of oversight. In addition, the chair reported that PBGC had submitted a preliminary implementation plan for the new policy and reported that PBGC had planned to provide a more complete implementation briefing in early July. We do not believe that a system of verbal agreement and informal guidance is strong enough oversight for investing \$68 billion. The successful implementation of this



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policy, which invests in a broader range of assets, will require close monitoring and consistent oversight.

In responding to the draft report, the PBGC director stated that the process that supported the adoption of the new policy was complete and robust. He said the process included a thorough assessment of PBGC's long-term obligations to plan participants and beneficiaries, exhaustive discussion among numerous constituents, and in-depth analysis by leading industry experts, including PBGC's investment consultant. In response to our recommendation, the director agreed that sensitivity analyses are important, and that PBGC will continue to perform them going forward. PBGC took initial steps to conduct an analysis on the new policy. However, we believe that more analysis should be conducted, including an analysis that incorporates assets, liabilities, and funded position. PBGC's board of directors and PBGC's director's comments are reproduced in appendixes III and IV, respectively.

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## Background

PBGC was established to insure the pension benefits of participants in qualified defined benefit plans and pay participants when plans could not. PBGC takes over the assets of underfunded terminated plans and is responsible for paying benefits to participants who are entitled to receive them. The Employee Retirement Income Security Act of 1974 (ERISA) established PBGC as a self-financing entity. Its assets originate from multiple sources including insurance premiums from sponsors of insured private sector defined benefit plans, assets acquired from terminated plans, and investment income earned on these assets; PBGC receives no tax revenue and its liabilities are not backed by the U.S. government. The premium rate and the maximum benefit level are set by statute.<sup>4</sup>

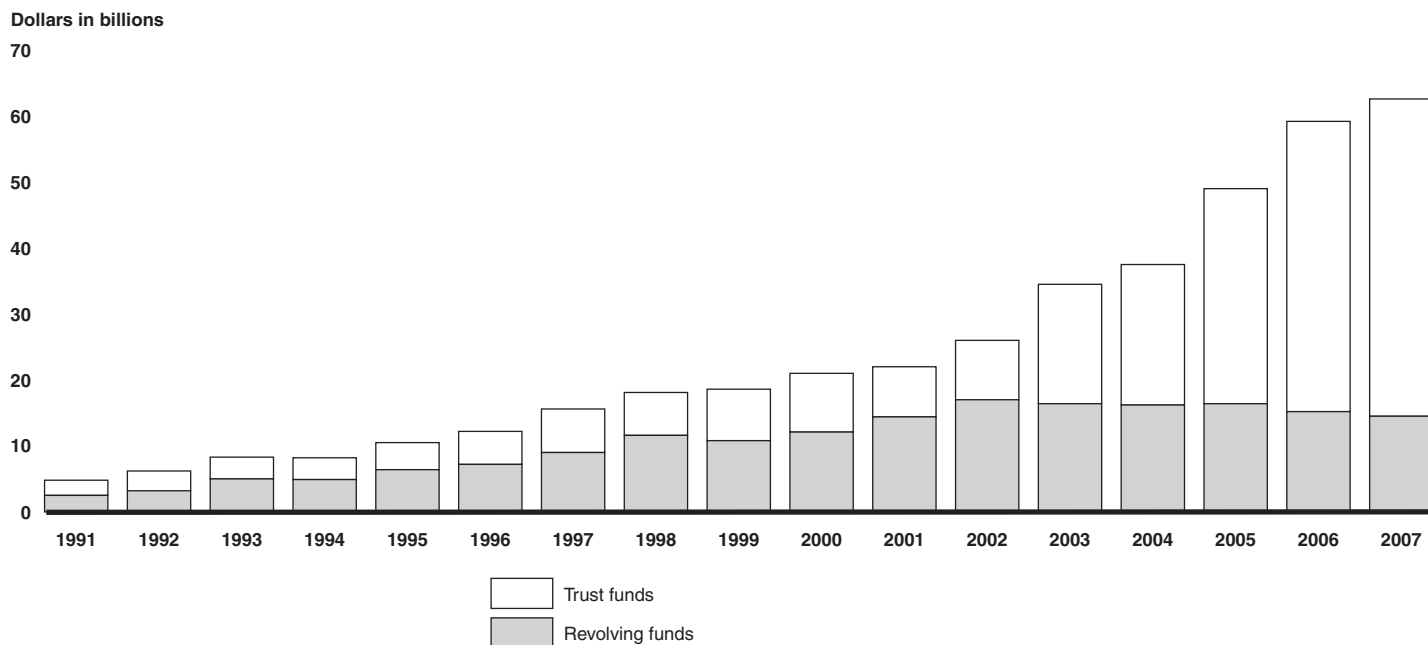
PBGC holds its assets in two categories of funds: the trust funds and the revolving funds. The trust funds hold assets acquired from terminated plans; the revolving funds consist of premium receipts. While ERISA requires certain revolving funds to be invested in obligations issued or guaranteed by the United States, PBGC has more flexibility to invest the

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<sup>4</sup>For most of the plans insured by PBGC, the flat-rate monthly annual premium for 2008 is \$33.00 per plan participant and the maximum guaranteed monthly benefit is \$4,312.50 for beneficiaries first receiving benefits as a single-life annuity from PBGC at age 65 from plans that terminated in 2008. Some underfunded single-employer plans pay an additional annual variable-rate charge of \$9 per \$1,000 of unfunded vested benefits. In 2007, PBGC took in close to \$1.6 billion in premiums and paid about \$4.3 billion in benefits.

trust fund assets in other investments.<sup>5</sup> As shown in figure 1, the trust funds grew significantly over the past 16 years to become the larger of the two funds, with most of the growth occurring after the record number of sizable terminations started in 2001. Because the terminated plans were underfunded, PBGC's deficit increased significantly.

**Figure 1: Amount of Assets in Revolving and Trust Funds, Fiscal Years 1991 through 2007**

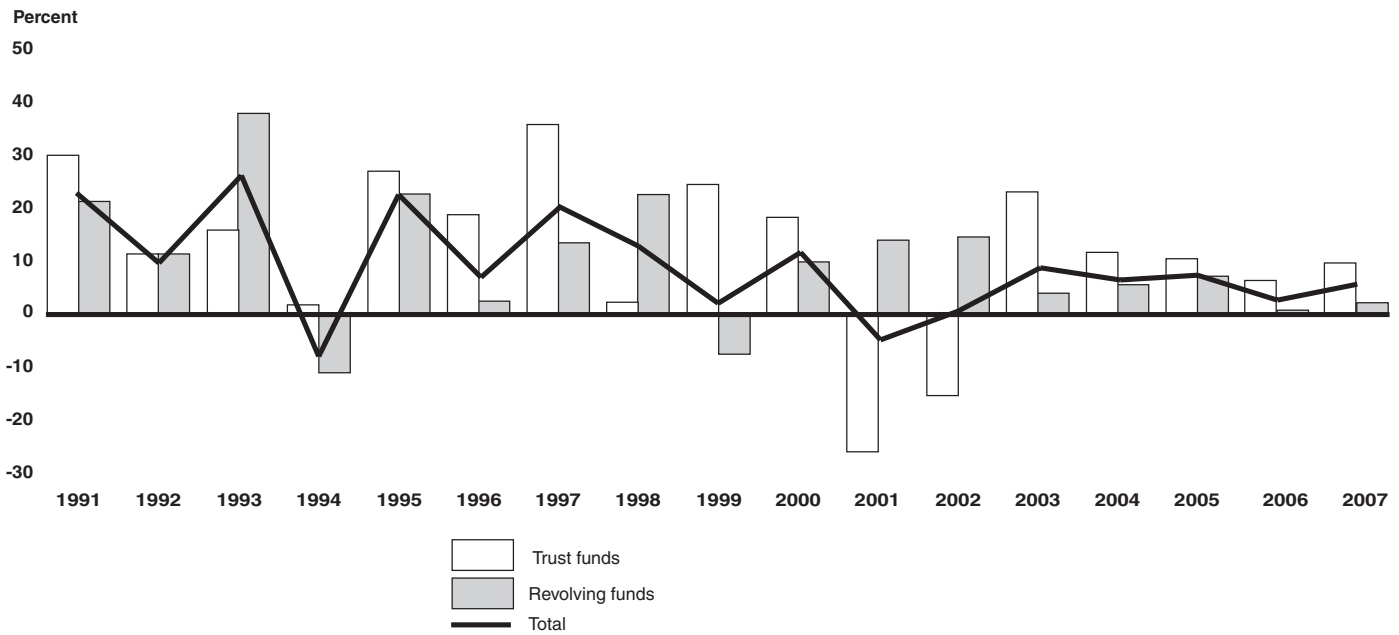


Source: GAO's analysis of PBGC annual report data.

The investment performance of the revolving and trust funds has varied over time (see fig. 2). However, PBGC's investments in fixed income and equities have generally followed major indexes, such as Lehman Brothers long Treasury index for the fixed income and the Wilshire 5000 and Standard and Poor's 500 indexes for the equity investments.

<sup>5</sup>29 U.S.C. § 1305. By law, the PBGC is required to invest certain revolving funds in obligations issued or guaranteed by the United States of America. Portions of the other revolving funds can be invested in other debt obligations. PBGC's current policy is to invest all revolving funds only in U.S. Treasury securities.

**Figure 2: Total Investment Performance and Performance by Revolving and Trust Funds, Fiscal Years 1991 through 2007**

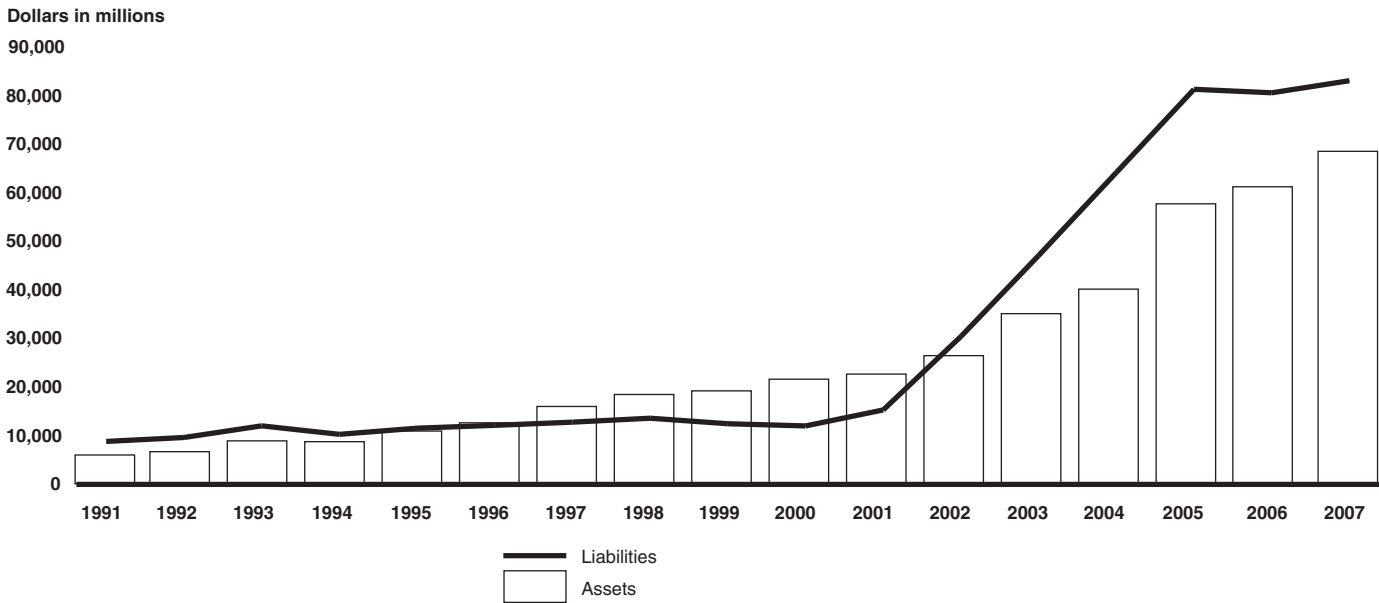


Source: GAO analysis of PBGC annual report data.

In July 2003, GAO designated PBGC’s single-employer pension insurance program—its largest insurance program—as “high-risk,” including it on GAO’s list of major programs that need urgent attention and transformation due to the financial risks that it faces. The program remains on the list today.<sup>6</sup> PBGC projected its financial deficit at nearly \$14 billion as of September 2007 (see fig. 3).

<sup>6</sup>GAO, *High-Risk Series: An Update*, [GAO-07-310](#) (Washington, D.C.: January 2007). In 1992, we placed PBGC on our list of federal programs at high risk because a large and growing imbalance between its assets and liabilities threatened PBGC’s long-term financial viability. GAO, *High-Risk Series: Pension Benefit Guaranty Corporation*. [GAO/HR-93-5](#) (Washington, D.C.: December 1992). To address PBGC’s financial problems, Congress passed the Retirement Protection Act in 1994, Pub. L. No. 103-465, 108 Stat.4809, which strengthened minimum funding requirements for plans and increased premiums paid to PBGC by underfunded plans. In addition, PBGC improved administration of its insurance programs. Consequently, we removed PBGC from our high-risk list in 1995. GAO, *High-Risk Series: An Overview*. [GAO/HR-95-1](#) (Washington, D.C.: February 1995). GAO again added PBGC’s single employer insurance program to its high-risk series in July 2003. GAO, *Pension Benefit Guaranty Corporation Single-Employer Insurance Program: Long-Term Vulnerabilities Warrant “High-Risk” Designation*, [GAO-03-1050SP](#) (Washington, D.C.: July 23, 2003).

**Figure 3: PBGC Asset and Liabilities, Fiscal Years 1991 through 2007**



Source: GAO's analysis of PBGC annual report data.

We previously reported that pension funding rules and PBGC's structure have contributed to its poor fiscal position.<sup>7</sup> The pension funding rules were not designed to ensure that plans had the means to meet their benefit obligations in the event that plan sponsors experienced financial distress. Meanwhile, in the aggregate, premiums paid by plan sponsors have not adequately reflected the financial risk to which PBGC is exposed. Accordingly, defined benefit plan sponsors have been able to turn significantly underfunded plans over to the PBGC, thus creating the current deficit. PBGC has become responsible for a number of large terminated pension plans, which have brought it large numbers of claims from plan participants. Between fiscal years 2000 and 2005, the number of participants to whom PBGC has paid benefits increased from around 243,000 to almost 700,000, with another half million expected to receive benefits from PBGC when they become eligible to retire.

