United States General Accounting Office

GAO

Report to Congressional Requesters

February 2003

PRIVATE PENSIONS

Process Needed to Monitor the Mandated Interest Rate for Pension Calculations

GAO

Accountability * Integrity * Reliability

GAO-03-313

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Highlights

Highlights of GAO-03-313, a report to Congressional Requesters

Why GAO Did This Study

Employers with defined benefit plans have expressed concern that low interest rates were affecting the reasonableness of their pension calculations used to determine funding requirements under the Employee Retirement and Income Security Act of 1974 (ERISA). ERISA requires employers to use a variation of the 30-year Treasury bond rate for these calculations; however, in 2001 Treasury stopped issuing the 30-year bond. This report provides information on (1) what characteristics of an interest rate make it suitable for determining current liability and lump-sum amounts; (2) what alternatives to the current rate might be considered; and (3) how using an alternative rate might affect plan participants, employers, and the Pension Benefit Guaranty Corporation (PBGC).

What GAO Recommends

GAO is not recommending executive action. However, in order to allow the Congress an opportunity to respond expeditiously to changes in interest rates that might affect the reasonableness of defined benefit pension calculations, the Congress may wish to consider providing the cognizant regulatory agencies (the Department of the Treasury, PBGC, and the Department of Labor) the authority to jointly adjust the rate within certain boundaries as specified under the law.

www.gao.gov/cgi-bin/getrpt?GAO-03-313.

To view the full report, including the scope and methodology, click on the link above. For more information, contact Barbara Bovbjerg at (202) 512-7215 or bovbjergb@gao.gov.

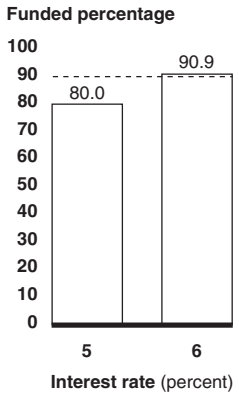
What GAO Found

GAO analysis indicates the Congress intended that the interest rates used in current liability and lump-sum calculations should reflect the interest rate underlying group annuity prices and not be vulnerable to manipulation by interested parties. In 1987, 30-year Treasury bond rates appeared to have both of these characteristics. However, the Department of the Treasury stopped issuing new 30-year Treasury bonds in 2001.

Actuaries and other pension experts have proposed a number of alternative interest rates, including alternatives based on interest rates set in various credit markets—including composite rates for long-term Treasury securities, long-term high-quality corporate bond indices, 30-year rates on securities issued by government-sponsored enterprises, such as Fannie Mae, 30-year interest rate swap rates—and PBGC interest rate factors based on surveys of insurance company group annuity purchase rates. Each alternative has attributes that may make it more or less suitable as an interest rate for the calculation of current liabilities, PBGC premiums, and lump-sum amounts. Additionally, the relationship of any interest rate to the underlying group annuity purchase rates may change over time and, unless the relationship is periodically evaluated, the Congress may be unable to appropriately respond to those changes.

If the alternative interest rate selected to replace the current statutory rate immediately results in a higher interest rate level, which is likely, it would generally lower participant lump-sum amounts, lower minimum employer funding requirements, and reduce PBGC premium revenue. However, if the alternative interest rate produces a lower interest rate level, plan participants would generally receive larger lump sums, some employers would need to increase contributions to their plans, and PBGC may experience an increase in revenue.

Effect of a 1-Percentage Point Increase in the Interest Rate on the Funded Percentage of a Hypothetical Defined Benefit Plan with a Typical Participant Distribution



Source: GAO calculations.

Note: At 90 percent funded and above for current liability, the plan is not subject to the deficit reduction contribution, which is the portion of the minimum funding requirements that uses the 30-year Treasury rate.

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Abbreviations

ACLI	American Council of Life Insurers
ERISA	Employee Retirement Income Security Act of 1974
FNMA	Federal National Mortgage Association
GSE	government-sponsored enterprises
IRC	Internal Revenue Code
IRS	Internal Revenue Service
LIBOR	London Interbank Offer Rate
PBGC	Pension Benefit Guaranty Corporation

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Accountability * Integrity * Reliability

United States General Accounting Office
Washington, DC 20548

February 27, 2003

The Honorable George Miller
Ranking Minority Member
Committee on Education and the
Workforce
House of Representatives

The Honorable Robert Andrews
Ranking Minority Member
Subcommittee on Employer-Employee
Relations
Committee on Education and the Workforce
House of Representatives

In 2001, groups representing employers with defined benefit plans expressed concern that low interest rates were affecting the reasonableness of their pension calculations.[1] Under the Employee Retirement Income Security Act of 1974 (ERISA), as amended, and the Internal Revenue Code (IRC), these calculations affect how much employers are allowed or required to contribute to their pension plans, how much employers must pay to the Pension Benefit Guaranty Corporation (PBGC) for federal insurance of the benefits promised by the plan,[2] and how much plan participants receive when pension benefits are distributed in a lump sum.[3] When making such calculations, the laws

[1]Under defined benefit plans, formulas set by the employer determine employee benefits. Defined benefit plan formulas vary widely, but benefits are frequently based on participant pay and years of employment. Because defined benefit plans promise to make payments in the future, employers must use present value calculations to estimate the current value of promised benefits. Present value calculations reflect the time value of money—that a dollar in the future is worth less than a dollar today, because the dollar today can be invested and earn interest. The calculation requires an assumption about the interest rate, which reflects how much could be earned from investing today's dollars.

[2]PBGC is a federal corporation created by ERISA to insure pension benefits, up to certain limits set by law, of participants in most qualified defined benefit pension plans. PBGC takes over defined benefit plans that are terminated with insufficient assets to pay the benefits to which participants are entitled.

[3]Generally, defined benefit plan participants receive benefits in periodic payments, called "annuities," starting at retirement and ending at the beneficiary's death. However, under certain circumstances, defined benefit plans may provide all promised benefits in a single lump-sum payment.

require that employers use interest rates on 30-year Treasury bonds, or interest rates that are based on 30-year Treasury bond rates. Specifically, the laws require employers to use

- an interest rate from within a permissible range of a 4-year weighted average of 30-year Treasury bond rates to calculate a plan's total liability, termed the plan's current liability, and to use that calculation to assess its funding level.[4] If plans are funded below certain thresholds as defined in the IRC, employers are to determine minimum contribution amounts on the basis of those assessments.[5] If a plan is fully funded as defined in the law, employers are precluded from making additional tax-deductible contributions to the plan.[6]

[4]In 1987, a permissible range meant a rate of interest that was not more than 10 percent above, and not more than 10 percent below, the weighted average of the rates of interest on 30-year Treasury bond securities during the 4-year period ending on the last day before the beginning of the plan year. The weighted average rate is calculated as the average yield over 48 months with rates for the most recent 12 months weighted by 4, the second most recent 12 months weighted by 3, the third most recent 12 months weighted by 2, and the fourth weighted by 1. The top of the permissible range was gradually reduced by 1 percent per year beginning with the 1995 plan year to not more than 5 percent above the weighted average rate effective for plan years beginning in 1999. The top of the permissible range was temporarily increased to 20 percent above the weighted average rate for 2002 and 2003. A plan's total liability is calculated for benefits earned through the valuation date.

[5]Under the special minimum funding rule, a single-employer plan sponsored by an employer with more than 100 employees in defined benefit plans is subject to a deficit reduction contribution for a plan year if the value of the plan's assets is less than 90 percent of its current liability. However, a plan is not subject to the deficit reduction contribution if (1) the value of plan assets is at least 80 percent of current liability and (2) the value of the plan assets was at least 90 percent of current liability for each of the 2 immediately preceding years or each of the second and third immediately preceding years. See 26 U.S.C. 412(l).

[6]The full funding limit is generally defined as the excess, if any, of (1) the lesser of (a) the accrued liability under the plan, including normal cost, or (b) 170 percent of the plan's current liability, over the value of the plan's assets. Additionally, the full-funding limit is never below the excess, if any, of 90 percent of a plan's current liability over the value of the plan's assets. See 26 U.S.C. 404(a)(1) and 26 U.S.C. 412(c)(7). Current and accrued liability differ in that current liability is limited to benefits that participants and beneficiaries have accrued to date, while accrued liability is generally based on projected benefits. This current liability full-funding limit was originally 150 percent of current liability but started being phased out in 1999. It will be repealed for plan years beginning in 2004 and thereafter. Even if a plan's assets are at the full-funding limit, the employer can contribute and deduct the amount, if any, to bring assets up to 100 percent of current liability.

- the interest rate on 30-year Treasury bonds to assess a plan's funding level and, if required, pay an additional premium, termed the variable-rate premium, to PBGC for federal insurance of their plan's benefits.[7]
- the interest rate on 30-year Treasury bonds to determine the minimum and maximum values of lump-sum distributions, and whether a benefit can be distributed as a lump sum without a participant's consent.[8] When determining the minimum lump-sum distribution payable, the 30-year Treasury rate is the highest rate that an employer can use in making the calculation.