To strengthen pension plan funding, Congress passed the Pension Protection Act of 2006 (PPA) and included provisions to shore up defined benefit plan funding. These provisions included raising the funding targets that defined benefit plans must meet, reducing the period over which

<sup>7</sup>GAO, *Pension Benefit Guaranty Corporation: Structural Problems Limit Agency's Ability to Protect Itself from Risk*, GAO-05-360T (Washington, D.C. : Mar. 2, 2005).

sponsors can “smooth,” or average, reported plan assets and liabilities, and restricting sponsors’ ability to substitute “credit balances” for cash contributions.<sup>8</sup> Other provisions of the act may increase PBGC revenues by raising flat-rate premiums, expanding variable-rate premiums, and introducing a termination premium for some bankrupt sponsors, while limiting PBGC’s guarantee to pay certain benefits.

## Characteristics of PBGC Investment Policies

PBGC has typically invested primarily in fixed income and domestic equities. However, the proportion of assets allocated to each class has shifted according to changes in investment policy. PBGC has responsibilities and liabilities as both an insurer and a payer of pension benefits. PBGC’s investment policy, as established by its board of directors, has alternated between a philosophy characteristic of insurance companies (immunizing against potential interest rate risk exposure by investing in fixed income assets of appropriate duration)<sup>9</sup> and an investment philosophy more characteristic of pension plans (optimizing investment returns) since its establishment (see table 1).

**Table 1: PBGC’s Investment Policy Objectives and Target Allocations, 1975 to February 2008**

	1975-1990	1990-1994	1994-2004	2004-2008
Objectives <sup>a</sup>	Optimize investment return within acceptable levels of risk	Immunize assets against potential risk exposure by limiting deficit volatility	Optimize investment return within acceptable levels of risk	Immunize assets against potential risk exposure by limiting deficit volatility
Fixed-income investments target <sup>b</sup>	No set limit	75% or greater	No set limit	75-85%
Equity investments target	No set limit	No more than 25%	No set limit	15-25%

Source: GAO analysis of PBGC documents.

<sup>a</sup>Each investment policy included additional objectives, such as to maintain low premium levels and to provide benefits to participants and beneficiaries.

<sup>b</sup>Each investment policy statement indicates that the revolving fund will be invested only in Treasury bonds although PBGC did not set a limit of fixed income investments at times.

<sup>8</sup>Pub. L. No. 109-280, 170 Stat. 780.

<sup>9</sup>Duration measures the sensitivity of the value of a fixed-income asset or liability to a change in interest rates. While rising interest rates result in falling bond prices, declining interest rates result in rising bond prices. As a result, for example, a bond with a duration of 5 would experience a 5 percent decline (increase) in its price if interest rates rose (fell) by 1 percent.

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When the strategy called for optimizing returns, PBGC generally invested much of the trust fund assets in equities, leaving the revolving fund as the primary source for fixed-income securities. PBGC changed its investment policy in both 1990 and 2004 in an effort to limit the volatility of the financial performance and reduce the overall risk including interest rate risk. During these periods, PBGC's investment policies set a cap of 25 percent on the proportion of total assets that PBGC could invest in equities. The policies called for PBGC to increase its investments in fixed-income securities to closely match the duration of its liabilities. The purpose of this strategy was to offset changes in the value of PBGC's liabilities with corresponding changes in the value of the fixed-income assets, in order to reduce the risk of an increase in PBGC's deficit as a result of interest rate changes.

Like the policies that PBGC adopted in 1975 and 1994 that optimized returns, PBGC's board recently approved investments in a broader range of asset classes. The new policy includes more international equities and other asset classes, such as private equity and emerging market debt. The policy's target allocation includes 40 percent to fixed-income, 39 percent to equities, 10 percent to real estate and private equity, 6 percent to alternative equities, and 5 percent to alternative fixed-income.

While PBGC functions as both an insurer of defined benefit plans and a trustee of the plans it takes over, it has unique attributes that set it apart from operating exclusively as either entity. PBGC has been compared to both life and property and casualty insurers. As with life insurers, PBGC has a long-term investment horizon for some of its liabilities; like property and casualty insurers, PBGC has unpredictable liabilities that require a degree of liquidity in the assets it holds. Both insurers allocate assets to a number of different classes, but predominately invest in fixed income assets—on average 75 percent in bonds for life insurers and 67 percent for property and casualty insurers (see table 2). However, unlike an insurance company, under current law, PBGC does not have the authority to adjust the premium it charges to reflect the potential risk of a policyholder, nor does it have the ability to control its risks by choosing which defined benefit plans it will insure or the terms under which it will insure them. In addition, insurers cannot carry a deficit at the magnitude that PBGC currently faces.

**Table 2: Estimated Average Asset Allocation Percentage for Life and Property and Casualty Insurance Companies, 2006**

	Life insurance <sup>a</sup>	Property and casualty insurance
<b>Equities</b>	<b>3.6</b>	<b>18.8</b>
Common	1.4	17.5
Preferred	2.1	1.3
<b>Fixed income</b>	<b>78.0</b>	<b>75.1</b>
Bonds	75.2	67.2
Cash	2.8	7.9
<b>Real estate and mortgages</b>	<b>11.0</b>	<b>1.1</b>
Real estate	0.7	0.8
Mortgages	10.4	0.3
<b>Other<sup>b</sup></b>	<b>7.4</b>	<b>5.0</b>
<b>Total</b>	<b>100.0</b>	<b>100.0</b>

Source: GAO analysis of data from the National Association of Insurance Commissioners.

<sup>a</sup>Data on life insurance allocations represent only the assets held in general accounts. A general account is usually an insurer's largest account and is where insurers record their guaranteed contracts. Life insurers also maintain other accounts, called "separate accounts," where they hold assets such as equities and real estate. A separate account is maintained independently from the insurer's general investment account and used primarily for variable annuity and variable life products. They are beyond the scope of this presentation.

<sup>b</sup>Other includes contract loans, other invested assets, and receivables from securities.

Much like a defined benefit plan sponsor, PBGC is responsible for paying benefits to participants of plans it has taken over. The investment strategies of pension funds typically center on equities and other investments, such as real estate and private equity. The fixed income investments averaged just over one-quarter of pension plan assets (see table 3). Unlike employers that sponsor defined benefit plans, PBGC does not have business revenue that can be tapped to make up funding shortfalls, nor can it appeal to a state legislature for additional funds as

public plans can. PBGC's new investment policy matches closely with the investment philosophy of pension plans.<sup>10</sup>

**Table 3: Average Asset Allocation Percentages for the Top 200 Public and Private Defined Benefit Plans, September 30, 2007**

	Private Defined Benefit Plans	Public Defined Benefit Plans
<b>Equities</b>	<b>56.3</b>	<b>60.4</b>
Domestic	35.8	40.5
International	20.5	19.9
<b>Fixed income</b>	<b>30.6</b>	<b>25.9</b>
Domestic	25.7	23.3
International	3.7	1.1
Cash	1.2	1.5
<b>Real estate and Mortgages</b>	<b>3.8</b>	<b>5.8</b>
Real estate equity	3.6	5.2
Mortgages	0.2	0.6
<b>Other</b>	<b>9.3</b>	<b>7.9</b>
Private equity	5.3	5.2
Other	4.0	2.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>

Source: Pensions & Investments.

## PBGC Governance

ERISA established a governance structure for PBGC consisting of a board of directors, with the Secretary of Labor as the Chair of the Board and the Secretaries of Commerce and Treasury as members. The board sets the parameters for PBGC's investments through the development of an investment policy statement. Prior to 2004, the board reviewed

<sup>10</sup>PBGC's policy also roughly matches that of one independent federal agency—the Railroad Retirement Board—which administers retirement, survivor, and disability benefits for railroad workers and their families. The Railroad Retirement and Survivors' Improvement Act of 2001 established the National Railroad Retirement Investment Trust to manage a portion of the Railroad Retirement Board's assets. Pub.L.No. 107-90, 105(a), 115 Stat. 878, 882-83. In fiscal year 2006, the target allocation established by the Trust included investments in equities (55 percent), fixed-income (35 percent), and alternative assets (10 percent). Prior to the passage of the law, the Railroad Retirement Board's assets were invested solely in U.S. government securities.



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its investment policy on a limited basis. In 2004, the board formalized the investment policy decision making by requiring a review of PBGC's investment policy no less than once every 2 years. PBGC's board recently revised its bylaws specifying that the board review PBGC's investment policy statement every 2 years and approve the statement every 4 years. The purpose of this periodic review was to ensure that (1) the investment policy objectives and operational objectives were properly aligned, (2) the implemented investment strategies were consistent with the investment objectives, and (3) the investment policy was conducted in a manner consistent with ERISA. The board sought to give PBGC sufficient flexibility in managing implementation while establishing parameters to ensure that investments are executed in a manner consistent with the stated objectives.

In 2007, we reported that PBGC's board had limited time and resources to provide policy direction and oversight and had not established comprehensive written procedures and mechanisms to monitor PBGC's operations.<sup>11</sup> In that report, we concluded that because the Secretary of Labor has historically had the authority to administer PBGC, the Department of Labor (Labor) has, in some ways, filled the void in accountability. Board representatives from the Departments of Treasury and Commerce often deferred to Labor on administrative matters and did not generally question Labor on its actions. However, we noted that it is essential that the board members exercise their authority to oversee PBGC and coordinate with Labor and each other not only on major policy issues, but also on the oversight of PBGC's activities. In addition, we noted that PBGC's management should work with the board to ensure that all significant matters are formally elevated to the board's attention. In addition to our recommendation regarding board oversight, we advised Congress to consider expanding board membership with additional suggestions that these members have diverse backgrounds as well as knowledge and expertise useful to PBGC's responsibilities. Further, if Congress were to expand the board, we suggested that dedicated staff be assigned who are independent of PBGC's executive management and have pension and financial expertise.

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<sup>11</sup>GAO, *Pension Benefit Guaranty Corporation: Governance Structure Needs Improvements to Ensure Policy Direction and Oversight*, [GAO-07-808](#) (Washington, D.C.: July 2007).

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## Board Representatives Collaborated with PBGC Directors to Develop Investment Policies, but Board Oversight of Implementation Efforts Is Not Clear

For each of the biennial reviews since 2004, the PBGC board representatives collaborated with the PBGC directors to reach consensus on a board-approved investment policy, but it is unclear to what extent the board oversaw efforts to implement the 2004 and 2006 policies, which were intended to limit PBGC's exposure to financial risk. Three different PBGC directors managed the investment policy reviews in 2004, 2006, and 2008 and PBGC staff took steps to implement changes resulting from the 2004 and 2006 investment policies. Despite these efforts, by 2008, PBGC had not met the 2004 and 2006 policy objective of reducing PBGC's equity holdings down to within a board-approved range. Although PBGC kept the board apprised of its asset allocation and returns, we found no indication that the board had approved the deviation from its established policy or expected PBGC to continue to reduce the proportion of equities to meet the target allocation.

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## PBGC's Directors Determined Scope of the Investment Policy Reviews and Made Recommendations to the Board

Three different PBGC directors managed the reviews that led to the 2004, 2006, and 2008 investment policies and followed a similar process in developing their respective investment policy recommendations to the board. For each of these reviews, the PBGC directors determined the scope of the review, consulted with a range of industry experts, and hired third-party financial consultants to perform the review of PBGC's investment policies and asset allocation strategies. The consultants provided detailed analyses and recommendations on PBGC's long-term asset allocation strategy. The advisory committee meetings served as a venue for sharing information during each investment policy review process. These meetings were regularly attended by advisory committee members; representatives of the board; and PBGC's director, staff, and consultants. The meetings provided a forum to discuss PBGC's investment strategy and hear presentations from PBGC's consultants, investment managers, and industry experts. The advisory committee provided its investment policy recommendation to the director, who then collaborated with the board representatives to prepare a consensus recommendation for the board's approval.

While each of the biennial policy reviews followed similar patterns, they had some distinctions. In managing the review that led to the 2004 investment policy, the PBGC director sought to better position PBGC to weather future volatility in the fixed income securities markets and the defined benefit pension system. As part of this review, the director presented three different asset allocation scenarios to the PBGC advisory committee members based on information gathered from academic professionals and industry experts. The director then presented his recommendation and the advisory committee's recommendation to the

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board and outlined the pros and cons of each. The board's representatives and the PBGC director worked together to reach consensus on a draft board resolution on investment issues, which the board later ratified as PBGC's new investment policy.

As part of the 2006 investment policy review, a new PBGC director conducted a review that was limited in scope; he considered it premature to make substantial changes to the 2004 investment policy as PBGC staff had just begun to implement the policy and had not yet reached the objective of limiting its equity risk exposure. To arrive at a recommendation, PBGC hired a consultant that provided a range of asset allocation options for PBGC to consider. In addition, the advisory committee convened panels comprised of representatives from state public pension funds and private corporations. As a result of this process, the PBGC director recommended and the board approved one substantive change to the existing policy—to allow PBGC to diversify its holdings to include international fixed income and equity securities.

In managing the review that led to the 2008 investment policy, a new PBGC director called for a comprehensive review of PBGC's investment policy to improve the likelihood that PBGC would meet its current and future obligations. To assist in this process, PBGC again hired a consultant to analyze a range of asset allocation alternatives to improve PBGC's financial condition. At the advisory committee meetings, presentations were made by PBGC's investment managers as well as by experts and the consultant who discussed liability-driven investing and alternative asset investments. The consultant also briefed the advisory committee on the scope and timeline of its review, presented a range of alternative allocation scenarios and risk assessments, and recommended its preferred asset allocation to improve the probability PBGC would be able to meet its statutory obligations with its current resources.

In the 2008 review, the advisory committee and the PBGC director relied on the consultant's analyses in developing their respective investment policy recommendations. The advisory committee considered the consultant's study along with PBGC's projections of future contributions and plan failures, and recommended to the PBGC director an investment allocation option that the committee believed best met the needs of the PBGC. PBGC staff told us that the director took the consultant's recommendation to the board representatives and worked with their respective staffs to customize a recommendation to the board itself. This process led them to alter the weights of certain asset classes, remove some asset classes altogether, and have the consultant run further analysis on the revised asset allocation formula. The board representatives told us

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that the goal in developing the recommendation was to achieve consensus and the board's unanimous vote. Upon reaching consensus, the director presented a recommendation to the board, which the board approved as PBGC's 2008 investment policy.