Generally, the interest rates specified in the law were intended, within certain parameters, to reflect the price an insurance company would charge to take responsibility for the plan's pension payments.[9] The price that insurance companies would charge employers for this service reflects current interest rates, the expected mortality and retirement rates of participants for the plans they are considering, and the insurance companies' expected expenses and required profit. These factors may be expressed as a single rate, called the group annuity purchase rate, which is the interest rate underlying the actual group annuity price. In the late 1990s, when fewer 30-year Treasury bonds were issued and economic conditions increased demand for the bonds, the 30-year Treasury rate diverged from other long-term interest rates, an indication that it also may have diverged from group annuity purchase rates. In 2001, Treasury stopped issuing these bonds altogether, and in March 2002, the Congress enacted temporary measures to alleviate employer concerns that low interest rates on the remaining 30-year Treasury bonds were affecting the

[7]An additional premium is required if the plan has unfunded vested benefits using a statutorily specified interest rate.

[8]Under IRC, if a participant ceases to be employed by the employer maintaining the plan, the plan may distribute the participant's benefit as a lump sum without the consent of the participant, if the present value of the benefit does not exceed a specified amount (currently $5,000). Internal Revenue Service regulations provide plans with various options for specifying the 30-year Treasury bond interest rate to be used under the plan, such as the period for which the interest rate will remain constant and the use of averaging.

[9]For example, by placing limits on the range of rates that employers might use as an interest rate for calculating current liabilities, the Congress effectively prevented employers from choosing a rate that reflects insurance company prices should it result in an interest rate outside the permissible range.

reasonableness of the interest rate for employer pension calculations.[10] To help the Congress decide what, if any, additional measure to take, you asked us to determine: (1) what characteristics of an interest rate would make it suitable for determining current liability and lump-sum amounts; (2) what alternatives to the current interest rate might be considered; and (3) how using an alternative rate might affect plan participants, employers, and PBGC.

To determine the characteristics of a suitable interest rate, we reviewed pension laws and their legislative history with respect to the calculation of current liability and lump-sum amounts. We also interviewed Labor, Treasury, and PBGC officials who might play a role in assessing alternative interest rates. To identify and examine the advantages and disadvantages of potential alternative interest rates, we interviewed representatives and reviewed documents from a number of government, actuarial, pension plan sponsor, and investment entities. We also compared rates and other market statistics for suggested alternative debt securities with rates for 30-year Treasury bonds from 1987 to 2002. To determine how alternative rates might affect employers, plan participants, and PBGC, we created hypothetical examples, based on discussions with actuaries and pension consultants, in which we tested the effect of changes in rate levels on current liabilities and lump-sum payments. We did not assess alternative methods for specifying interest rates. For example, we did not assess whether the interest rate for current liability calculations should be specified as a 4-year weighted average or current market rate. Our scope and methodology is explained more fully in appendix I.

Results in Brief

Our analysis of the law and related congressional documents, and discussions with PBGC and Treasury officials, indicate that the interest rates used in current liability and lump-sum calculations were to have two characteristics. They were to: (1) reflect group annuity purchase rates and (2) not be vulnerable to manipulation by interested parties. In 1987, 30-year Treasury bond rates appeared to have both of these characteristics. While group annuity purchases are private transactions and information about actual group annuity rates is not available, several

[10]The Job Creation and Worker Assistance Act of 2002 expanded the permissible range of the statutory interest rate for current liability calculations for plan years beginning after December 31, 2001, and before January 1, 2004. Similarly, the act increased the statutory interest rate for PBGC variable-rate premium calculations for plan years beginning during the same time period. See section 405 of P.L. 107-147, Mar. 9, 2002.

actuaries said that, in 1987, 30-year Treasury bond rates appeared to be reasonably close to actual group annuity purchase rates. Additionally, 30-year Treasury bonds were actively traded in large markets, which meant that interested parties could not easily manipulate their rates. Also, federal agencies collected and compiled trade information for Treasury securities and published their rates, which provided further assurance that rates could not be manipulated.

Actuaries and other pension experts have proposed a number of alternative interest rates for pension calculations. Most alternatives were based on interest rates set in various credit markets—including composite rates for long-term Treasury securities; long-term, high-quality corporate bond indices; 30-year rates on securities issued by government-sponsored enterprises (GSEs), such as Fannie Mae; and 30-year interest rate swap rates. One alternative, PBGC interest rate factors, was based on surveys of insurance company group annuity purchase rates. Each alternative has characteristics that may make it more or less suitable as an interest rate for current liability and lump-sum calculations. During periods of financial uncertainty, for example, Treasury rates' proximity to group annuity purchase rates might be adversely affected if investors' demand for risk-free securities increases, causing Treasury rates to decline relative to other long-term rates. On the other hand, the market is well established and Treasury debt has the backing of the federal government, and, therefore, its rates may be considered more trustworthy than other alternatives. In contrast, insurance companies offering group annuities tend to invest their premium income in corporate debt rather than in other securities, and have a similar credit rating to GSEs and interest rate swap rates. Therefore, rates on these securities might better track changes in group annuity purchase rates, but private rates might be perceived to be more vulnerable to manipulation or more complex than Treasury rates. The PBGC interest rate factors were specifically developed to approximate group annuity purchase rates. However, PBGC interest rate factors are based on confidential surveys, and PBGC's rate calculations are not published or independently verified, which might make them more vulnerable to manipulation than other alternatives. For any of the market-based interest rates, the relationship to group annuity purchase rates may change over time. Unless the relationship is periodically evaluated, the Congress may be unable to appropriately respond to those changes.

If the alternative interest rate selected to replace the current rate results immediately in a higher rate level, which is likely, it would generally lower participant lump-sum amounts, lower minimum employer funding requirements, and reduce PBGC premium revenue. A higher interest rate

lowers each of these amounts because it increases the value of today's dollars, relative to future dollars, and therefore fewer of today's dollars should be needed to pay benefits in the future. However, if the alternative interest rate produces a lower rate level, plan participants would receive larger lump sums, some employers would need to increase contributions to their plans, and PBGC may experience an increase in revenue. The magnitude of these effects would depend on the characteristics of the plan and its participants and how the rate is specified in the law. For example, if the rate were to increase and a high percentage of the participants in the plan were far from the plan's normal retirement age, the percentage decrease in employer contributions would be greater than if the participants were closer to retirement or already retired. Additionally, if the Congress specifies the interest rate differently for current liability and lump-sum calculations, as is currently the case, the magnitude of the impact on each could differ.

Because the choice of the statutory interest rate has important implications for federal revenue, employer cash flow, and participant retirement income, this report contains matters for congressional consideration concerning the ability of the Congress to respond expeditiously to changes that may affect the relationship between the interest rate and group annuity purchase rates.

Background

Interest rates are key assumptions in calculating the present value of promised future pension benefits.[11] When interest rates are lower, more money is needed today to finance future benefits because it will earn less income when invested. At a 6-percent interest rate, for example, a promise to pay $1.00 per year for the next 30 years has a present value of about $14. If the interest rate is reduced to 1.0 percent, however, the present value of $1.00 per year for the next 30 years increases to about $26 because the $26, when invested, will earn the relatively small income associated with a 1-percent interest rate. Therefore, lower interest rate assumptions result in higher current liability and lump-sum amounts.

The interest rate appropriate for measuring the present value of a plan's pension liabilities may differ depending on a number of factors, including

[11]Other important assumptions in estimating the value of plan benefits include the mortality and retirement rates for plan participants because those rates determine the expectation that each future benefit payment will be made and the expected starting date of benefit payments, respectively.

the purpose of the measurement. For example, the interest rate appropriate for measuring the present value of a plan's pension liabilities on an ongoing basis may reflect the assumed rate of return that the plan is expected to achieve on the investment of its assets.[12] On the other hand, the interest rate appropriate for measuring the present value of that same plan's pension liabilities at plan termination may reflect interest rates implicit in annuity purchase rates.[13]

Before ERISA, few rules governed the funding of defined benefit plans, and there were no guarantees that participants would receive promised benefits. When the pension plan of a major automobile manufacturer failed in the 1960s, for example, thousands of defined benefit plan participants lost their pensions. As part of ERISA, the Congress established PBGC to pay pension benefits in the event that an employer could not. In addition to establishing PBGC, ERISA and IRC require employers to make minimum contributions to under-funded plans and prevent employers from making tax-deductible contributions to plans exceeding specified funding limits.[14]

Subsequently, concerns were raised about the potential claims that PBGC might face from the termination of plans that had insufficient assets to pay promised benefits. In an effort to improve plan funding and protect PBGC, IRC funding rules were amended in 1987 to require that employers show they were accumulating sufficient funds should they need to terminate their plan and contract with an insurance company to take responsibility for future pension payments. The 1987 amendment required that employers calculate each plan's current liability as the sum of the present values of each participant's accrued benefits,[15] and to calculate the present

[12]Recently, a number of issues have been raised concerning the interest rate that should be used for measuring pension liabilities. See, for example, Lawrence N. Bader and Jeremy Gold, Reinventing Pension Actuarial Science, The Pension Forum, Society of Actuaries, (Schaumberg, IL, forthcoming) at *http://www.soa.org/sections/reinventing_pension.pdf*.

[13]Selection of Economic Assumptions for Measuring Pension Obligations, Actuarial Standard of Practice Number 27, Actuarial Standards Board, Dec. 1996.

[14]Employers are generally subject to an excise tax for failure to make required contributions or for making contributions in excess of the greater of the maximum deductible amount or the ERISA full-funding limit.

[15]Accrued benefits are benefits that plan participants have earned based on past service. Accrued benefits may be vested, in which case plan participants have a nonforfeitable right to them, or nonvested, in which case participants have not yet completed qualification requirements for the benefits. In a voluntary plan termination, participants become fully vested in their accrued benefits.

values as if the plan were to terminate at the end of the plan year. To make this calculation, the amendment stated that the interest rate used under the plan shall be: "consistent with the assumptions which reflect the purchase rates which would be used by insurance companies to satisfy the liabilities under the plan."[16] The law also stated that the selected interest rate must be within a specified range of a weighted average of interest rates on 30-year Treasury bonds. The Conference Committee report accompanying the amendment stated, however, that the specified range was not intended to be a "safe harbor" with respect to whether the interest rate is reasonable. The report stated:

> ". . . the determination of whether an interest rate is reasonable depends on the cost of purchasing an annuity sufficient to satisfy current liability. The interest rate is to be a reasonable estimate of the interest rate used to determine the cost of such annuity, assuming that the cost only reflected the present value of the payments under the annuity (i.e., and did not reflect the seller's profit, administrative expenses, etc.). For example, if an annuity costs $1,100, the cost of $1,100 is considered to be the present value of the payments under the annuity for purposes of the interest rate rule, even though $100 of the $1,100 represents the seller's administrative expenses and profit. In making the determination with respect to the interest rate . . . other factors and assumptions (e.g., mortality) are to be individually reasonable."[17]

In 1987, the range of permissible interest rates was from 10-percent below to 10-percent above the weighted average 30-year Treasury bond rate. In 1994, IRC was amended to reduce the upper limit of the permissible range of interest rates from 10 percent to 5 percent above weighted average rate.[18] The House Report accompanying the bill stated that the 1987 legislation was intended to address the chronic under-funding of pension plans that had persisted since passage of ERISA.[19] However, when measuring current liability, plans could decrease contributions by choosing an interest rate at the high end of the range. According to the report, the highest allowable interest rate was reduced to 105 percent to minimize a plan's ability to decrease its current liability through the choice of interest rates.

[16]Section 9307(e)(1)(5)(B)(iii)(II) of P.L. 100-203, Dec. 22, 1987.

[17]Omnibus Budget Reconciliation Act of 1987, Conference Report to Accompany H.R. 3545, House of Representatives Report 100-495 at 846 and 868, Dec. 21, 1987.

[18]The amendment phased in the change in the upper limit to 105 percent over several years.

[19]Retirement Protection Act of 1994, House Report No. 103-632(II), Aug. 26, 1994.

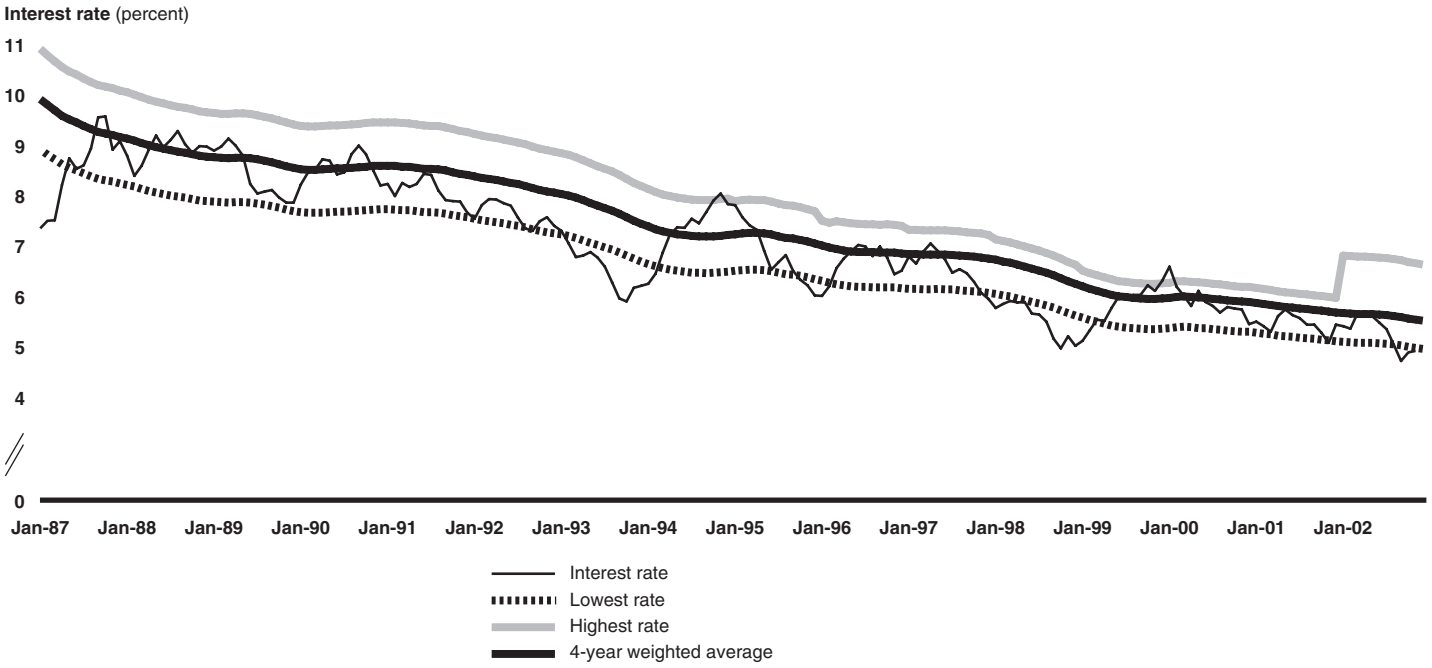
Additionally, in 1994, IRC was amended to require that employers determine the minimum value of certain optional forms of benefit, such as lump sums, using an interest rate no higher than the interest rate for 30-year Treasury bonds. To prevent employers from exceeding the maximum lump-sum payment specified by law,[20] IRC also required employers to use an interest rate no lower than 30-year Treasury bond rates when calculating lump sums for certain highly paid employees. The Congress enacted the amendment for a number of reasons, including to ensure that rates for determining lump-sum payments better reflected prices in the insurance annuity market.[21]

Figure 1 shows, for 1987 to 2002, the range of allowable rates for current liability calculations and the allowable interest rates for lump-sum calculations. In November 2002, for example, the interest rate for 30-year Treasury bonds was 4.96 percent. That month, the 4-year weighted average rate for 30-year Treasury bonds was 5.58 percent, and the range of allowable interest rates for current liability calculations was 5.02 percent to 6.70 percent.

[20]The maximum lump sum cannot exceed the present value of the maximum annual benefit permitted by IRC (for a participant retiring at age 65 in 2003, the lesser of $160,000 a year or 100 percent of the participant's average compensation for the high 3 years).

[21]In addition to changing the required interest rate to 30-year Treasury bond rates, the amendment required employers to use a mortality table based on the prevailing commissioners standard table used to determine reserves for group annuity contracts. See Section No. 767, P.L. 103-465, Dec. 08, 1994, and H.R. Rep. No. 632(II), Aug. 26, 1994.

Figure 1: Interest Rates and Weighted Average Rates on 30-Year Treasury Bonds and Highest and Lowest Allowable Interest Rates for Current Liability Calculations, 1987 to 2002



Source: Federal Reserve Board and IRS.

Note: In 2002, IRC was amended to increase the highest allowable rate to 120 percent of the 4-year weighted average.

Interest Rate Should Reflect Group Annuity Purchase Rates

Our analysis of the law and related congressional documents, and discussions with PBGC and Treasury officials, indicates that the interest rates used in current liability and lump-sum calculations were to have two characteristics. They were to: (1) reflect group annuity purchase rates and (2) not be vulnerable to manipulation by interested parties. Because actual group annuity purchase rates are unknown, the Congress specified rates to regulate an employer's selection of an interest rate. While 30-year Treasury rates may have been close to group annuity purchase rates in 1987, PBGC was not aware of any available studies that documented that proximity. Officials said that, in addition to their possible proximity to group annuity purchase rates, the Congress adopted 30-year Treasury bond rates as the basis for interest rates because they could not be easily manipulated by interested parties. In this regard, Treasury bonds were actively traded in large markets and interest rate data for them were available from government sources, which helped ensure that the rates accurately represented market conditions and could not be easily manipulated by

interested parties. However, the Department of the Treasury stopped issuing new 30-year Treasury bonds in 2001.