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### PBGC Staff Were Responsible for Implementing Policy Changes and Monitoring Investment Performance

In each investment policy, the board assigned responsibility for implementing the investment program, monitoring investment managers, and reporting on investment performance to PBGC staff. To address changes made in the 2004 and 2006 investment policies,<sup>12</sup> PBGC's staff told us that they worked with a consultant to determine the number and type of investment managers to hire. For example, in 2004, they said that PBGC determined that it needed additional fixed-income investment managers that focused on asset-liability matching. In 2006, PBGC staff said that they chose to hire no new managers but instead instructed their existing managers to add international securities as an investment option in their portfolios. According to PBGC officials, when PBGC has hired new investment managers, it has used the competitive federal procurement process.<sup>13</sup> As part of this process, they explained that PBGC took steps to identify the appropriate managers, held oversight meetings on the premises of investment firms; reviewed historical reports and systems; and evaluated the managers' implementation strategies, financial ties, and management capacity. PBGC officials told us that they selected managers based upon their demonstrated performance, expertise, and cost. PBGC then let most contracts to the investment managers for one base year plus six option years and gave the investment managers discretion to manage investments within PBGC's policy guidelines.

PBGC staff monitored the managers' performance against negotiated investment benchmarks and guidelines. For example, PBGC staff told us that they monitored the managers' monthly investment reports—which provided a full accounting of all transactions, commentary on the status of investments, and projections of future returns—and followed up with the portfolio managers to clarify issues that emerged. Several investment

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<sup>12</sup>PBGC officials told us that they have begun to draft an implementation plan for the 2008 policy.

<sup>13</sup>According to PBGC officials, PBGC follows the federal procurement process, which requires agencies to conduct a nationwide search, publicize a request for proposals, hold a pre-bidders conference to explain various technical issues and to answer questions, set up a technical evaluation panel, receive bids, score applications to determine which applicants meet the minimum mandatory requirements, and perform due diligence before selecting the finalists.

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managers told us that they had frequent conversations with PBGC staff and that the frequency of the contact would increase if they did not meet their benchmarks. In addition, PBGC produced detailed quarterly investment performance reports for the board that among other things compared managers' performance against benchmarks and listed the risk characteristics associated with the portfolio.

PBGC staff told us that they ensured that investment managers complied with the terms of their contracts by conducting quarterly compliance reviews of its investment managers and annual on-site compliance reviews during which staff would review the managers' systems, financial disclosure forms, and annual reports. In addition, PBGC officials said that they evaluated each manager's annual financial disclosure form required by the Securities and Exchange Commission, and sought clarification for any anomalies they found. PBGC officials said that these due diligence procedures provided additional assurance that its investment managers would follow PBGC's policies and guidelines on managing the assets entrusted to them. Moreover, they told us that they used the annual contract renewal to monitor the investment manager contracts closely, negotiate fees, or seek termination as necessary. Between 2004 and 2008 PBGC terminated several of its investment manager contracts, at least one because of poor performance.

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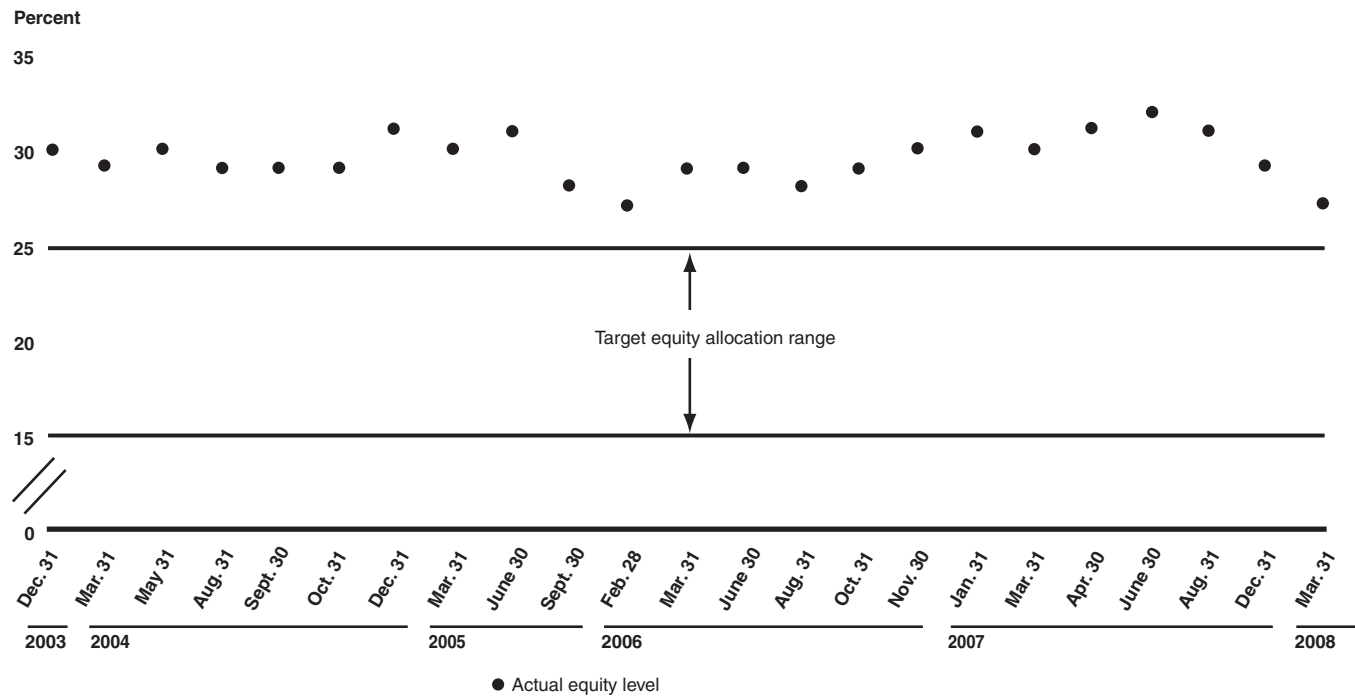
## Board Oversight of Policy Implementation Efforts Is Unclear

In the 2004 investment policy, the board called on PBGC to limit its exposure to risk arising from differences in interest rate sensitivity between its assets and liabilities. To accomplish this objective, the board set an expectation for PBGC to decrease its equity investments to a target range of 15 and 25 percent of total assets within 2 years.<sup>14</sup> The 2006 investment policy—which made one substantive modification to the 2004 policy—maintained the same objective of minimizing exposure to interest rate risk and repeated the target allocation and the 2-year time frame. However, as shown in figure 4, PBGC did not attain its goal of limiting its exposure to interest rate risk by reducing its equities down to within the board-approved target range as required by the 2004 and 2006 investment policies.

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<sup>14</sup>The policy indicated that newly trusteed assets from terminated plans were to be transitioned to fixed-income investments. Assets held at the time of the policy change were not used to begin implementation of this strategy.

**Figure 4: Proportion of Equities in PBGC's Total Portfolio, December 31, 2003, through March 31, 2008**



● Actual equity level

Source: GAO's analysis of PBGC data.

Note: The data for this figure come from the advisory committee meeting minutes (2004-2007) and other documents that PBGC provided to us. The data depict PBGC's financial condition at certain points in time and are not comprehensive.

In February 2006, the PBGC director reported to the board that the 2004 policy (which PBGC began implementing in 2005) continued to serve PBGC well and while PBGC had not met the target range, he expected to do so shortly.<sup>15</sup> The director resigned in May 2006 shortly after the board approved the 2006 policy, and PBGC made little progress between May 2006 and March 2008 in reducing its equities below 25 percent. In May 2007, PBGC reported that its equity returns (11.6 percent) had significantly outperformed its bond returns (3.6 percent) in the previous 3 years, making it difficult to reach the target in a financially responsible way. PBGC officials told us that although they had not met the target, they had operated within the policy's management flexibility to improve PBGC's overall financial condition by having more equity on the market during a

<sup>15</sup>The staff report accompanying the director's memo to the board noted that there were sufficient additional assets in probable terminations to complete the transition in 2006.

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period of high equity returns. In a 2007 overview of the investment program, PBGC noted that PBGC staff, the board, and advisory committee understood the dynamic nature of PBGC's financial environment and that the investment policy gave PBGC the flexibility to respond quickly and prudently to changes in market conditions. Our review of the 2004 and 2006 policies found that the board gave PBGC some flexibility in managing investments, but expected PBGC to stay within specific parameters set by the board to ensure successful execution of the investment program in a manner consistent with the stated policy objectives.

PBGC staff provided the board with information on PBGC's investment performance and asset allocation at board meetings and in quarterly and annual reports, but there is no indication whether the board formally approved PBGC's deviation from the policy or maintained its expectation that PBGC would meet the target. According to minutes from the board meetings during this time, board members asked informational questions periodically, such as inquiring about the basis for PBGC's fixed income/equity ratio, but did not otherwise discuss PBGC's difficulties implementing the investment policy. In 2006, PBGC's director notified the board that PBGC had not met the board-approved target, but recommended that the board keep the current policy mostly intact. The board ratified a policy that contained the same target range and same timetable for PBGC staff to reach it. However, the board did not require PBGC to establish interim implementation goals against which to measure PBGC's progress, identify the challenges in meeting the investment goals, and facilitate discussion about the steps necessary to ensure that the larger policy objectives were achieved. PBGC officials told us that the mandates for the 2004 and 2006 policies did not trigger the need for an in-depth, complex transition plan. However, PBGC's efforts to reach the policy goal were not successful.

While the board is responsible for establishing and overseeing PBGC's administration of its investment policies, the board members did not provide clear direction in the efforts to implement them. In 2007, we reported that PBGC's board of directors had limited time and resources to provide policy direction and oversight and lacked established procedures and mechanisms to monitor PBGC operations. We further noted that the board members have designated officials and staff within their respective agencies to conduct much of the work on their behalf and relied mostly on PBGC's management to inform these board representatives of pending issues. While board representatives served as liaisons between PBGC and their respective board members and reported that they kept the board members apprised of developments in the investment policy review, it is unclear from our interviews and the documents that we reviewed what

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role the board members expected them to play in monitoring investment policy implementation. The current and former board representatives that we spoke to provided a variety of perspectives on the extent to which the board bore responsibility for investment policy implementation. The board's representatives told us that they reviewed PBGC's investment performance reports and participated in regular conference calls. One former board representative told us that the board representatives served as the de facto governance of PBGC and another indicated that while it was the board's responsibility to ensure the implementation of the investment policy, the board lacked mechanisms to oversee the implementation process. Current board representatives told us that while they were aware that PBGC had not met the policy objective, they did not believe that the board had a role in implementing policy. For example, one representative stated that it was not the board's role to question PBGC's management of assets, but rather to ensure that PBGC hired the right investment firms. Another representative stated that the board and PBGC did not attempt to tighten the range of investments allowed under the current policy because they expected that the investment policy would soon change.

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## PBGC's New Investment Policy Aims to Achieve Greater Returns, but PBGC Has Likely Understated the Risks

PBGC's investment policy objective has shifted from protecting its deficit from volatility to focusing on optimizing returns; specifically, the policy aims to eliminate PBGC's current deficit over the long term by increasing the expected rate of return on assets. The new policy reduces the proportion of PBGC assets allocated to fixed-income investments, such as Treasury and corporate bonds; increases its proportional holdings in international equities; and introduces new asset classes, such as private equity, emerging market debt and equities, high-yield fixed income, and private real estate (see fig. 5).<sup>16</sup> PBGC officials assert that the new allocation of assets is diversified enough not only to provide higher expected returns, but also to lower expected risks when compared to the previous allocation.<sup>17</sup> The consultant hired by PBGC to conduct an asset

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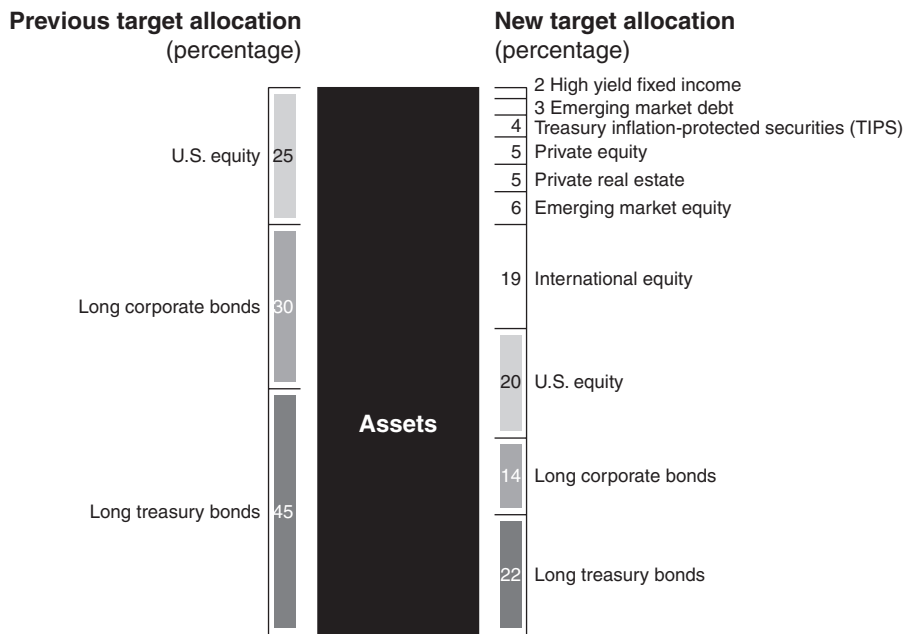
<sup>16</sup>PBGC had acquired assets under these new classes from terminated plans, but it followed a policy to liquidate the assets as soon as prudently possible and reinvest in assets approved under policy. At the time it approved the new policy, PBGC held less than 1 percent of its total assets in emerging market equities (0.6%), high-yield fixed income (0.5%), and emerging market debt (0.9%), and approximately 1.7 percent in private equity.

<sup>17</sup>Diversification is the practice of spreading investments among different asset classes or within an asset class to reduce risk and increase return. Diversification across asset classes can help mitigate the risk of isolating investments in one class without affecting expected returns.



allocation review concluded that the previous asset allocation policy that limited equity investments to a maximum of 25 percent had lower expected returns and held higher risks. Based on the consultant's assumptions, the measure of risk for PBGC's newly adopted asset allocation is about 1 percentage point lower than the risk measure for the previous allocation.

**Figure 5: Comparison of PBGC's Previous and New Asset Allocation Policies**



Source: GAO.  
 Note: The previous asset allocation target represents PBGC's target of a maximum of 25 percent of total investments in equities and does not reflect the actual portfolio that PBGC held. The new asset allocation is based on PBGC's 2008 Investment Policy.