Information on Actual Group Annuity Purchase Rates Is Not Available

Information needed to determine actual group annuity purchase rates is not available because annuity purchases are private transactions between insurance companies and employers who terminate their pension plan. To terminate a defined benefit plan, an employer determines the benefits that have been earned by each participant up to the time of plan termination and purchases a single-premium group annuity contract from an insurance company, under which the insurance company guarantees to pay the accrued benefits when they are due. The insurance company determines the employer's premium by analyzing participant demographics and making assumptions about a number of variables, including:

- **Interest rates**. The assumed interest rate is used to determine the present value of projected benefit payments and costs at the annuity purchase date. Rates reflect current market rates for the securities in which the company is likely to invest the premium paid by the plan: generally fixed income securities, such as corporate bonds and mortgage-backed securities, with a relatively low credit risk.[22] Interest rate assumptions may vary according to a number of factors at plan termination, including the projected cash flow of the plan and the yield curve on relevant securities.[23](See app. II.) Interest rates are adjusted to produce the insurer's target level of capital requirements and profits from the annuity.
- **Mortality rates**. The assumed mortality rate reflects death rates associated with known or assumed characteristics of the participant

[22]Insurance companies may be able to achieve a somewhat higher rate of return than indicated by publicly traded securities, at a given credit risk, by lending money privately and holding investments to maturity.

[23]Projected cash flows are the expected payments to retired and nonretired participants taking into account their expected mortality and adjusted for the expected commencement dates for nonretired participants. A yield curve shows how current interest rates vary with the term to maturity of securities that would be used to finance the cash flow.

population, with some adjustments to account for future potential improvements in mortality.[24]

- **Administrative expenses, taxes, and other costs**. Administrative expenses for annuities include the cost of setting up accounts and tracking payments. Many insurers assume a flat rate for each annuitant in pricing some administrative expenses, such as account set-up charges. Some insurers reduce their interest rate assumption to account for those expenses.

Information about insurance company assumptions, or premium payments and projected benefits, would be needed to estimate actual group annuity purchase rates; however, this information is often not available publicly.[25] For example, employers who decide to terminate their pension plans typically contact a broker or consultant who then solicits bids for a group annuity contract from qualified insurance companies. Insurance companies bid on the contract through the broker or consultant. Negotiations or an auction may take place, which may further affect the price. Insurance companies typically do not disclose assumptions made during this process.

[24]According to a survey of insurance companies for a Society of Actuaries research project, all companies adjusted their mortality by projection to the current date, and most companies projected future improvement. Surveys indicate that insurance companies use several mortality tables, including the 1994 Group Annuity Reserving and 1994 Group Annuity Mortality tables. *See* Victor Modugno, "30-Year Treasury Rates and Defined Benefit Plans," in *30-Year Treasury Rates and Defined Benefit Plans*, a special report commissioned by the Society of Actuaries (2001), *www.soa.org/sections/pension_research.html* (downloaded Dec. 12, 2002), 3. *See also* Ryan Labs, Inc., "Pension Financial Management and Valuation Discount Rates," in *30-Year Treasury Rates and Defined Benefit Plans*, a special report commissioned by the Society of Actuaries (2001), *www.soa.org/sections/pension_research.html* (downloaded Dec. 12, 2002), 27.

[25]Insurance company actuaries said that variations in plan provisions and insurance company assumptions with respect to early retirement and ancillary benefits may preclude an accurate determination of actual group annuity purchase rates, even if the buy-out price and basic plan information were disclosed. They also said, however, that a periodic survey of insurance company assumptions could be useful in assessing the designated interest rate.

Thirty-Year Treasury Bonds Had Desirable Characteristics, but Are No Longer Issued

Thirty-year Treasury bonds had several desirable characteristics when they were selected to approximate group annuity purchase rates in 1987. For example, the American Academy of Actuaries said that in 1987, the 30-year Treasury bond rate plus 0.3 percentage points (30 basis points[26]) would have replicated group annuity purchase rates.[27] This would indicate that the difference between the rate of return on 30-year Treasury bonds and the typical insurance company investment (such as long-term, high-quality corporate bonds) approximated the expenses and other annuity pricing factors that insurance companies would consider. The extent to which 30-year Treasury bond rates maintained their proximity to group annuity purchase rates would depend upon how closely Treasury rates continued to approximate insurance company investment rates of return, after adjusting them for expected administrative expenses and other annuity pricing factors.

Additionally, policymakers said that 30-year Treasury bond rates were selected as the interest rate in 1987 in part because interested parties could not easily manipulate Treasury rates. Two characteristics of 30-year Treasury bonds that would indicate their rates could not be easily manipulated were their "transparency" and "liquidity."

- **Thirty-year Treasury bond rates were transparent.** For a rate to be transparent, information about it must be widely available and frequently updated. The Federal Reserve Board of Governors, using data provided by the Department of the Treasury, published information on 30-year Treasury rates. The Department of the Treasury constructed 30-year Treasury bond rates using data collected from private vendors and reviewed and compiled by the Federal Reserve Bank of New York.
- **Thirty-year Treasury bonds were liquid.** For a bond to be liquid, the market in which it is traded must be large and active so that isolated events or erratic behavior by a single market participant are unlikely to have a major effect on market prices. According to a senior market analyst, the 30-year Treasury bond market in 1987 was likely the deepest and most liquid market in low risk 30-year bonds in the world.

[26]A basis point is one-hundredth of a percent.

[27]Jon Parks and Ron Gebhardtsbauer, *Alternatives to the 30-Year Treasury Rate*, a public statement by the Pension Practice Council of the American Academy of Actuaries (July 27, 2002), *www.actuary.org/pdf/pension/rate_17july02.pdf* (downloaded Dec. 12, 2002), 8.

While 30-year Treasury bonds had several favorable characteristics when they were selected to approximate group annuity purchase rates, their issuance has since been suspended. The 30-year Treasury bond rates that are currently used as an interest rate for pension calculations are published by the Internal Revenue Service (IRS) based on rates for the last 30-year Treasury bonds, which were issued in February 2001.

Alternative Interest Rates Have Advantages and Disadvantages Compared with Treasury Bond Rates

Actuaries and others have proposed a number of alternatives that could be used to control the selection of interest rates for current liability and lump-sum calculations, including (1) interest rates set in credit markets for various securities, such as long-term Treasury securities; long-term, high-quality corporate bonds; 30-year GSE bonds; and 30-year interest rate swaps; and (2) PBGC interest rate factors based on surveys of insurance company group annuity purchase rates. As shown in table 1, each alternative has characteristics that affect its likelihood of approximating group annuity purchase rates over time and its potential vulnerability to manipulation. For example, the closer an alternative's interest rate levels match the net return on investment of insurance companies offering group annuities, the more likely that alternative will match group annuity purchase rates. Similarly, the closer the underlying credit rating of an alternative matches that of an insurance company offering group annuities, the more likely that alternative will match group annuity purchase rates.

Table 1: Characteristics of Proposed Alternatives that Affect Their Suitability as an Interest Rate for Pension Calculations

	Interest rates determined by credit markets				
Feature	**Long-term Treasury securities**	**Long-term, high-quality corporate bonds**	**30-year GSE securities**	**30-year interest rate swaps**	**PBGC interest rate factors**
Closeness of relationship to group annuity purchase rates, based on insurance company investments or credit rating	During periods of financial uncertainty, may fall below group annuity purchase rates because of increased demand for Treasury securities.	While insurance companies are believed to invest largely in corporate bonds, may need to deduct for expenses and profit.	Credit rating comparable to or higher than insurance companies that offer group annuities.	Comparable credit rating and not callable.	Study indicates rate levels were close for some plans between 1994 and 1997. Constructed from surveys of insurance companies' group annuity purchase rates, but includes information from only two surveys annually.
Vulnerability to manipulation	Government rate, based on highly visible trading data in well-established, active market.	Large market overall, but different issuing companies, quality, and cash structures segment market. New reporting system likely to increase availability of trading data, but rates based more on price estimates than on trades.	Market has perceived backing of federal government. Effort by Federal National Mortgage Association (Fannie Mae) to increase availability of information underlying rates. Current market for Fannie Mae benchmark debt not very large or well traded.	Very large, active market, with rates based on daily survey of rates offered on new contracts. However, concern about low market volume at long maturities. Relatively new market, perhaps more difficult to understand.	Rates based on confidential survey and market representation of respondents is unknown. PBGC calculations are not published or independently verified.

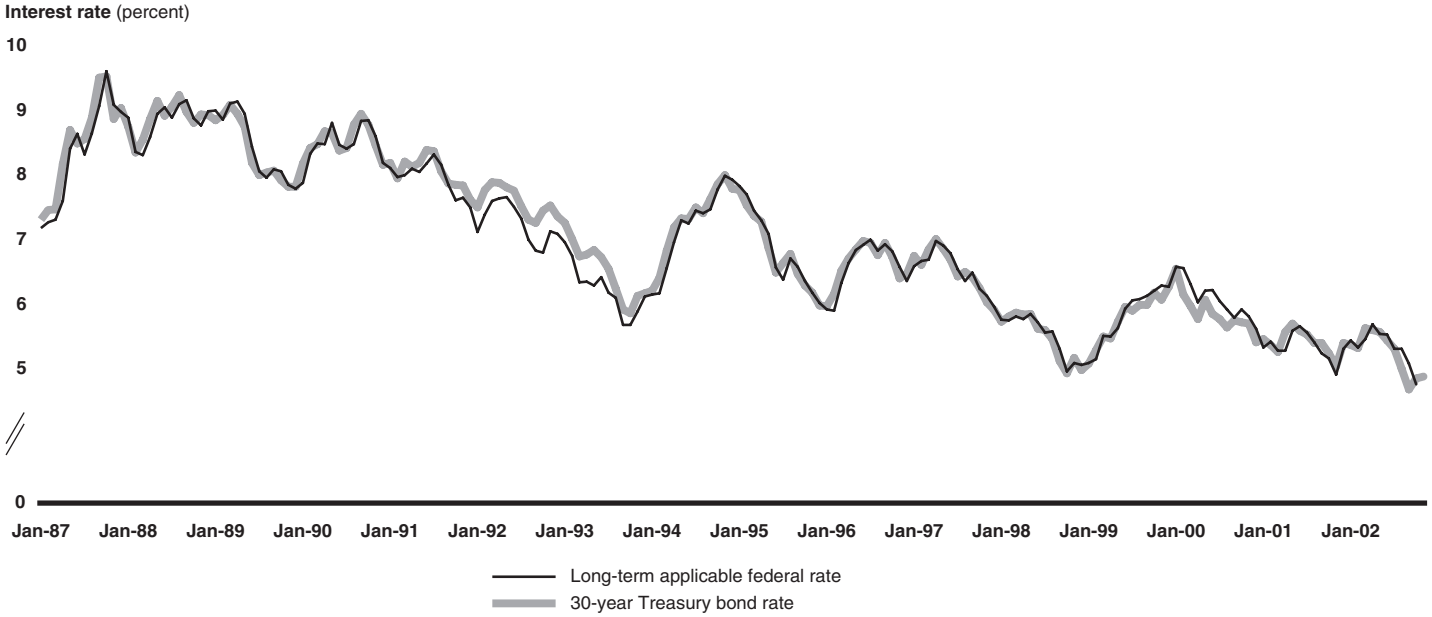
Source: GAO analysis.

Various calculations can be applied to any interest rate to make it more suitable for its intended use. For example, each of the alternatives could be specified as: (1) a single monthly interest rate, which is currently the case for lump-sum calculations; (2) a corridor of interest rates around the 4-year weighted average of a monthly rate, which is currently the case for current liability calculations; or (3) a yield curve. According to several actuaries and others, specifying the alternative as a yield curve, instead of a single rate or corridor of rates around a weighted average rate, would have advantages and disadvantages. For example, specifying a yield curve might enable each plan to more closely approximate its group annuity purchase rate, but doing so might increase the difficulty of plan calculations and could prove relatively costly for small plans.

Long-Term Treasury Securities

The Department of the Treasury continues to construct rates for long-term bonds that could be used as a basis for selecting interest rates for current liability and lump-sum calculations. For example, the Treasury Department constructs a rate, called the long-term applicable federal rate, which approximates Treasury's borrowing costs for securities with maturities exceeding 9 years. IRS publishes applicable federal rates. Figure 2 compares the long-term applicable federal and 30-year Treasury bond rates from 1987 to 2002. As can be seen, the differences between the two rates are generally less than 50 basis points.

Figure 2: Annual Long-Term Applicable Federal Rate and 30-Year Treasury Bond Rate, 1987 to 2002



Source: Department of the Treasury and Federal Reserve Board of Governors.

According to actuaries, insurance companies typically place group annuity premiums in fixed-income investments that have a higher rate of return than 30-year Treasury bonds. Treasury rates are lower than rates for other fixed-income investments of the same maturity because Treasury bonds have a lower credit risk.[28] The proximity of Treasury bond rates to group annuity purchase rates may vary with changes in investor attitudes about credit risk. During periods of financial uncertainty, for example, investors may have a sharply heightened desire for safety, often referred to as a "flight to quality," which could cause Treasury rates to decline relative to rates for other securities. Some investment analysts believe that one such period began toward the end of the 1990s.

Despite concerns that long-term Treasury bond rates may not track closely with group annuity purchase rates during periods of financial uncertainty, Treasury bond rates retain some characteristics that may continue to make them a desirable interest rate. The government constructs the rates,

[28]Credit risk is the potential that borrowers will be delinquent or default on their obligations.

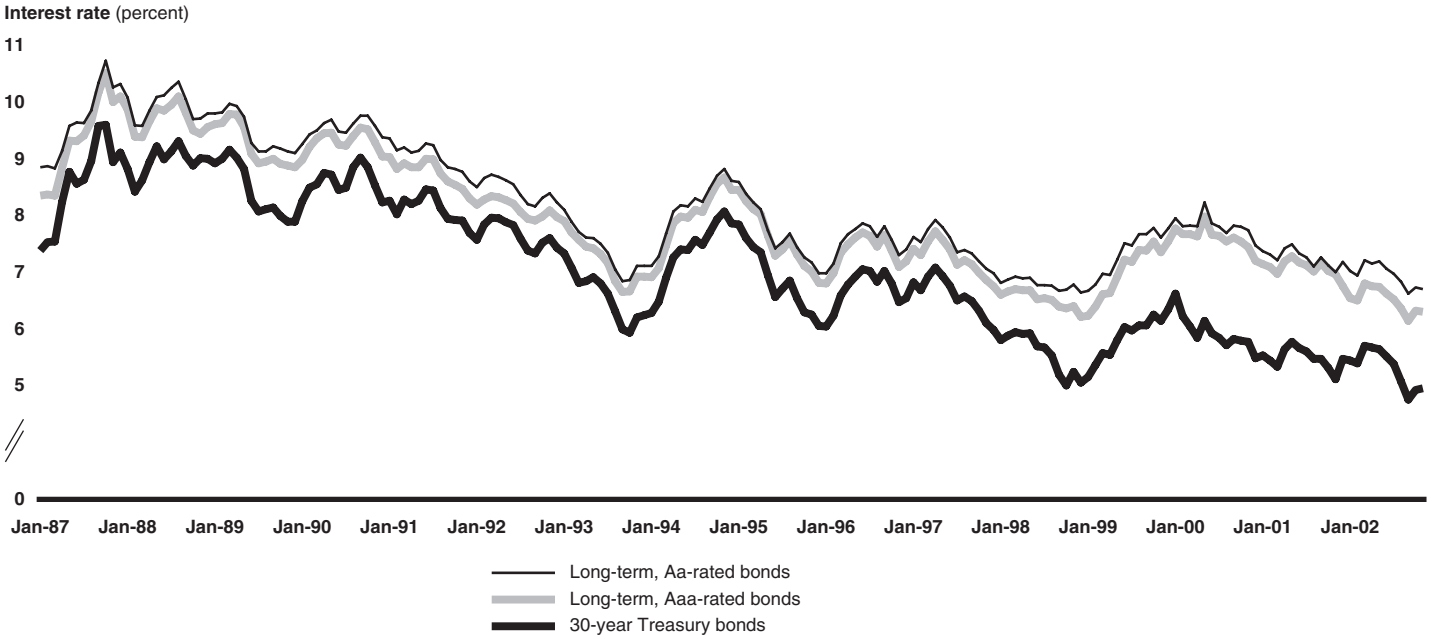
and they are based on trades in large, active, and highly visible markets. For example, debt securities markets have shifted to the 10-year Treasury note to serve some of the same long-term benchmark functions as the 30-year Treasury bond has served in the past.

Long-Term High-Quality Corporate Bond Index Rates

Various financial investment firms construct indices of interest rates for long-term, high-quality corporate bonds, which are debt securities with maturity of 10 years or more issued by companies with relatively low credit risk.[29] Figure 3 compares interest rates for the highest-quality corporate debt (bonds rated Aaa by Moody's Investor Services), high-quality corporate debt (bonds rated Aa), and 30-year Treasury bonds for the period 1987 to 2002. As can be seen, corporate bonds with a Aa rating have higher interest rates than corporate bonds with a Aaa rating and 30-year Treasury bonds.

[29]Companies that issue debt typically have a "credit rating" based on an assessment of its probability of making promised payments. A number of companies, including Moody's and Standard & Poor's, issue widely accepted credit ratings of different companies.