Our assessment of PBGC's analysis shows that while the returns may improve, the risks associated with the new allocation could be higher than presented. The original analysis was based on a forecasting model, which is driven by estimates that rely on judgment and a degree of subjectivity. The consultant conducted a series of simulations to identify the risks and returns of various asset allocation options and develop its recommendations to PBGC, but did not test the sensitivity of its analysis

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to reasonable changes in the assumptions.<sup>18</sup> The Office of Management and Budget states in guidance to federal agencies that, because of the uncertainty inherent in modeling, its effects should be analyzed and reported, and that sensitivity analysis should be included in such a report.<sup>19</sup> Using data from PBGC's consultant, we conducted several analyses designed to highlight the sensitivity of the results to the underlying assumptions and found that the expected returns could be higher than the previous allocation, but the risks (as measured by standard deviation) may also be higher (see fig. 6). In our analysis, we varied the consultant's assumptions using Ibbotson data and JPMorgan's capital market estimates to compare the risks and returns associated with previous and new target allocations.<sup>20</sup> We did not conduct sensitivity tests incorporating PBGC's liabilities or funded position because we encountered difficulty obtaining

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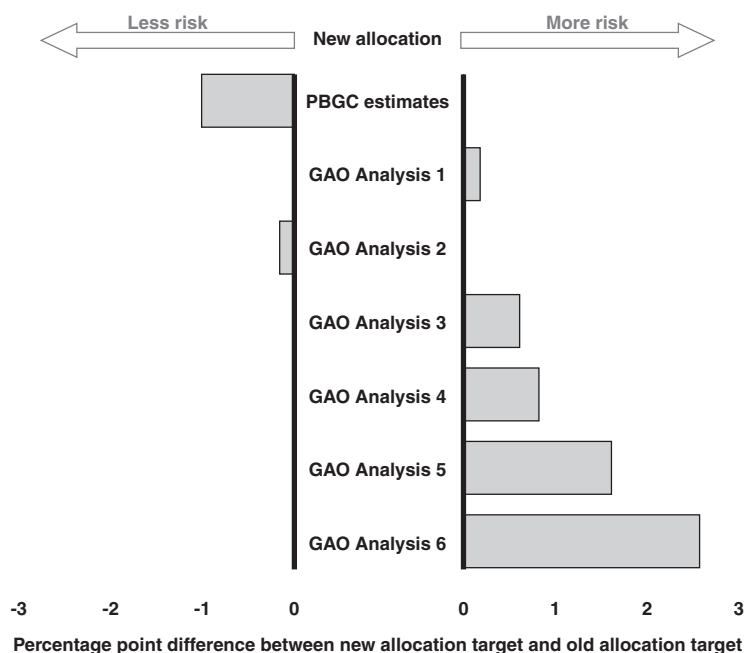
<sup>18</sup>PBGC's outside consultant utilized the Monte Carlo simulation to conduct an analysis which produces useful insights beyond a deterministic model. However, this technique has its limitations and depends critically on the inputs—asset class returns, standard deviations, and correlations between the performance of asset classes—entered into the model. Because reasonable experts can disagree on estimates for these inputs, some sensitivity testing is warranted. For more on the limitations of Monte Carlo simulation, see R. Ibbotson and R. Sinquefeld, *Stocks, Bonds, Bills, and Inflation Yearbook*, Ibbotson, 2008.

<sup>19</sup>While the circular specifically refers to cost-benefit analysis, it provides a guide to the treatment of uncertainty in any model or analysis with implications for important programs or policies. According to the guidance, major assumptions should be varied and the outcomes recomputed to determine how sensitive outcomes are to changes in the assumptions. The assumptions that deserve the most attention will depend on the dominant elements and the areas of greatest uncertainty of the program being analyzed. See Office of Management and Budget Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs.

<sup>20</sup>Ibbotson data serve as a reference for capital market returns and are recognized as the industry standard for illustrating historical performance of different asset classes. JPMorgan, as a large asset and wealth manager, provides an alternative set of assumptions on the range of asset classes included in the PBGC's new allocation. According to JPMorgan Asset Management, the institution has assets under supervision of \$1.6 trillion and assets under management of \$1.2 trillion and more than 650 investment professionals providing over 200 different strategies spanning the full spectrum of asset classes, including equity, fixed income, cash liquidity, currency, real estate, hedge funds and private equity.

reliable data to conduct a more complete analysis.<sup>21</sup> For an explanation of our analysis, see appendix II.

**Figure 6: Degree to Which the New Allocation Holds More or Less Risk than the Previous Allocation under Different Asset Assumptions**



**PBGC Estimates:** Maintains all of the consultant's assumptions.

**GAO Analysis 1:** Substitute estimates on the standard deviation on U.S. equity based on Ibbotson data for 1926-2006 (22%) for the consultant's assumption and adjusts other equities accordingly.

**GAO Analysis 2:** Substitute estimates on the standard deviation on U.S. equity based on Ibbotson data for 1997-2006 (20%) for the consultant's assumption and adjusts other equities accordingly.

**GAO Analysis 3:** Substitute estimates on the standard deviation on fixed income assets based on Ibbotson data for 1926-2006 on Long High-Quality bonds (8.5%) and Long Treasury Bonds (9.2%) for the consultant's assumptions (11.4%) and (12.4%).

**GAO Analysis 4:** Substitute estimates on the standard deviation on fixed income assets based on Ibbotson data for 1926-2006 on Long High-Quality bonds (6.6%) and Long Treasury Bonds (9.4%) for the consultant's assumptions.

**GAO Analysis 5:** Combines Analysis 2 and Analysis 4.

**GAO Analysis 6:** Substitute JP Morgan capital market assumptions on the standard deviation, returns and correlations for the consultant's assumptions except for certain alternative assets not covered by JP Morgan.

Source: GAO.

Notes: Magnitude is represented as the percentage point difference between the standard deviations of the old target allocation and the new target allocations. A negative difference indicates that the previous target allocation holds more risk than the new allocation.

The New Target Allocation is based on PBGC's investment policy statement, 2008.

The Previous Target Allocation is based on the allocation used by the consultant in its analysis and does not represent the assets PBGC was holding at the time.

<sup>21</sup>The consultant assisted us in our efforts to review the results and conduct sensitivity tests but could not provide the exact data provided to PBGC. With some minor adjustments, we were able to replicate the return and standard deviations on several of the portfolios summarized in the presentation. In addition, because we encountered issues reconciling data from PBGC's Pension Insurance Modeling System with the data provided by the outside consultant, we did not conduct sensitivity tests on PBGC's liabilities or funded position. Because similar limitations would be present in a more complete analysis that incorporates PBGC's liabilities and funded position, additional sensitivity analysis would provide a more complete picture of the risks PBGC faces under the new policy. The data limitations are discussed in greater detail in appendix II.

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Our analysis focused mostly on how different assumptions about the volatility of fixed income and equities affected the overall risk of the new allocation and highlights how sensitive the new allocation is to small changes in assumptions—demonstrating the uncertainty of the measures of risk associated with the allocation.<sup>22</sup> Our analysis shows that the consultant’s measures of risk associated with fixed income are particularly sensitive to changes. For example, the consultant set the assumption of market risk (as measured by the standard deviation) for long Treasury bonds at 11.2 percent. In contrast, other sources use a lower risk assumption, such as 7.62 percent in JP Morgan’s Capital Market assumptions or roughly 9.3 percent based on Ibbotson historical data.<sup>23</sup> When the risk on high-quality corporate bonds and long Treasury bonds is lowered by just 2 percent, the new allocation becomes riskier than the previous allocation. Since the majority of PBGC’s previous allocation was in fixed income investments, the differences in fixed income risk assumptions significantly affects the outcomes in comparison with the new allocation. In addition, when we substituted JP Morgan’s full set of capital market assumptions for the consultant’s assumptions, including asset correlations, we found that the new allocation took on significantly more risk (as shown in GAO analysis 6 in fig. 6).

Since the PBGC has a long-term investment horizon it may be able to prudently incur greater short term risks to secure higher long term returns. For example, in analyses 1 through 5 in figure 6, the expected returns for the new allocation are 1.9 percent higher than the previous allocation while in analysis 6, it was approximately 1 percent higher—although significantly more volatile.<sup>24</sup> However, quantitative measures of risk do not capture the full set of risks inherent in the new investment strategy. As PBGC’s need for cash on a short-term basis increases to pay the growing number of beneficiaries over the next decade, liquidity risk becomes an

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<sup>22</sup>As with any predictive modeling and sensitivity analysis, our input assumptions and quantitative approach has limitations. As a result, our sensitivity analysis should not be considered definitive estimates. Moreover, we did not address the data limitations associated with some alternative assets (see app. II for more details).

<sup>23</sup>PBGC’s consultant’s assumptions are based on a 15-year duration bond, Ibbotson’s estimate is based on a 20-year maturity, and JP Morgan is based on bonds with a maturity greater than 10-years. Generally, bonds with longer maturities carry more risk than those with shorter maturities. Collectively, these results demonstrate how the risk of the portfolios varies with the assumption on fixed-income securities.

<sup>24</sup>In the first five cases in figure 6 the expected returns are 5.7 percent for the previous allocation and 7.6 percent for new allocation, while in the case 6, the returns are 6.13 for the previous allocation and 7.16 percent for the new allocation.

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important consideration in its asset allocation strategy. PBGC had cash obligations of over \$4.5 billion in 2007.<sup>25</sup> These obligations included \$4.2 billion in benefit payments, \$2 million in settlements, and \$377 million in administrative expenses. The consultant's analysis indicated that liquidity risks were considered and that the new asset allocation policy should allow those risks to be managed, but recommended ongoing monitoring of liquidity needs.<sup>26</sup> Under the new allocation, PBGC plans to hold 21 percent of its assets in private equity, real estate, emerging market debt and equity, and high-yield fixed income, totaling over \$11 billion of PBGC's total investments.<sup>27</sup> These assets are generally considered illiquid or volatile and are held for a long period of time before gaining expected returns. For more illiquid assets like private equity, recent studies estimate that it generally takes at least 7 years to return the committed capital.<sup>28</sup>

Further, while strategies that emphasize fixed income run the risk of preventing PBGC from growing itself out of its deficit, strategies that de-emphasize fixed income may increase the risk that the PBGC's deficit will increase in an economic downturn. A downturn could affect the plans insured by PBGC since large private pension plans hold assets similar to those in PBGC's new allocation. As a result, PBGC could take trusteeship of newly terminated plans at the same time that its assets have declined. A recent letter issued by the Congressional Budget Office (CBO) on PBGC's new investment strategy further highlights the additional risks.<sup>29</sup> The CBO finds that PBGC's move into new asset classes may raise the expected rate of return, but it also entails a greater downside risk—increasing the probability that the value of PBGC's assets will be below the amount necessary to meet benefit obligations as they come due.

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<sup>25</sup>Officials explained that PBGC accesses cash in different ways, including liquidating incoming assets from terminated plans before transferring them into PBGC's investment portfolio or liquidating currently held assets. PBGC holds a certain amount of cash on hand. According to the fiscal year 2007 management report, PBGC held \$2 billion in cash at the beginning of the year and \$2.2 billion at year's end.

<sup>26</sup>We did not review the methodology used in making this determination.

<sup>27</sup>PBGC reported that, as of September 30, 2007, it held \$55.1 billion in total investments.

<sup>28</sup>See Alexander Ljungqvist and Matthew Richardson, *The Cash Flow, Return, and Risk Characteristics of Private Equity*, National Bureau of Economic Research, January 2003. S. Kaplan and A. Schoar, Private Equity Performance: Returns, Persistence, and Capital Flows, *Journal of Finance*, 60(4), 2005 suggest that the commitment to return capital is usually on the order of 10 to 12 years in total.

<sup>29</sup>See CBO, "A Review of the Pension Benefit Guaranty Corporation's Investment Strategy," letter to Chairman George Miller, Apr. 24, 2008.

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## Conclusions

PBGC's governance structure is a critical element in ensuring that PBGC can meet its obligations to U.S. workers and retirees who rely on it for their retirement income. Last year we reported that the current board had limited time and resources to provide policy direction and oversight and suggested that Congress consider expanding the board, appointing additional board members with knowledge and expertise beneficial to PBGC.

In a short period of time, the investment policy has changed from one focused on optimizing returns to limiting PBGC's exposure to interest rate risk to returns again. While the board formally approved each policy, it has not taken an active and engaged role in ensuring that its own policy objectives are met. As a result, the board's lack of policy direction and oversight may be hindering PBGC's long-term viability.

Although PBGC's new investment policy was developed in response to its current deficit, relying solely on investment income to remedy PBGC's inherently poor financial outlook is likely to introduce additional risk to PBGC's portfolio. The degree of the risk associated with the new policy is unclear and may carry more risks than the previous policy. If the investment strategy is focused on improving the PBGC's financial condition, a worsening condition could lead to increasingly risky strategies that may threaten the pension benefits of retirees. PBGC needs to have a better understanding of the risks associated with its new policy as it prepares to move a considerable portion of its assets into investments that it has never held before. A complete disclosure and understanding of the risks PBGC faces will help the board and PBGC better plan for implementing the new policy. Implementing PBGC's new investment policy will require that the board have accountability measures, such as objectives, milestones, and completion time frames, to conduct careful, ongoing oversight and to ensure that PBGC achieves its policy goals and protects the pension benefits of retirees.

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## Recommendations for Executive Action

To ensure accountability for the full implementation of the board's new investment policy decisions and its appropriate oversight of an investment policy that carries more risk, we are recommending that the PBGC board

- Require the PBGC director to formally submit for board approval a written implementation plan that outlines accountability measures for carrying out the new investment policy, such as PBGC's key objectives, milestones, and completion time frames;

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- Require the PBGC director to report periodically on the progress toward meeting the objectives, milestones, and time frames in the plan and to provide justification for any deviations in the approved implementation plan; and
  - Document the board's agreement or disagreement with any deviations from the policy implementation plan.

To gain a better understanding of the risks involved in the new investment policy, PBGC should conduct sensitivity analyses before implementing the new policy. These analyses should use a variety of assumptions of the risks and returns of the new allocation that incorporates assets, liabilities, and funded position.

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## Agency Comments and Our Evaluation

We obtained written comments on a draft report from the Secretary of Labor, on behalf of the PBGC board of directors, and from the director of PBGC. Their comments are reproduced in appendixes III and IV, respectively. In addition, PBGC provided technical comments, which we incorporated in the report where appropriate.

In a response to our draft report, the chair of PBGC's board of directors emphasized the board's commitment to providing strong oversight of the PBGC investment policy to ensure that the policies are implemented appropriately. The comments stated that, during implementation of the previous investment policy, board members received reports on PBGC's efforts and determined that PBGC had taken prudent measures to comply with the investment policy. The chair of the PBGC board did not specifically address our recommendations, but stated that the current combination of presentations by PBGC, verbal agreements, and informal guidance provided from the board and its representatives offered an appropriate level of oversight. In addition, the chair reported that PBGC had submitted a preliminary implementation plan for the new policy and that PBGC had planned to provide a more complete implementation briefing in early July.