Figure 3: Long-Term, High-Quality Corporate Bond and 30-Year Treasury Bond Rates, 1987 to 2002



Source: Moody's Investor Services and Federal Reserve Board of Governors.

Several actuaries and plan sponsor groups have suggested using one or more indices for long-term, high-quality corporate bond rates as the basis of an interest rate, while others suggest that these indices require adjustments before they can be used. Because insurance companies tend to invest in long-term corporate debt, these rates may track changes in group annuity purchase rates. An industry representative said that an unadjusted average of the indices would reflect insurance company expenses and other group annuity pricing factors because insurance companies typically achieve a higher rate of return on investment than is indicated by high-quality corporate bond rates. For example, investing in lower-quality bonds and private loans might achieve a higher rate of return than investing in high-quality corporate bonds. According to some actuaries, however, the indices would need to be adjusted for insurance company expenses and other factors before they would reflect the level of group annuity purchase rates. For example, a study for the Society of Actuaries said that a long-term corporate bond index rate minus 70 basis

points would reasonably approximate group annuity purchase rates.[30] However, the ERISA Industry Committee recommended using an average of corporate bond indices published by four firms as the interest rate without such an adjustment. Some actuaries and other pension experts have suggested that rates on some corporate bond indices might also need to be adjusted to make allowances for certain options before the rates would reflect the level of group annuity purchase rates. For example, corporate bonds are typically "callable," meaning that the issuer can recall a bond before its maturity date. Because this creates some uncertainty to the holder of a corporate bond, this may also increase corporate bond rates relative to group annuity purchase rates.

Corporate bond indices have properties that make them difficult to manipulate, but the corporate bond market may not be as liquid and transparent as the Treasury bond market. While the investment-grade corporate bond market is very large overall, with over $700 billion in issuance in 2001 and an estimated $4 trillion in outstanding value as of the third quarter of 2002, the market is segmented by differences in credit quality and issuer characteristics and, therefore, is less liquid than a large unsegmented market such as the market for Treasury securities. Additionally, interest rates for specific corporate bonds are based on quotes by traders, who usually estimate the current trading value of a bond and quote a rate based on its spread versus a comparable Treasury security. However, information on which to base corporate bond quotes is expected to become more widely available through a National Association of Security Dealer's reporting system, which was launched in July 2002 and reports many large recent transactions. The new system may not alleviate all transparency concerns. Some financial experts said that corporate bonds are not as highly traded as other debt securities, which means that recent trades are often not available to verify current market conditions and rates.

Certain corporate bond indices also have unique characteristics and complexities that could affect their suitability as an interest rate. Corporate bond indices are put together by private financial companies, which then compute an interest rate for the index based on underlying

[30]The study used the 30-year Bloomberg A3 index of industrial bonds for the analysis. See Victor Modugno, *30-Year Treasury Rates*, *6*. According to the American Academy of Actuaries, the Bloomberg A3 index rate is close to the rate for Moody's Aa-rated bonds because it is option adjusted. For example, the rates are adjusted to eliminate the call provision. See Parks and Gebhardtsbauer, *Alternatives*, 4.

interest rates of the component bonds. Financial companies differ in how publicly they share information on which bonds they include in an index, how they weight component interest rates, and other factors and calculations that influence the published rate. Further, the reliability of the corporate indices can be affected by the reliability of the data source—actual transactions, quotes, or estimates of values or yields—on which they are based.

Thirty-Year Rates on GSE Securities

Thirty-year rates on securities issued by GSEs are rates on bonds used to finance home ownership and other public policy goals. GSEs are private corporations, such as Federal National Mortgage Association (also known as Fannie Mae), that have the implicit backing of the U.S. government. In 1998, Fannie Mae began issuing debt through its benchmark program, which is intended to be high-quality, noncallable, actively traded debt. Fannie Mae attempts to issue benchmark debt periodically and in large amounts, similar to how Treasury issued 30-year bonds in the past.

Several pension experts have suggested using 30-year Fannie Mae bond rates as the basis for the interest rate. Because GSE securities have received a credit rating comparable to, or higher than, the credit rating of the insurance companies that offer group annuities, GSE rates may approximate group annuity purchase rates. GSE-issued debt is generally of the highest credit quality but not considered credit-risk free like Treasury securities. Therefore, GSE rates would typically be expected to fall between Treasury rates and high-quality corporate rates of comparable maturity.

Fannie Mae benchmark 30-year bond rates have properties that indicate a low likelihood that interested parties could manipulate them, but the securities have a relatively small market and relatively low trading activity compared with the Treasury and corporate bond markets. Outstanding volume of 30-year Fannie Mae benchmark debt was $14.9 billion as of December 2002, which was significantly less than the $589 billion in outstanding Treasury bonds as of November 30, 2002, and $4 trillion in outstanding long-term corporate bonds. According to Federal Reserve data of market transactions by primary dealers, trading in long-term GSE debt, which includes securities besides Fannie Mae benchmark debt, has been approximately $1.1 billion per day in 2002, which is much less than long-term Treasury securities. According to some experts, GSE debt is expected to continue to grow. With regard to transparency, Fannie Mae has also recently increased the availability of information on trades

underlying the rates on its securities, which should increase rate transparency.

Thirty-Year Interest Rate Swaps Rate

Thirty-year interest rate swap rates are fixed rates in a contract between two parties, one of whom agrees to make fixed interest payments based on a specified amount of money in exchange for interest payments based on variable short-term rates on the same specified amount of money for the duration of the contract. For example, one party might agree to pay a 5 percent annual fixed rate on $1 million every year for the next 30 years in exchange for receiving a published 3-month interest rate that changes periodically for the next 30 years on the same $1 million. The 30-year swap rate in this case would equal 5 percent, and the predominant 30-year swap rate should move up and down with the expected level of short-term interest rates over the next 30 years. The "notional" amount of money ($1 million in the example) does not typically change hands between the counter parties in a swaps contract, and unlike most other fixed-income markets, interest-rate swaps do not involve the issuance of debt. By entering into a swap contract, the party that agreed to make fixed interest rate payments can help offset potential risk from variable-rate debt that it issues by making fixed interest payments in exchange for variable-rate payments. The variable-rate payments that it receives under the agreement can then be used to pay its debt holders. If interest rates go up, the debt issuer pays higher debt service payments but also receives higher interest payments from the swap agreement.

Several pension experts have considered using 30-year interest rate swap rates as the basis for current liability and lump-sum calculations. Interest-rate swaps contracts are generally perceived to contain low credit risk for two reasons. First, the two parties involved in the contract typically have high credit ratings. Second, swap contracts typically use the London Interbank Offer Rate (LIBOR) as the floating rate, and the LIBOR has a low credit risk. The overall credit quality underlying LIBOR-based, interest-rate swap rates is likely comparable to that of high-quality corporate bonds. However, unlike some corporate bonds, swaps are not callable, so their rates would not need to be adjusted for such options and typically would be expected to fall below those on high-quality corporate bonds of similar maturity. The credit rating of insurance companies in the group annuity market is generally Aa or better. Interest rate swaps might give an accurate indication of an insurance company's cost of borrowing funds.

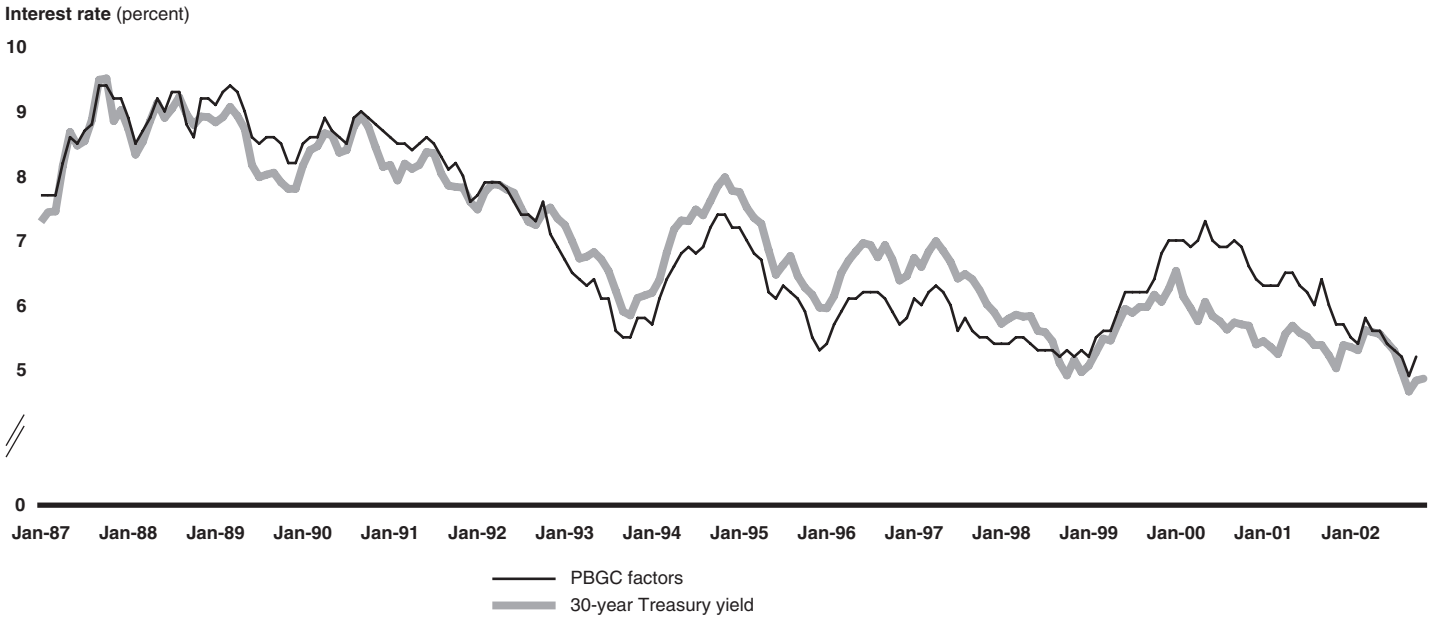
The interest rate swap market has characteristics that likely protect rates from potential manipulation. The swap market is considered to be very

active, although the trading volume and amount outstanding for longer maturity interest rate swaps are believed to be low, relative to shorter maturities. The Federal Reserve Board publishes 30-year interest rate swap rates daily based on a private survey of quotes on new contracts offered by 16 large swaps dealers, and quotes on swaps contracts are updated throughout the day and visible via subscription services. A unique advantage of using swaps as an interest rate is that swaps do not require the issuance of debt; rather, swap rates reflect contracts between two parties. Because new contracts are produced every day, it is easier to update 30-year swap rates than other rates involving the issuing of debt, which happens only periodically. The international swaps market represents the largest of the alternatives considered, with an outstanding dollar-denominated value of swaps contracts estimated at approximately $20 trillion, with many new transactions conducted between parties every day. However, some experts have expressed concern about using the 30-year interest rate swaps because the swaps market is relatively new and the outstanding trading volume of 30-year interest rate swaps is believed to be much lower than for shorter maturity contracts.

PBGC Interest Rate Factors

Of all the alternative rates, PBGC's interest rate factors have the most direct connection to group annuity purchase rates. Figure 4 shows that the proximity of PBGC interest rate factors to 30-year Treasury bond rates varied from 1987 through 2002.

Figure 4: PBGC Interest Rate Factors and 30-Year Treasury Bond Rates, 1987 to 2002



Source: PBGC and Federal Reserve Board of Governors.

Note: PBGC interest rate factors have been set back 2 months because published rates reflect interest rates approximately 2 months earlier. Additionally, PBGC factors from 1987 to 1993 were adjusted by PBGC to reflect the same mortality table that was used to determine the factors after 1993. Also, PBGC publishes two factors, one for the first 20 years to 25 years of a valuation period, and another for the remaining years. The figure shows factors for the first part of the valuation period.

PBGC interest rate factors are based on surveys of insurance companies conducted by the American Council of Life Insurers (ACLI) for PBGC and IRS.[31] The survey asks insurers to provide the net annuity price for annuity contracts for plan terminations. PBGC develops interest rate factors, similar to interest rates, from the survey results, which are adjusted to the end of the year using an average of the Moody's Corporate Bond Indices for Aa and A-rated corporate bonds for the last 5 trading days of the month. The adjusted interest rate factors are published in mid-December for use in January. The interest rate factors are then further adjusted each subsequent month of the year on the basis of the average of the Moody's bond indices. According to PBGC, the interest rate factors, when used

[31]ACLI conducts four surveys annually. PBGC interest rate factors are based on an average of the surveys conducted in June and September.

along with the mortality table specified in PBGC regulations,[32] reflect the rate at which pension sponsors could have settled their liabilities, not including administrative expenses, in the market for single-premium nonparticipating group annuities issued by private insurers. Although PBGC interest rate factors do not consider the insurers' administrative expenses, a May 2000 American Academy of Actuaries study of the PBGC interest rate factors found that they overstated termination liability by a relatively small amount, averaging 3 percent to 4 percent.[33] The study characterized PBGC factors as mildly conservative.

Despite its seeming desirability as a statutory rate because of its direct connection to group annuity purchase rates, PBGC's interest rate factors may be more vulnerable to manipulation than other alternatives because they are not based on interest rates determined by the credit market and are less transparent. The identity of insurance companies surveyed and included in PBGC factors is not known, raising ambiguity about the extent to which the PBGC interest rate factors reflect the current broad market for group annuities. Additionally, PBGC calculations are not reported or independently reviewed. However, an insurance company representative said that insurance companies participating in the survey would likely agree to have that participation reported, and a PBGC official said that PBGC would not object to an independent review of its methodology for developing the interest rates.

[32]29 C.F.R. 4044.53 specifies the use of the 1983 Group Annuity Mortality Table for PBGC valuations of current liability, which under current rules is the same table specified by the IRS for current liability calculations. However, IRS has initiated the process to change the table. See IRS Announcement 2000-7, which was published February 7, 2000. An IRS actuary said that the effort is still in process with no estimated completion date. According to PBGC, changing the mortality table on which the factors are based would alter them. An official said, for example, that basing the factors on the mortality table that PBGC used in preparing its 2002 financial report would change them by 60 basis points.

[33]Marilyn M. Oliver and Gregory S. Schlappich, PBGC Plan Termination Cost Study, American Academy of Actuaries, May 4, 2000.The study examined actual plan terminations, which mostly occurred between 1994 and 1997. Available data did not cover very large plan terminations and the study cautioned that no conclusions should be drawn with respect to them.

Alternatives Likely to Decrease Lump-Sum Payments, Employer Contributions, and PBGC Revenue

If the alternative results immediately in a higher allowable interest rate, which is likely for the alternatives we reviewed, using the higher rate would generally decrease minimum allowable lump-sum amounts[34] and increase the number of participants whose benefit could potentially be distributed as a lump sum without their consent, decrease minimum and maximum employer contributions, and decrease PBGC revenue. The present value of a participant's benefit and related contribution and premium requirements would decrease because a higher interest rate increases the value of today's dollars, relative to future dollars, and therefore fewer of today's dollars should be needed to pay benefits in the future. However, if the alternative produces a lower interest rate, plan participants would receive larger lump sums, employers would need to increase contributions to their plans, and PBGC may experience an increase in revenue.

The magnitude of these effects on lump sums, plan funding, and PBGC premiums would depend on the characteristics of the plan and its participants and how the rate is specified in the law. Additionally, if the Congress specifies the interest rate differently for current liability and lump-sum calculations, as is currently the case, the magnitude of the impact on each could differ. Furthermore, the effect on current liability and lump-sum calculations could be phased in over a period of time. In 1994, for example, the law phased in the reduction in the upper limit on interest rates for current liability calculations from 110 percent to 105 percent over a 5-year period. Additionally, requiring the use of an updated mortality table for current liability calculations might partially offset the effect that a higher interest rate would have on current liability calculations.[35]

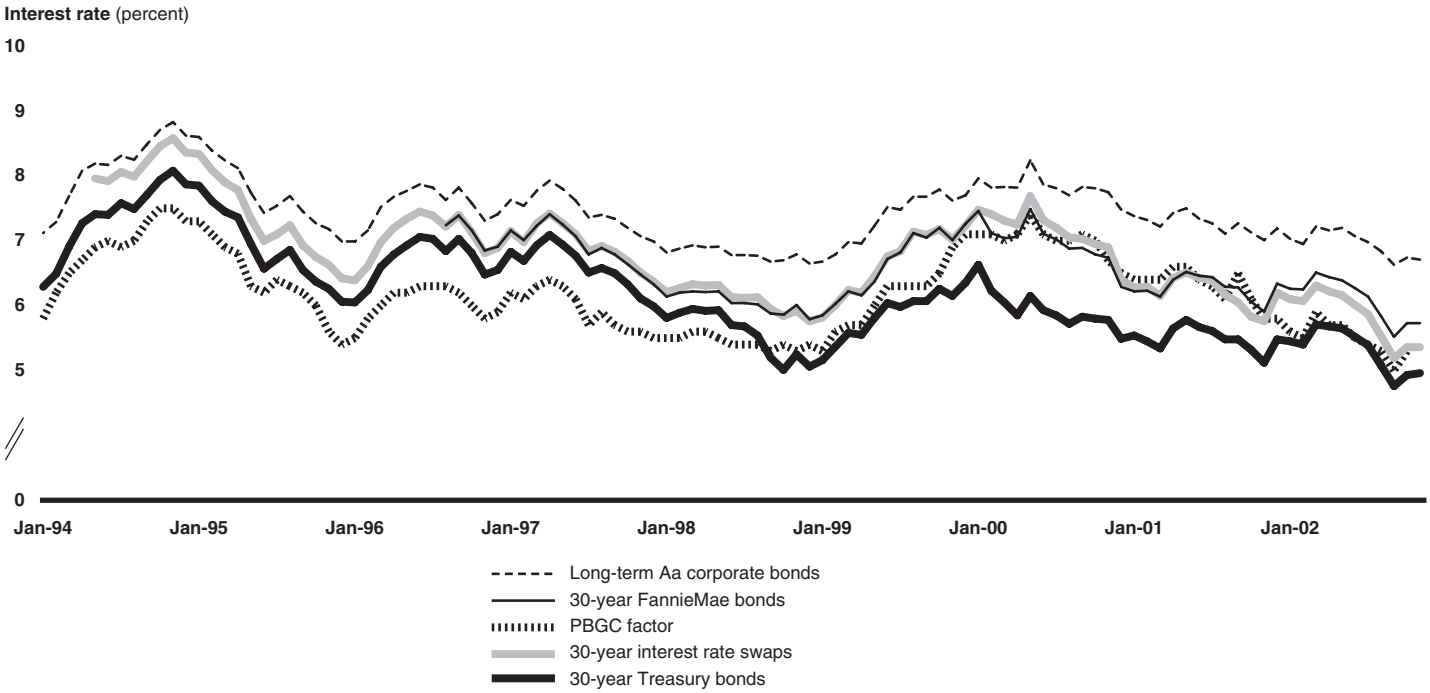
During the period from January 1994 to July 2002, the monthly long-term corporate bond rates, GSE rates, and 30-year interest rate swap rates, were generally greater than the 30-year Treasury bond rate; the PBGC estimated rate was below the 30-year Treasury bond rate in the mid-1990s but was higher than the 30-year Treasury bond rate after 1998. As shown in figure