We do not believe that a system of verbal agreement and informal guidance is strong enough oversight for investing \$68 billion. The successful implementation of this policy, which invests in a broader range of assets, will require close monitoring and consistent oversight. Documentation of PBGC's progress toward meeting policy objectives, milestones, and implementation timelines and the board's agreement or disagreement with any deviations from the policy implementation plan remains critical for ensuring the accountability of the funds needed to

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support millions of retirees. Further, PBGC's governance structure—which comprises presidentially appointed board members, board representatives, and the PBGC director—has experienced frequent turnover in the past, making the need for documentation of key decisions related to PBGC's investments essential.

In responding to the draft report, the PBGC director stated that the process that supported the adoption of the new policy was complete and robust. He said that the process included a thorough assessment of PBGC's long-term obligations to plan participants and beneficiaries, exhaustive discussion among numerous constituents, and in-depth analysis by leading industry experts, including PBGC's investment consultant. In response to our recommendation, the director agreed that sensitivity analyses are important and that PBGC will continue to perform them going forward. PBGC also provided some additional analysis using alternative assumptions from Goldman Sachs. PBGC noted that our sensitivity analysis used fixed income assumptions that understated the risk associated with PBGC's fixed income assets and that assumptions based on the 15-year duration bond are more accurate. Finally, PBGC points to the higher Sharpe ratio of the new portfolio as evidence that the new policy is superior to the old policy in all the alternatives it considered.<sup>30</sup>

We are pleased that PBGC has taken initial steps to conduct a sensitivity analysis. Since the assumptions used in this analysis are not disclosed, it is difficult to determine whether PBGC reasonably captured differing views. Our report emphasized that the quality of PBGC's forecasts, which used stochastic modeling, depends on the technique used to model uncertain returns and on the assumed values of key parameters, including the distribution of returns, means, standard deviations, and correlations between assets. Therefore, reasonable variation of these assumptions is needed to better inform the degree of uncertainty in the results. We urge PBGC to consider whether the analysis conducted by Goldman Sachs provides sufficient variation in the alternative assumptions to those employed by its outside consultant. In addition, the analysis should incorporate PBGC's assets, liabilities, and funded position as our recommendation indicates.

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<sup>30</sup>The Sharpe ratio is a measure of the excess return (reward) per unit of risk and is represented as the ratio of the expected rate of return minus the risk-free rate divided by the standard deviation.



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With respect to our assumptions on fixed income, we used data that more closely aligned with PBGC's actual fixed income investments than that presented by PBGC's consultant.<sup>31</sup> While we do not believe the assumptions we utilized in this report are necessarily superior to those used by others, we believe that they are reasonable for sensitivity analysis in that they approximate historical averages and, in one test, are based on estimates produced by a reputable financial advisor that differed significantly from PBGC's outside consultant.

PBGC's reliance on the Sharpe ratio is subject to limitations similar to those of the standard deviation in evaluating alternative portfolios. Moreover, the Sharpe ratios are based on assumptions about future asset returns and the volatility of those returns—unknown items given the uncertainty of future events. We agree with PBGC that the uncertainties inherent in the Sharpe ratio and the standard deviation should be identified to highlight that an analysis of quantitative uncertainty does not fully account for real world uncertainty. Lastly, a superior Sharpe ratio implies that the new investment policy is expected to provide better risk-adjusted performance. However, as we demonstrated in our analyses using our different assumptions, better risk-adjusted performance should not be interpreted to imply that the new strategy is less risky than the previous policy.

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<sup>31</sup>According to PBGC's 2007 annual report, the average maturity on the fixed income assets in its portfolio was 16.7 years and the average duration was 13.4 years. We used Ibbotson's historical data on bonds with a 20-year maturity and JP Morgan's assumption on long bonds with an average maturity greater than 10 years and duration of 11.2 years. Our assumptions ranged roughly from 0.8 percent lower to 0.5 percent higher than the volatility on the PBGC's actual fixed income portfolio for the 1998 to 2007 period (8.4 percent). In contrast, the PBGC's outside consultant assumptions results in an estimate that was over 3 percent higher. (We assume a 60-40 split between long Treasury bonds and long corporate bonds and ignore the minor adjustments for the correlation between long government and long corporate bonds for the Rocaon and Ibbostson estimates.)

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As agreed with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after today's issuance. At that time, we will send copies of this report to the Secretaries of Commerce, Labor, and Treasury as well as the Director of PBGC and other interested parties. We will also make copies available to others on request. If you or your staff have any questions concerning this report, please contact Barbara Bovbjerg on (202) 512-7215 or Tom McCool on (202) 512-2642. Contact points for our Office of Congressional Relations and Office of Public Affairs can be found on the last page of this report. Key contributors are listed in appendix V.



Barbara D. Bovbjerg,  
Director, Education, Workforce,  
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# Appendix I: Scope and Methodology

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To understand the Pension Benefit Guaranty Corporation's (PBGC) procedures for developing and implementing its investment policies, we examined PBGC's past investment policy statements and supporting documentation, paying particular attention to the revisions made in 2004, 2006, and 2008. To determine the roles and responsibilities of each of the participants in these processes, we interviewed current and former board representatives, board agency officials, PBGC executive directors, senior PBGC management officials, and advisory committee chairmen. In addition, we reviewed the meeting minutes of both the board of directors (2003 to present) and the advisory committee (2000 to present). For the 2008 policy, we reviewed the asset allocation studies produced by consultants and analyzed the consultant's, the advisory committee's, and the executive director's recommendations. To gain perspective on the investment policy formulation process, we attended an advisory committee meeting where the investment policy options were discussed. To learn more about how PBGC manages and monitors its investment program, we interviewed PBGC's long-time consultant and current investment managers, discussing their respective roles in implementing the investment strategy and managing PBGC's assets. We reviewed relevant literature, statutes, and available data and interviewed experts knowledgeable of PBGC and investment approaches. We did not meet with the board members nor did we attend any board meetings because PBGC policy does not open its meetings to outside parties.

To assess PBGC's new investment strategy, we reviewed the analysis provided to PBGC by its consultant, conducted sensitivity analyses on the market risks—as measured by standard deviations—and returns of PBGC's previous and new asset allocation policy, discussed the outcomes with PBGC staff and the contractor, and reviewed relevant literature. The PBGC's new asset allocation policy is partially informed by a forecasting model that produces projections that are uncertain due to imprecision in the underlying data and modeling assumptions. As a result, we varied some of the major assumptions and recomputed some of the estimates to determine how sensitive outcomes are to changes in the assumptions. We also assessed other limitations of the analysis due to reliability issues surrounding the data and assumptions on the various assets classes. Our work is consistent with Office of Management and Budget (OMB) guidance on the treatment of uncertainty in forecasting.<sup>1</sup> Appendix II provides further details related to our analysis.

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<sup>1</sup>Office of Management and Budget Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*.

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# Appendix II: Description of GAO's Sensitivity Analysis

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The analysis that guided PBGC's decision to change its investment policy was based on a forecasting model developed by PBGC's consultant—Rocaton Investment Advisors, LLC—and was driven by key assumptions based on quantitative and qualitative assessments of various asset markets. The consultant employed a stochastic forecasting technique, known as a Monte Carlo simulation, to identify the risks and returns of various asset allocation options and develop its recommendations to PBGC. Monte Carlo simulation is a problem-solving technique used to approximate the probability of outcomes by performing multiple trial runs (simulations) and is widely used by researchers analyzing financial markets.<sup>1</sup> While the Monte Carlo technique has a number of benefits, such as capturing the volatility of market returns, critics believe the technique is limited in its ability to replicate the actual behavior of capital markets since it is dependent on assumptions of future asset returns, standard deviations, and correlations. (Tables 4 and 5 show the assumptions for asset return and risk and correlations used by the consultant.) Experts advise using other tools, such as sensitivity analysis, to compare results from this type of simulation and properly characterize the sources and nature of uncertainty in the results.<sup>2</sup> Because the consultant did not test the sensitivity of its analysis to reasonable changes in the assumptions, we tested the returns and risks of the consultant's results under alternative assumptions.<sup>3</sup>

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<sup>1</sup>GAO has used the Monte Carlo simulation in past reports, and it has also been used by the CBO in Social Security projections.

<sup>2</sup>See R. Ibbotson and R. Sinquefeld, *Stocks, Bonds, Bills, and Inflation Yearbook*, Ibbotson, 2008. In addition, federal agencies are advised to conduct sensitivity analysis on forecasts. See Office of Management and Budget Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs.

<sup>3</sup>We relied on the output from the consultant's forecasting model although we did not verify the accuracy of the model. We were able to independently reproduce the consultant's results to obtain estimates roughly equivalent to those the consultant presented to the PBGC. We found small differences between our results and the consultant's during verification, but made small adjustments to the expected returns and standard deviation of each asset to establish a base case upon which to conduct our sensitivity analyses. The adjustments were made to better align our results with the consultant's and to minimize the sum of squared adjustments. As a result, these adjustments are spread over different asset classes and are as small as possible for each asset class. We confirmed our methodology with the consultant and discussed reasons for the differences in estimates.

**Table 4: PBGC Consultant Assumptions, Returns and Risk**

<b>Asset class</b>	<b>Compounded annual returns</b>	<b>Standard deviation (risk)</b>
Treasury inflation-protected securities	4.2%	5.2%
Long Treasury bonds (15 year)	4.3%	11.2%
Long high-quality bonds (10 year)	5.3%	8.4%
Long high-quality bonds (15 year)	4.9%	12.4%
Core fixed income	5.2%	4.5%
High-yield bonds	6.8%	8.5%
Emerging market debt	7.4%	10.0%
Emerging market debt (local currency)	7.3%	11.0%
U.S. equities	7.9%	15.0%
Non-U.S. equities	7.7%	17.0%
Emerging equities	10.0%	25.0%
Private equity (buyout)	9.9%	25.0%
Private equity (venture)	11.5%	35.0%
Private real estate	7.3%	10.0%
Commodities	4.3%	21.0%
Absolute return	6.7%	5.0%

Source: Rocaton Investment Advisors, LLC.

Table 5: PBGC Consultant Assumptions, Correlations

Asset	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Long high-quality bonds	1.0														
2. Long Treasury bonds	0.9	1.0													
3. Treasury inflation-protected securities	0.2	0.2	1.0												
4. Core fixed income	0.6	0.7	0.3	1.0											
5. High-yield bonds	0.2	0.4	0.0	0.4	1.0										
6. U.S. equities	0.0	0.2	-0.1	0.2	0.5	1.0									
7. Non-U.S. equities	0.0	0.1	-0.1	0.2	0.3	0.6	1.0								
8. Emerging equities	-0.2	-0.1	-0.1	-0.2	0.2	0.3	0.6	1.0							
9. Private real estate	0.2	0.2	0.0	0.1	-0.1	0.4	0.3	0.1	1.0						
10. Private equity (buyout)	-0.1	-0.2	-0.3	-0.2	0.0	0.5	0.3	0.1	0.4	1.0					
11. Private Equity (venture)	0.1	0.0	0.0	0.0	-0.1	0.4	0.1	0.0	0.3	0.6	1.0				
12. Emerging market debt	0.0	0.1	0.2	0.3	0.4	0.2	0.2	0.3	-0.1	0.0	0.1	1.0			
13. Emerging market debt (local currency)	0.0	0.1	0.2	0.1	0.3	0.2	0.4	0.4	0.0	-0.1	0.0	0.4	1.0		
14. Commodities	-0.1	-0.1	0.2	-0.1	-0.1	0.0	0.1	0.2	0.0	0.1	0.3	0.3	0.2	1.0	
15. Absolute return	0.2	0.0	0.0	0.2	0.3	0.5	0.5	0.3	0.0	0.2	0.0	0.2	0.0	0.0	1.0

Source: Rocaton Investment Advisors, LLC.

## Measuring Returns under Alternative Assumptions

To test the consultant's assumptions on expected return, we conducted eight separate analyses that varied the assumed rate of return on fixed income and the equity premium (see table 6). Each of these analyses showed that the estimated rates of return were consistently higher for the new allocation when compared to the previous allocation. This analysis should not be considered as definitive evidence that the new investment will outperform the old allocation and does not consider the data limitations associated with alternative assets.

To construct the expected return on the portfolio of assets, we weighted the expected returns of the individual assets as follows:

$$(1) \quad ER^P = \sum_i^I w_i ER_i^A$$

**Appendix II: Description of GAO's Sensitivity Analysis**

where,  $ER^P$  is the expected return of the portfolio,  $w_i$  is the percentage of the portfolio allocated to asset  $i$ , and  $ER_i^A$  is the expected return of asset class,  $i$ .

**Table 6: Sensitivity Analysis of Portfolio Expected Returns**

GAO Analysis		Expected return estimates	
		New allocation target	Previous allocation target
Baseline assumptions	Maintains all of the consultant's assumptions on expected returns, assuming a U.S. equity premium of roughly 3.8%.	7.60%	5.71%
GAO analysis 1:	Lowers the U.S. equity premium to 2.0% and maintains the consultant's assumptions on other asset returns.	7.24%	5.26%
GAO analysis 2:	Lowers the U.S. equity premium to 2.0%, adjusts the return on international equities to maintain the consultant's assumption regarding the relative relationships between all equities, and maintains the consultant's assumption on fixed income.	6.79%	5.26%
GAO analysis 3:	Maintains the consultant's assumptions on international equities, lowers the U.S. equity premium to 2.0%, and substitutes historical returns based on Federal Reserve Bank data for the consultant's assumptions on fixed income.	8.10%	6.80%
GAO analysis 4:	Combines the alternative assumptions used in analyses 1 through 3: Lowers U.S. equity premium to 2.0%, adjusts international equity, and uses historical returns based on Federal Reserve data for fixed income returns.	8.04%	6.80%
GAO analysis 5:	Lowers the U.S. equity premium to 2.5% and maintains the consultant's assumptions on other asset returns.	7.34%	5.38%
GAO analysis 6:	Lowers the U.S. equity premium to 2.5%, adjusts the return on international equities to maintain the consultant's assumption regarding the relative relationships between all equities, and maintains the consultant's assumption on fixed income	7.02%	5.38%
GAO analysis 7:	Maintains the consultant's assumptions on international equities, lowers the U.S. equity premium to 2.5%, and substitutes historical returns based on Federal Reserve Bank data for the consultant's assumptions on fixed income.	8.20%	6.92%
GAO analysis 8:	Combines the alternative assumptions used in analyses 4 through 7: Lowers U.S. equity premium to 2.5%, adjusts international equity, and uses historical returns based on Federal Reserve data for fixed income returns.	8.26%	6.92%

Source: GAO analysis.

Notes: The equity premium is expressed here as the expected return of U.S. equities in excess of the long-term Treasury bonds. We used two equity premiums in our analysis: a 2.0 percent equity premium based on Holmer, Martin (2007) "PENSIM Analysis of Impact of Final Regulation on Defined-Contribution Default Investments;" and a 2.5 percent equity premium, which is the low end of estimates produced by Fama, Eugene and Kenneth French (2002), "The Equity Premium," The Journal of Finance. 57(2): 637-659.

International equities include emerging equities and non-U.S. equities. The consultant's assumptions characterizing the relationship between the expected returns on these assets and U.S. equity are contained in table 4.

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Fixed Income includes long-term U.S. treasury bonds and high-quality corporate bonds. The consultant's assumptions we used were 4.9% (long-term U.S. treasury bonds) and 5.6% (high-quality corporate bonds). Our assumptions for expected returns on fixed income securities are based on historical monthly data from the Federal Reserve Bank of St. Louis, representing 1953 to 2007 were 6.4% (Treasury bonds) and 7.2% (corporate bonds).

We used arithmetic returns in this analysis. Producing statistics for compounded returns at the portfolio level produced similar results.

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## Measuring Risks under Alternative Assumptions

To assess the sensitivity of the new allocation to greater or lesser levels of risk, we substituted common estimates of risk, where possible, as expressed as standard deviations for different asset classes, as shown in table 7. This analysis is meant to be illustrative and does not produce definitive estimates of future risk for either allocation. In our analysis, we retained the consultant's estimates of risk for those asset classes where other estimates were unavailable. In addition, we solved for the "critical value" of the standard deviation for fixed income and equities to identify the point at which the risks associated with the new allocation overlaps the risks of the previous allocation. In doing so, we found that when the standard deviation on high-quality corporate and long Treasury bonds is lowered by roughly 2 percent, the new allocation becomes riskier than the previous allocation. Similarly, when raising the standard deviation on equity by about 4.8 percent, the new allocation becomes riskier than the previous allocation.

To construct the standard deviation of the portfolio, we weighted the variance covariance matrix, such as in the following formula:

$$(2) \quad STD^P = \sqrt{\sum_j \sum_i w_i w_j \text{cov}(r_i, r_j)}$$

where  $STD^P$  is the standard deviation of the portfolio,  $w_i$  and  $w_j$  is percentage of the portfolio allocated to asset class i and j respectively, and  $\text{cov}(r_i, r_j)$  is the covariance of the returns of asset classes i and j. In equation (2)  $\text{cov}(r_i, r_j)$  represents the variance of the asset class—a measure of its returns' volatility. When i is not equal to j  $\text{cov}(r_i, r_j)$  represents the measure of the co-movements between the returns of asset classes i and j.



**Table 7: Sensitivity Analysis of Portfolio Risk**

GAO analysis		Standard deviation estimates (risk)	
		New allocation target	Previous allocation target
Baseline assumptions	Maintains all of the consultant's assumptions	8.90%	9.90%
GAO analysis 1: 1926 - 2006 Equity	Substitute estimates on the standard deviation on U.S. equity based on Ibbotson data for 1926-2006 (22%) for the consultant's assumption and adjusts other equities accordingly <sup>a</sup>	10.85%	10.67%
GAO analysis 2: 1997 - 2006 equity	Substitute estimates on the standard deviation on U.S. equity based on Ibbotson data for 1997-2006 (20%) for the consultant's assumption and adjusts other equities accordingly	10.27%	10.43%
GAO analysis 3: 1926 - 2006 fixed income	Substitute estimates on the standard deviation on fixed income assets based on Ibbotson data for 1926-2006 on long high-quality bonds and long Treasury bonds (8.5% and 9.2%) for the consultant's assumptions (11.2%) and 12.4%)	8.34%	7.73%
GAO analysis 4: 1997 - 2006 fixed income	Substitute estimates on the standard deviation on fixed income assets based on Ibbotson data for 1926-2006 on long high-quality bonds and long Treasury bonds (6.6% and 9.4%) for the consultant's assumptions.	8.32%	7.50%
GAO analysis 5: 1997 - 2006 fixed income and equities	Combines analysis 2 and analysis 4.	9.76%	8.15%
GAO analysis 6: JP Morgan assumptions	Substitute JP Morgan capital market assumptions on the standard deviation, returns and correlations for the consultant's assumptions except for certain alternative assets not covered by JP Morgan. <sup>b</sup>	8.75%	6.21%

Source: GAO analysis.

<sup>a</sup>Ibbotson data serve as a reference for U.S. capital market returns and are recognized as the industry standard for illustrating historical performance of different asset classes.

<sup>b</sup>JPMorgan, as a large asset and wealth manager, provide an alternative set of assumptions on the range of asset classes included in the PBGC's new allocation. According to JPMorgan Asset Management, the institution has assets under supervision of \$1.6 trillion and assets under management of \$1.2 trillion and more than 650 investment professionals providing over 200 different strategies spanning the full spectrum of asset classes, including equity, fixed income, cash liquidity, currency, real estate, hedge funds, and private equity.

The substitutions conducted under Analysis 6—utilizing JP Morgan's market assumptions—allowed us to test a larger set of the consultant's asset class assumptions, including the correlations between classes, which resulted in a greater difference in the standard deviations between the previous and new allocations. (JP Morgan's long-term capital market assumptions are displayed in tables 8 and 9.) Because JP Morgan's asset

classes do not align directly with the consultant's analysis, we retained the consultant's assumptions for some alternative assets, such as commodities and absolute return assets.<sup>4</sup> For consistency, we also retained the consultant's assumptions on emerging market debt in U.S. currency. To ensure that the relationships were sensible, we tested the correlation matrix and found that it was inconsistent<sup>5</sup>—some correlations (between a pair of asset returns) were invalid. We adjusted the matrix using standard techniques to obtain the nearest correlation matrix.<sup>6</sup> The results for the standard deviation were only slightly different—less than 0.04 percentage point for the previous and new allocations.

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<sup>4</sup>Absolute return assets are typically derivatives used to implement hedging strategies. The strategy seeks return through active asset allocation (at the asset class and country level) by using long and short positions, independent of a client's underlying asset allocation, investments, or benchmark restrictions. Neither commodities nor absolute return assets are a part of the new or old PBGC allocation.

<sup>5</sup>The correlation matrix had negative eigenvalues. Matrices with these properties are referred to as negative semi-definite and will impair portfolio optimization routines. Changing the assumptions of a correlation matrix can lead to a logically inconsistent matrix but this outcome is common even when actual historical correlations are used. In such cases the matrix must be corrected by the nearest valid correlation matrix that is positive semi-definite.

<sup>6</sup>We utilized Principal Components Analysis to correct the matrix. From the original correlation matrix, we determined the eigenvalues and matrix of eigenvectors ( $W$ ) and then executed the following steps: (1) use the eigenvalues as the main diagonal of a matrix  $A$  with the off diagonals equal to zero, (2) set the negative elements of  $A$  equal to zero, (3) determine the new correlation matrix as  $(W)(A)(W^{-1})$ , (4) and impose two conditions on the correlation matrix: the main diagonal should be equal to one and assets with a zero correlation should continue to be equal to zero (no information as to whether the correlation should be positive or negative), and (5) calculate the eigenvalues of the new matrix and determine if they are all positive. If not, increase the elements in the main diagonal of matrix  $A$  that were originally set to zero by a small amount and return to step 5. We concluded when the correlation matrix was positive semi-definite. The resulting correlation matrix was similar to the original matrix and the differences in the results were trivial.

**Appendix II: Description of GAO's Sensitivity Analysis**

**Table 8: JPMorgan Asset Management Long-term Capital Market Assumptions, Returns and Risk for Select Assets**

<b>Asset class</b>	<b>Compounded annual returns</b>	<b>Standard deviation (risk)</b>
Treasury inflation-protected securities	4.50%	5.09%
U.S. 10-year Treasury bonds	4.50%	4.46%
Long duration government/corporate bonds	5.50%	7.62%
U.S. aggregate (core fixed income)	5.25%	3.46%
High-yield bonds	7.50%	7.28%
Emerging market debt	7.00%	13.63%
U.S. equities	8.00%	14.80%
Non-U.S. equities	9.25%	17.78%
Emerging equities	9.50%	24.08%
Private real estate	7.00%	14.25%
Private equity	9.00%	22.95%

Source: JP Morgan Asset Management.

Note: JP Morgan's assumptions were augmented with some data from the consultant to ensure that our analysis could include some alternative asset classes. For non-U.S. equities, we use European Large Cap stock minus the United Kingdom.

**Table 9: JPMorgan Asset Management Long-term Capital Market Assumptions, Select Correlations**

<b>Asset</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>
1 Treasury inflation-protected securities	1.00										
2 U.S. aggregate (core fixed income)	0.80	1.00									
3 Long Treasury bonds	0.81	0.95	1.00								
4 Long high-quality bonds	0.81	0.95	1.00	1.00							
5 High-yield bonds	0.03	0.10	0.19	0.19	1.00						
6 Emerging market debt	0.18	0.15	0.17	0.17	0.48	1.00					
7 U.S. equities	-0.21	-0.21	-0.17	-0.17	0.49	0.54	1.00				
8 Non-U.S. equities	-0.25	-0.23	-0.18	-0.18	0.47	0.46	0.79	1.00			
9 Emerging equities	-0.11	-0.23	-0.18	-0.18	0.51	0.67	0.71	0.68	1.00		
10 Private real estate	0.13	0.05	0.08	0.08	0.34	0.37	0.31	0.27	0.33	1.00	
11 Private equity	-0.14	-0.14	-0.09	-0.09	0.56	0.49	0.61	0.63	0.70	0.33	1.00

Source: JP Morgan Asset Management.

Note: JP Morgan assumptions were augmented with some data from the consultant to ensure that our analysis could include some alternative asset classes. For non-U.S. equities we use European Large Cap stock minus the United Kingdom.

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## Limitations

As with any analysis of estimated future financial returns and risks, we faced certain limitations in conducting our work that may also have implications on the analysis conducted by PBGC's consultant.

### *Results are inherently imprecise estimates*

Projections of future outcomes based on key assumptions produce inherently imprecise estimates of funding ratios, asset returns, or market volatility.

### *Standard deviation is an imperfect proxy for risk*

Standard deviation, which analysts traditionally use as a proxy for market risk, measures volatility but cannot predict the full spectrum of risks facing a portfolio over time. Therefore, a calculation of standard deviation on various investment portfolios will not necessarily provide complete information of the risks associated with that portfolio or the appropriateness of an investment strategy for a particular individual or institution. For example, even if the standard deviation showed that PBGC's new portfolio was more volatile on a year-to-year basis than the portfolio under PBGC's previous policy, this does not necessarily mean that the new strategy is inappropriate or necessarily inferior when considering the potential for higher returns over a longer period of time. Another drawback of the standard deviation measure is its inability to differentiate between volatility when returns are positive, as opposed to when returns are negative.<sup>7</sup>

### *Inability to incorporate data on PBGC's liabilities*

When conducting our sensitivity analysis, we were only able to focus on PBGC's assets because of difficulties obtaining consistent data to combine the asset analysis with data on PBGC liabilities.<sup>8</sup> We acknowledge that a sensitivity analysis that incorporates PBGC's liabilities and funded

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<sup>7</sup>While it is mathematically possible to have higher standard deviations with no downside risk, the larger the variance in the return for a given asset, the more likely it will produce negative returns.

<sup>8</sup>PBGC's consultant could not provide us with the projected asset returns used to account for PBGC's liabilities. We attempted to gather information from PBGC's Pension Insurance Modeling System (PIMS), which is used to generate projections that forecast PBGC's funded status, but the asset returns provided by the consultant were not comparable, and we did not continue to pursue these lines of inquiry further given time and resource constraints.

position would provide a more complete picture of the risks that PBGC may face under the new investment policy. However, similar to our partial analysis, the PBGC's expected funded position will vary with changes in the major assumptions on asset returns, standard deviations, and correlations.

*Data on certain alternative assets have known limitations*

Data on private equity and emerging market data have several known limitations.

- Private equity

Managers of private equity funds are largely exempt from public disclosure requirements. As a result, available data on private equity returns are largely reported voluntarily by principal market participants and statistics generated from these data cannot be used to generalize about the entire private equity asset class.<sup>9</sup> Moreover, due to selective and infrequent reporting of private equity returns and potentially subjective valuations, the returns that are reported are likely overstated and standard deviations understated.<sup>10</sup> Research has shown that private equity funds vary widely in their valuation practices and that different private equity firms have different values for the same portfolio company during the same timeframe. The lack of widely accepted benchmarks for the private equity class limits the understanding of the risk, return and correlation characteristics of private equity and therefore, the role of private equity in a diversified portfolio. Therefore, the portfolio diversification benefits of private equity presented in the consultant's analysis may be less than the consultant assumed.<sup>11</sup>

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<sup>9</sup>Venture capital funds have opposed disclosing their internal rates of return and some have restricted the participation of limited partners that may disclose their investment strategy.

<sup>10</sup>While research showed that private equity as a class did not outperform public equivalent instruments or did not do so significantly, recent research suggests that private equity funds actually under-perform the S&P 500, net of fees. For example, see S. Kaplan and A. Schoar, "Private Equity Performance: Returns, Persistence, and Capital Flows," *Journal of Finance*, 90(4), 2005, or for an overview see L. Phalippou, "Investing in Private Equity Funds: A Survey," The Research Foundation on the CFA Institute, 2007.

<sup>11</sup>A recent Center for International Securities and Derivatives Markets' research paper noted that private equity investment can only provide limited diversification benefits as both the Private Equity and Venture Capital Indexes move together with the S&P 500. They generate the highest returns when U.S. markets performed well and exhibited the lowest returns when the S&P 500 experienced its worst returns over the 1990 to 2005 period.

- Emerging market assets

Recent market trends have challenged the notion that the U.S. markets are de-coupled from other financial markets in the world. Although there are limited historical data for emerging market assets, the data that are available suggest that correlations among emerging financial markets are unstable and emerging markets may, at times, be significantly correlated with U.S. markets. If further integration of global financial markets continues, the significance of these correlations could increase over time. It is possible that the actual correlation between emerging market assets and U.S. assets is higher than those suggested in the consultant's model. For example, in assuming a correlation between emerging market equity and U.S. equity markets, JP Morgan Asset Management assumed a correlation of 0.71, more than double the consultant's assumption of 0.3. Given this diversity of assumptions, it is important to test the sensitivity of the initial results to alternative, plausible possibilities. In addition, recent research has shown that, in general, the correlation among multiple asset classes appears to be inherently unstable.<sup>12</sup> Since correlations among assets are fundamental to portfolio construction and portfolio diversification, this limitation should also be carefully considered when interpreting the consultant's results.

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<sup>12</sup>See W. Coaker, "The Volatility of Correlation: Important Implications for Asset Allocation Decision," *Journal of Financial Planning*, February 2006.

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# Appendix III: Comments from the Pension Benefit Guaranty Corporation Board of Directors

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SECRETARY OF LABOR  
WASHINGTON, D.C. 20210

JUL - 8 2008

Mr. Gene Dodaro  
Acting Comptroller General  
United States Government Accountability Office  
Washington, DC 20548

Dear Mr. Dodaro:

I am responding on behalf of the Pension Benefit Guaranty Corporation (PBGC) Board to your request for comments on the Government Accountability Office's (GAO) draft report entitled "PBGC ASSETS: Implementation of New Investment Policy Will Need Stronger Board Oversight" (GAO-08-667). This letter provides our general comments concerning the draft report and our responses to the recommendations.

In 2007, GAO reported on the Board's oversight of the PBGC and documented the Board's efforts in this important area. I am pleased that GAO's latest report has again recognized the commitment of the Board to provide strong oversight over the PBGC. As the draft report states, my fellow Board members and I instituted a policy for regular review of the Investment Policy Statement with the first biennial review in 2004, again in 2006, and most recently this year. We are fully committed to strong oversight of the PBGC investment policy to ensure that the policy is implemented appropriately.

The Board maintained oversight of the implementation of the 2004 and 2006 investment policy revisions and approved the path the PBGC was taking to reach its investment targets. For a variety of reasons, the PBGC did not achieve the 15% - 25% equity investment target range set by the Board in 2004. The PBGC operated in a very dynamic financial environment during this period. Equity values rose very rapidly, making it harder to prudently sell sufficient amounts of equity assets quickly enough to reach the equity investment target range. This difficulty was compounded by the PBGC's trusteeship of billions of dollars in several very large terminated pension plans with assets heavily allocated to equities.

The Board and the Board Representatives asked for and received reports regarding the PBGC's efforts, and determined that the PBGC was taking prudent measures to comply with the investment policy under the circumstances. The Board considered these efforts as consistent with the goals of the investment policy and transition guidance in the policy.

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**Appendix III: Comments from the Pension  
Benefit Guaranty Corporation Board of  
Directors**

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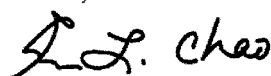
The current policy was adopted by the Board only after an extensive review process that began in mid-2007. The Director and the PBGC staff facilitated the Board's review of the Investment Policy Statement by engaging a consultant to provide a comprehensive review of the investment policy and to recommend alternatives for the Board's consideration. The Board was kept well-informed through the review process by the Board Representatives and the Director, and provided policy direction regarding the investment policy through its representatives. The resulting diversified investment policy is intended to help ensure the PBGC can meet its obligations to workers and retirees who rely on the PBGC for a secure retirement.

The recently revised PBGC bylaws and current Investment Policy Statement require the Board to review the PBGC's Investment Policy Statement at least every two years and to approve the policy at least every four years. The PBGC Director is responsible to the Board for the implementation and administration of the investment program, which includes keeping the Board and its representatives informed of implementation decisions regarding the Investment Policy Statement. The PBGC has already presented a preliminary implementation plan and has scheduled a more complete implementation briefing in early July.

The Board recognizes the importance of its oversight and accountability role. The Board already requires periodic reports on investment policy and takes seriously the importance of making sure that the PBGC staff adheres to implementation plans. The Board believes that the presentations by the PBGC and verbal agreement and informal guidance by the Board and the Board Representatives to the PBGC is appropriate oversight.

The Board is dedicated to overseeing the management of the PBGC's investment policy and to protecting the pension benefits of the 44 million Americans covered by the PBGC's insurance programs. We appreciate having had the opportunity to review and comment on the draft report.

Sincerely,



Elaine L. Chao  
Chair of the Board  
Pension Benefit Guaranty Corporation



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# Appendix IV: Comments from the Pension Benefit Guaranty Corporation

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Pension Benefit Guaranty Corporation  
1200 K Street, N.W., Washington, D.C. 20005-4026

Office of the Director

July 9, 2008

Ms. Barbara Bovbjerg, Director  
Education, Workforce, and Income Security Issues  
Mr. Thomas J. McCool, Director  
Center for Economics, Applied Research and Methods  
Government Accountability Office  
441 G Street, N.W.  
Washington, D.C. 20548

Dear Ms. Bovbjerg and Mr. McCool:

This responds to your request for management's comments on the Government Accountability Office (GAO) draft report, "PBGC ASSETS: Implementation of New Investment Policy Will Need Stronger Board Oversight" (GAO-08-667). Your work in reviewing this important policy area is appreciated.

As the draft report recognizes, PBGC's Board of Directors (Board) instituted a policy of biennially reviewing the Investment Policy Statement, with the first review in 2004 and the others following on schedule. GAO's June 2007 report on Board oversight also acknowledged that the current Board has been more active in its oversight of PBGC than in the past. The adoption of the new investment policy, as well as the Board's recent comprehensive revision of the PBGC by-laws, evidence this Board's ongoing commitment to strengthening PBGC.

## **BACKGROUND**

Any analysis of PBGC's investment policy must begin with a clear understanding of ERISA.

ERISA makes it clear that the United States Government does not stand behind the liabilities of the PBGC and that Congress does not want to be confronted with the need to allocate billions of dollars to fund PBGC's deficit. The previous policy was focused on asset-liability matching, or what the GAO report refers to as "protecting its deficit from volatility." Asset-liability matching was ultimately impossible, however, because the PBGC has approximately \$70 billion in liabilities and approximately \$55 billion in assets. "Protecting [our] deficit from liability" risked locking in the deficit and virtually assuring the need for an eventual Congressional bailout.

**INVESTMENT POLICY OBJECTIVE**

PBGC's investment policy is now founded upon the principle, adopted in the policy itself, that it is PBGC's responsibility to be able to meet its obligations. Thus, the policy does not focus on short-term, interest rate-driven snapshots of funded status. Rather, it seeks to "prudently maximize investment returns in order to meet the Corporation's current and future obligations." All investment policies entail risk. This policy's use of risk is prudent, and it achieves greater efficiency in its risk-return relationship.

**METHODOLOGY**

The process that supported the adoption of this policy was complete and robust. It included a thorough assessment of PBGC's long-term obligations to plan participants and beneficiaries, exhaustive discussion among numerous constituents, and in-depth analysis by leading industry experts, including PBGC's investment consultant, Rocaton Investment Advisors (Rocaton).

Rocaton and PBGC staff closely examined the characteristics of the Corporation's liabilities, including duration and key risk factors. A few months into the process, the Board Representatives and the Advisory Committee agreed upon the investment policy's long-term Objective and Guiding Principles. Rocaton then used an efficient frontier framework to evaluate hundreds of possible portfolios. From these hundreds of portfolios, Rocaton chose a sample set of 14 portfolios and subjected them to detailed stochastic analysis. This analysis uses Monte Carlo simulations to expose each portfolio to 5,000 different scenarios over a 20-year period.

Rocaton's asset/liability model quantified the relative merits and risks associated with different asset mixes, using the following metrics: 1) investment returns, 2) volatility of investment returns, 3) funded position over various periods, and 4) volatility of the funded position. These metrics were evaluated over short, intermediate, and long-term time frames. This analysis recognizes that PBGC faces significant uncertainty. For that reason, it considers a wide range of possible outcomes for each of these metrics. By considering these metrics under different scenarios, including: "best-case" (99<sup>th</sup> percentile), "expected" (50<sup>th</sup> percentile), and "worst-case" (1<sup>st</sup> percentile), we were able to evaluate the risk/return tradeoffs associated with different asset mixes and, therefore, determine an appropriate investment policy.

From the numerous portfolios analyzed, the new investment policy offered the most appropriate balance of liquidity, downside protection, and long-term return potential relative to the Corporation's obligations. Other key Rocaton findings included:

- The prior investment policy's focus on limiting the financial risk exposure arising from a mismatch of assets against liabilities had a very high opportunity cost while not adequately protecting PBGC from downside risk;

- The prior investment strategy was relatively undiversified and had a low likelihood of meeting PBGC's financial obligations over the long term;
- PBGC would increase the likelihood of meeting its financial obligations with a more diversified asset allocation strategy, expected to deliver higher returns and better downside protection over the long term; and
- Shifting some of PBGC's allocation from fixed income to equities and/or alternative asset classes would significantly improve PBGC's ability to strengthen its financial position and significantly improve PBGC's downside protection.

**RESPONDING TO RISKS**

GAO focused on the importance of fully understanding the risks involved in this policy, and we agree.

Standard deviation of asset returns, which the draft report discusses in detail, is one of the most commonly used calculations of risk. According to our calculations, the standard deviation of asset returns is actually lower in the current policy than in the prior policy. This is due to the fact that diversification mitigates risk. However, GAO is correct that different investment consultants and investment managers make differing assumptions regarding the correlation of asset classes and the likelihood of future investment returns, and it is clear that changing those assumptions produces different results. This is demonstrated by the fact that GAO used assumptions different than PBGC's assumptions in some of its analyses. Some of GAO's calculations concluded that the new policy had a higher standard deviation than the prior policy. More important than this insight, though, is the fact that none of the calculations offered by GAO results in a standard deviation higher than 10.85 percent. This is a number well within the mainstream of large institutional investment portfolios.

That figure would be completely consistent with the policy's objective stated above, that the Corporation seeks to "prudently maximize investment returns in order to meet its current and future obligations." The important question here is not whether JP Morgan or Rocaon or Ibbotson has the best assumptions. Rather, it is whether, as a matter of direction and magnitude, including all kinds of risks as well as return, the direction the Board has chosen – to prudently maximize the chance the Corporation can pay benefits when due – is the right direction for the Corporation.

Whether PBGC will have sufficient assets to pay benefits when due can be addressed by assessing "asset-only" returns and risks, funded status risk, and liquidity risk, as discussed below:

- “Asset-only” Returns and Risks

Rocaton performed its investment analysis using a Monte Carlo simulation tool. It used inputs, including capital market assumptions, to project a wide array of potential outcomes based on specified distributions and provided expected values and levels of variability associated with those expected values.

One of the most significant risks PBGC’s portfolio and liabilities face is interest rate risk. In addition to the thousands of outcomes allowed in Monte Carlo simulation, Rocaton also incorporated into its modeling a series of liability interest rates or “annuity shock factors” to address interest rate volatility, especially since PBGC’s annuity interest factor is not a market-based interest rate.

Rocaton’s analysis demonstrated that the new investment policy is far superior to one based on asset-liability matching. In particular, this policy, as compared to the prior policy, is expected to produce higher portfolio/“asset-only” returns with lower volatility.

The table below illustrates the substantially higher expected portfolio returns, on an “asset-only” basis, for the new policy as compared to the prior policy (7.7 % versus 5.7 %). The table also shows the reduced “asset-only” risk/standard deviation associated with the benefits of diversification (8.2 % versus 9.9 %).

**Comparative Analysis of “Asset-only” Risks and Returns**

	<u>New Policy</u>	<u>Prior Policy</u>	<u>Change</u>
Expected Asset Compound Return	7.7%	5.7%	2.0%
Expected Asset Risk (standard deviation)	8.2%	9.9%	(1.7%)

- Liquidity Risk

During this process, the Board requested a detailed analysis of cash flow risks. Rocaton’s liquidity analysis showed that, even for worst-case scenarios, the new investment policy will readily allow PBGC’s trust fund to meet the projected cash flow needs of the Corporation over the next 20 years. In fact, as shown in the attachment to this letter, even in the worst-case scenario for any single year during a twenty-year period, the maximum amount of PBGC’s trust funds needed to cover benefit payments and administrative expenses is only 13 percent. This does not even consider PBGC’s highly-liquid revolving fund which is invested solely in U.S. Treasury securities – currently valued at approximately \$15 billion.

- **Funded Status Risk**

The new investment policy is designed to focus, not on the volatility of funded status (or changes in the deficit), but on increasing the likelihood that PBGC will be able to meet its liabilities. An investment policy with a near-term focus on snapshots of funded status makes it harder to achieve that goal. Nonetheless, in the longer term, the most significant risk that PBGC faces is the risk that it will not be able to meet its liabilities (or that it will require a Congressional bailout in order to do so). This risk is best characterized as funded status risk, and we conducted comprehensive analysis of this risk.

The table below shows the impact of the new investment policy on PBGC's funded status in 20 years, indicating that the worst case scenario for funded status is far worse under the prior policy than under the current policy – a difference with a net present value over \$30 billion.

**Comparative Analysis of “Funded Status” Returns  
in the 20<sup>th</sup> year (In Millions)**

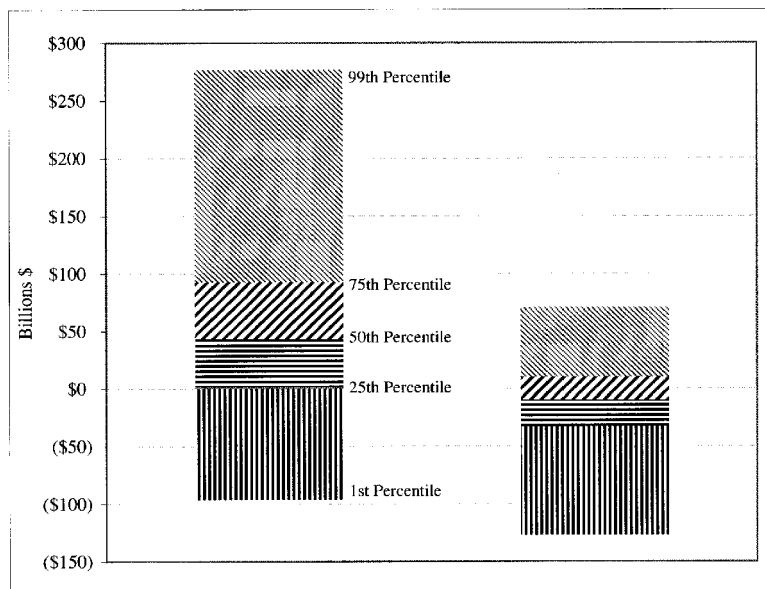
	<b><u>New Policy</u></b>	<b><u>Prior Policy</u></b>	<b><u>Change</u></b>
Best-Case (99 <sup>th</sup> percentile)	\$276,953	\$70,807	\$206,146
Expected (50 <sup>th</sup> percentile)	\$43,549	(\$9,809)	\$53,358
Worst-Case (1 <sup>st</sup> percentile)	(\$95,875)	(\$126,907)	\$31,032

The standard deviation of funded status is also relevant. Under a policy of asset-liability matching one would expect that the standard deviation of the funded status – the degree to which the assets and liabilities move together or apart – would be lower than in a policy like this one, which is not based on asset-liability matching. That is the case here. The standard deviation of funded status was 7.7 percent in the prior policy and is 10.9 percent in the new policy.

However, this does not conclude the analysis. The range of possible outcomes is broader under the new policy than the old, and this is why the standard deviation number is higher. Standard deviation is a limited tool, though, because it only measures the range of highest to lowest outcomes. It does not distinguish between higher upside and lower downside.

As indicated in the chart above, the prior policy had a much more significant downside risk. This can also be shown by the bar chart below which shows the range of outcomes for funded status (the standard deviation). The bar for the prior policy has a narrower range, but a lower minimum point.

A Comparison of the Range of Outcomes for  
Funded Status in the 20<sup>th</sup> Year



Funded Position (\$ millions)- 20 years

Percentile	New Policy	Prior Policy
99th (Best)	\$276,953	\$70,807
75th	\$92,687	\$10,475
50th (Expected)	\$43,549	(\$9,809)
25th	\$2,138	(\$32,805)
1st (Worst)	(\$95,875)	(\$126,907)

**Appendix IV: Comments from the Pension Benefit Guaranty Corporation**

**SENSITIVITY ANALYSES**

PBGC agrees with GAO that many different advisers can have many different assumptions and that varying assumptions can sometimes vary outcomes.<sup>1</sup> To that point, we asked Goldman Sachs to perform a supplemental comparative analysis. Goldman Sachs indicated that their sensitivity analysis used varied investment assumptions (e.g., return, risk, and correlations) from alternative sources to assess the likely performance of both the prior and the new investment policy in terms of projected investment return and risk outcomes.<sup>2</sup>

The following table and graph present Goldman Sachs's analysis and illustrate the impact of using different sets of capital market assumptions. The important point this chart shows is that even with five varied sets of assumptions, the returns, the Sharpe ratios, and the ultimate asset growth are all dramatically superior in the new investment policy under each scenario.

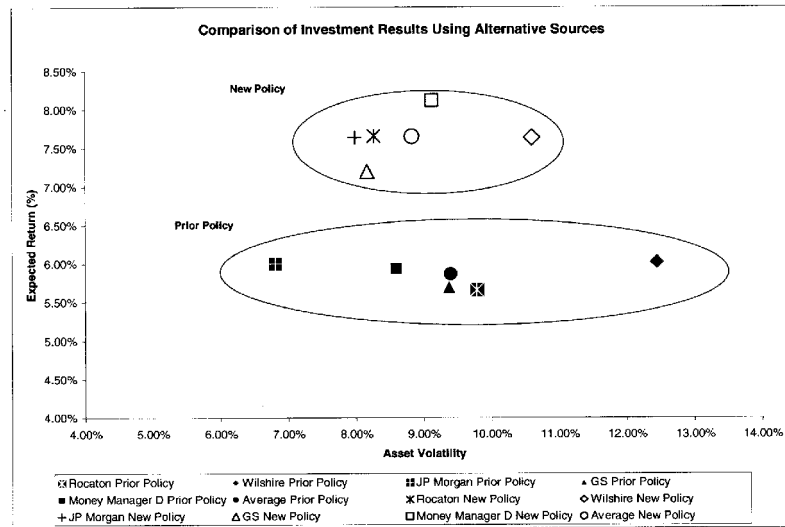
<u>Firm</u>	<u>Policy</u>	<u>Expected Return</u>	<u>Asset Volatility</u>	<u>Sharpe Ratio</u>	<u>Incremental Asset Increases</u>
Rocaton	Prior	5.66%	9.78%	0.18	\$61B
	New	7.66%	8.26%	<b>0.46</b>	<b>\$83B</b>
Wilshire	Prior	6.02%	12.44%	0.16	\$65B
	New	7.64%	10.59%	<b>0.34</b>	<b>\$83B</b>
JP Morgan	Prior	6.00%	6.80%	0.29	\$65B
	New	7.64%	7.98%	<b>0.46</b>	<b>\$83B</b>
Goldman Sachs	Prior	5.70%	9.37%	0.18	\$62B
	New	7.20%	8.16%	<b>0.39</b>	<b>\$78B</b>
Money Manager (D)	Prior	5.94%	8.59%	0.23	\$64B
	New	8.12%	9.12%	<b>0.45</b>	<b>\$88B</b>

**Note:** The last column represents estimates of incremental asset increases at the end of a 20-year period under the new and prior investment policies, based on the following two assumptions: 1) simple returns are used in lieu of compound returns, and 2) PBGC's annual cash inflows approximately offset the annual cash outflows.

<sup>1</sup> Varying assumptions can affect the results of any sensitivity analysis. However, those changed return and correlation assumptions must be applied consistently to the same underlying assets as the assets found in the portfolio that is being evaluated. JP Morgan's 10-year duration fixed income assumptions were used to evaluate PBGC's prior policy. It would be more accurate to have used JP Morgan's 15-year duration fixed income assumptions, because PBGC's prior policy actually had a 15-year duration fixed income portfolio. An analysis that uses 10-year duration understates the total risk of the portfolio under the prior investment policy. In addition, Ibbotson's fixed income assumptions were also based on a shorter duration index (approximately 12 years as compared to 15 years).

<sup>2</sup> Goldman Sachs's sensitivity analysis incorporated assumptions provided by JP Morgan that are consistent with the actual duration of the PBGC portfolio under the prior policy.

**Appendix IV: Comments from the Pension Benefit Guaranty Corporation**



One final point about risk and return is relevant here. Both GAO and the Congressional Budget Office (CBO) have recognized that the new investment policy is likely to result in higher returns (draft report, pp. 5, 23; CBO letter, April 24, 2008). In addition, both express concern that this policy may invest in assets that are riskier than the assets in which PBGC previously invested. However, the concern that any observer should have is not for the risk of a particular asset class, but the risk of the entire portfolio. The substantial diversification and risk mitigation of the new policy can best be demonstrated by an investment measurement tool that was not focused on in the draft report – the Sharpe ratio.

The Sharpe ratio, like all investment measurement tools, has its limitations, but it is the most commonly utilized measurement of the risk/return efficiency of a portfolio, demonstrating excess return per unit of risk. A higher Sharpe ratio indicates a more efficient use of risk. It is important to note that in every analysis of every portfolio, reviewed here or anywhere in the GAO draft report, whether utilizing assumptions provided by Rocaton, JP Morgan, Goldman Sachs or other sources, the Sharpe ratio is higher for the new policy than for the prior policy.



**CONCLUSION**

PBGC pursued a robust process, considering and measuring numerous risks faced by this or any investment policy. Hundreds of portfolios were tested; this policy and many others were each subject to testing against the variation in 5,000 economic scenarios. The policy selected takes better advantage of PBGC's long-term investment horizon and utilizes the benefits of diversification to mitigate risk. Our calculations indicate that the "asset-only" return standard deviation and the worst-case funded status risk are both superior in the new policy. All calculations have indicated that the Sharpe ratio of the new policy is superior to that of the prior policy.

The sensitivity analysis that was done for PBGC, based on varying assumptions, also indicates a standard deviation that meets the objective of the new policy to "prudently maximize investment returns in order to meet the Corporation's current and future obligations." Finally, PBGC agrees with GAO that sensitivity analyses are important, and we will continue to perform them going forward.

With nearly 44 million workers and retirees relying on PBGC's insurance programs, the new investment policy is of critical importance. Again, we appreciate your work and that of staff on this important topic, and we look forward to working with GAO as we progress.

Sincerely,



Charles E.F. Millard

Attachment

**Appendix IV: Comments from the Pension  
Benefit Guaranty Corporation**

Attachment

**PBGC's Cash Needs, under the Worst-Case Scenario, as a Percentage of PBGC's Trust Fund Assets over a 20-year Period under the New Investment Policy (in millions)**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	
<b>Sources of Cash</b>																					
Trust Asset (Reg. Of Year)	\$ 39,420	\$ 45,272	\$ 44,100	\$ 45,548	\$ 42,970	\$ 45,674	\$ 48,092	\$ 46,779	\$ 56,490	\$ 55,855	\$ 59,093	\$ 62,630	\$ 69,815	\$ 66,469	\$ 49,946	\$ 42,954	\$ 38,974	\$ 46,086	\$ 32,173	\$ 38,960	
Premiums	\$ 1,381	\$ 1,356	\$ 1,280	\$ 1,320	\$ 1,361	\$ 1,448	\$ 1,479	\$ 1,575	\$ 1,581	\$ 1,635	\$ 1,679	\$ 1,886	\$ 1,869	\$ 1,848	\$ 2,222	\$ 2,063	\$ 2,150	\$ 2,197	\$ 2,250	\$ 2,438	
<b>Uses of Cash</b>																					
Trust Benefit Payments	\$ 2,610	\$ 2,862	\$ 3,069	\$ 3,254	\$ 3,362	\$ 4,043	\$ 4,715	\$ 4,597	\$ 5,431	\$ 5,332	\$ 5,762	\$ 6,443	\$ 7,146	\$ 7,367	\$ 5,507	\$ 4,469	\$ 3,910	\$ 5,166	\$ 3,675	\$ 4,564	
Administrative Expenses	\$ 398	\$ 404	\$ 418	\$ 418	\$ 418	\$ 418	\$ 418	\$ 418	\$ 418	\$ 418	\$ 428	\$ 439	\$ 460	\$ 461	\$ 473	\$ 485	\$ 497	\$ 509	\$ 522	\$ 535	
Trust Assets (End of Year)	\$ 45,272	\$ 44,100	\$ 45,548	\$ 42,970	\$ 45,674	\$ 48,092	\$ 46,779	\$ 56,490	\$ 55,855	\$ 59,093	\$ 62,630	\$ 69,815	\$ 66,469	\$ 49,948	\$ 42,954	\$ 36,974	\$ 46,086	\$ 32,173	\$ 38,960	\$ 25,815	
Cash Flow	7.2%	7.9%	8.1%	8.8%	8.8%	9.6%	10.7%	10.7%	10.4%	10.3%	10.5%	11.0%	10.9%	11.8%	12.0%	11.5%	11.9%	12.3%	13.0%	13.1%	

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# Appendix V: GAO Contacts and Staff Acknowledgments

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## GAO Contacts

Barbara Bovbjerg (202) 512-7215 or [bovbjergb@gao.gov](mailto:bovbjergb@gao.gov)

Thomas J. McCool (202) 512-2642 or [mccoolt@gao.gov](mailto:mccoolt@gao.gov)

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## Acknowledgments

Blake Ainsworth, Assistant Director, and Sara L. Schibanoff, Analyst-in-Charge, managed this assignment. Other staff who made key contributions throughout the assignment are Joseph Applebaum; Susan Bernstein; Lawrance Evans, Jr.; Kimberley M. Granger; Kenrick Isaac; Gene Kuehneman; Jonathan S. McMurray; Marc Molino; Jose Oyola; Jeremy Schwartz; and Craig Winslow.

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# Related GAO Products

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*Pension Benefit Guaranty Corporation: Governance Structure Needs Improvements to Ensure Policy Direction and Oversight.* [GAO-07-808](#). Washington, D.C.: July 6, 2007.

*High-Risk Series: An Update.* [GAO-07-310](#). Washington, D.C.: January 2007.

*Private Pensions: The Pension Benefit Guaranty Corporation and Long-Term Budgetary Challenges.* [GAO-05-772T](#). Washington, D.C.: June 9, 2005.

*Highlights of a GAO Forum: The Future of the Defined Benefit System and the Pension Benefit Guaranty Corporation.* [GAO-05-578SP](#). Washington, D.C.: June 2005.

*Private Pensions: Questions Concerning the Pension Benefit Guaranty Corporation's Practices Regarding Single-Employer Probable Claims.* [GAO-05-991R](#). Washington, D.C.: Sept. 9, 2005.

*Private Pensions: Recent Experiences of Large Defined Benefit Plans Illustrate Weaknesses in Funding Rules.* [GAO-05-294](#). Washington, D.C.: May 31, 2005.

*Pension Benefit Guaranty Corporation: Structural Problems Limit Agency's Ability to Protect Itself from Risk.* [GAO-05-360T](#). Washington, D.C.: Mar. 2, 2005.

*Pension Benefit Guaranty Corporation: Single-Employer Pension Insurance Program Faces Significant Long-Term Risks.* [GAO-04-90](#). Washington, D.C.: Oct. 29, 2003.

*Pension Benefit Guaranty Corporation: Long-Term Financing Risks to Single-Employer Insurance Program Highlight Need for Comprehensive Reform.* [GAO-04-150T](#). Washington, D.C.: Oct. 14, 2003.

*Pension Benefit Guaranty Corporation: Single-Employer Pension Insurance Program Faces Significant Long-Term Risks.* [GAO-03-873T](#). Washington, D.C.: Sept. 4, 2003.

*Pension Benefit Guaranty Corporation Single-Employer Insurance Program: Long-Term Vulnerabilities Warrant 'High Risk' Designation.* [GAO-03-1050SP](#). Washington, D.C.: July 23, 2003.

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**Related GAO Products**

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*Pension Benefit Guaranty Corporation: Appearance of Improper Influence in Certain Contract Awards.* [GAO/T-OSI-00-17](#). Washington, D.C.: Sept. 21, 2000.

*Pension Benefit Guaranty Corporation: Contracting Management Needs Improvement.* [GAO/HEHS-00-130](#). Washington, D.C.: Sept. 18, 2000.

*Improving Financial Condition of the Pension Benefit Guaranty Corporation and Insured Pension Plans.* [GAO/HEHS-99-37R](#). Washington, D.C.: Dec. 18, 1998.

*Pension Benefit Guaranty Corporation: Financial Condition Improving, but Long-Term Risks Remain.* [GAO/HEHS-99-5](#). Washington, D.C.: Oct. 16, 1998.

*High-Risk Series: An Overview.* [GAO/HR-95-1](#). Washington, D.C.: February 1995.

*High-Risk Series: Pension Benefit Guaranty Corporation.* [GAO/HR-93-5](#). Washington, D.C.: December 1992.

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