[34]A change to a higher statutory interest rate would not decrease minimum lump-sum amounts for participants in plans that use an interest rate below the rate on 30-year Treasury bonds for calculating lump-sum amounts.

[35]More recent mortality tables take into consideration increased expected longevity due to advances in medical diagnostics and treatment and therefore have the effect of increasing current liability valuations because the valuation will have to be made with the assumption that the promised monthly benefit will be paid over a longer period of time.

5, each rate's relationship to the 30-year Treasury rate has changed over time.

Figure 5: Thirty-Year Treasury Bond Rates and Proposed Alternative Interest Rates, 1994 to 2002

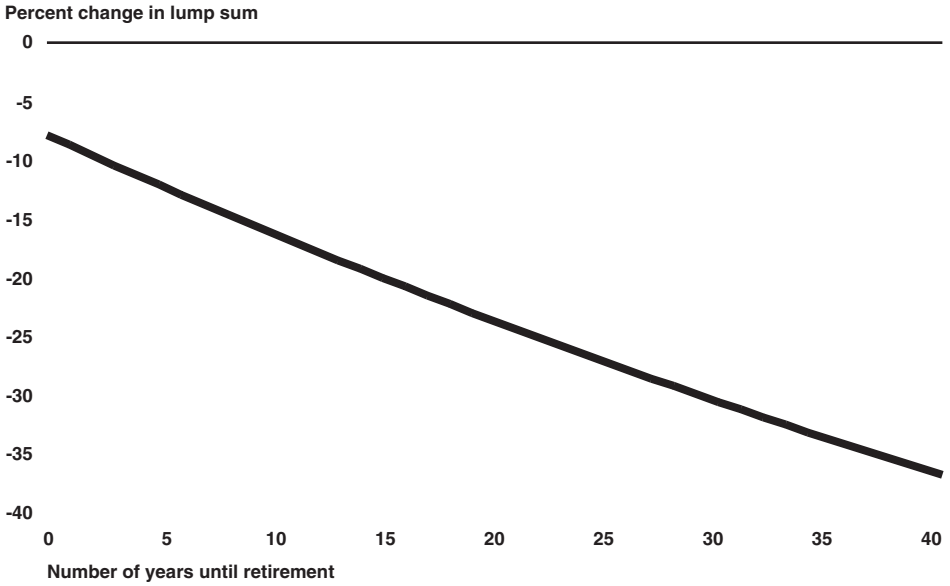


Source: PBGC, Federal Reserve Board of Governors, Moody's Investors Service, Federal National Mortgage Association (Fannie Mae), and Bloomberg.

Use of Higher Interest Rates Would Decrease Lump-Sum Amounts

Figure 6 shows that the effect of a change in the interest rate used to calculate lump sums is greater for participants further away from retirement than for participants near retirement. The figure shows, for example, that a 1-percentage point increase in the interest rate from 5 percent to 6 percent would result in an 8 percent decrease in the lump sums of participants expected to retire almost immediately. On the other hand, that same 1-percentage point increase in the interest rate would result in a 36 percent decrease in the lump sums of participants expected to retire in 40 years.

Figure 6: Percent Change in Lump Sums for Participants Retiring in 40 Years or Less for an Interest Rate Increase from 5 Percent to 6 Percent



Source: American Academy of Actuaries.

Note: GAO and American Academy of Actuaries analysis using the 1994 Group Annuity Reserving table mortality data.

Reducing the dollar amount of each lump-sum distribution by using a higher interest rate may affect the number of employers that offer a lump-sum distribution and the number of participants electing to take a lump-sum distribution. Many employers already offer a lump-sum provision in their plans; however, if the rate used to calculate lump-sum distribution amounts were to increase, reducing the amount of each distribution, more employers may adopt lump-sum provisions in their plans in order to reduce costs. However, fewer participants might elect a lump-sum distribution if the value of such payments were to decline relative to the participant's annuity benefit.

Reducing the calculated present value of each participant's benefit would also increase the number of participants whose benefit may be distributed by the plan as a lump sum without their consent. An increase in the assumed interest rate would cause the present values of some benefits, which are currently above the $5,000 limit for nondiscretionary distribution as a lump sum, to be reduced to the point that they fall below that limit.

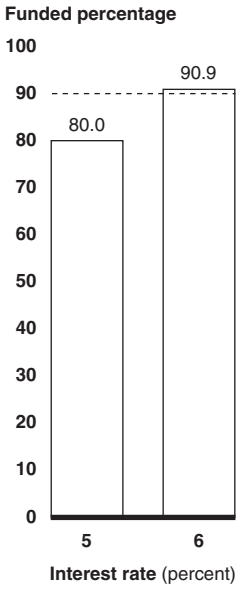
Use of Higher Interest Rates May Decrease Employer Contributions and PBGC Revenue

Because a higher interest rate would make plans appear better funded relative to current liabilities than they were before, employer contributions and PBGC revenue may decrease. For each 1-percentage point change in the interest rate, estimated current liabilities of a pension plan would change by 12 percent to 15 percent.[36] Such a change may lower or eliminate the minimum employer contribution, referred to as the deficit reduction contribution, required by the IRC.[37] Therefore, plans with a typical distribution of participants would see their liabilities reduced by 12 percent to 15 percent from a 1-percentage point increase in the interest rate. Figure 7 shows plans that were 80 percent funded would become more than 90 percent funded and would no longer have to make a deficit reduction contribution.

[36]This assumes a typical distribution of participants by age and other relevant factors, such as number of years until retirement and years of service. See Parks and Gebhardtsbauer, A*lternatives*, 6. The magnitude of an increase or decrease in plan liabilities associated with a given change in discount rates would depend on the demographic and other characteristics of each plan. Essentially, the percentage change in liabilities, for a given change in the discount rate, would be greater for plans and plan participants with a majority of their benefit payments in the distant future (younger participants far from retirement) than for those plans with a majority of their payments in the near term (older participants close to or already in retirement).

[37]The IRC requires that plans with a funded percentage below 90 percent be subject to the deficit reduction contribution. However, plans that are between 80 percent and 90 percent funded are exempted from the deficit reduction contribution as long as the funded percentage in 2 consecutive years out of the prior 3 years were at or above 90 percent.

Figure 7: Effect of a 1-Percentage Point Increase in the Interest Rate on the Funded Percentage of a Hypothetical Plan with a Typical Participant Distribution



Source: GAO calculations.

Note: At 90-percent funded and above for current liability, the plan is not subject to the deficit reduction contribution, which is the portion of the minimum funding requirements that uses the 30-year Treasury rate. A 12-percent reduction in liabilities, resulting in a 10.9-percent increase in the funded percentage is assumed for illustrative purposes.

A higher interest rate would also decrease allowable employer contributions for plans at the full funding limit. The IRC imposes full funding limitations that limit tax-deductible contributions under certain circumstances in order to prevent employers from contributing more to their plan than is necessary to cover promised future benefits. The full funding limitations established in 1987 and 1994, also known respectively as the 150-percent current liability limitation[38] and the 90-percent current liability limitation, are required to be computed using the 30-year Treasury rate. If the rate with which they are required to be computed were to increase, more plans would be subject to the full funding limitation and, therefore, fewer would be allowed to make additional contributions.

[38]The current liability full-funding limit established in 1987 was originally 150 percent of current liability but started being phased out in 1999. It will be repealed for plan years beginning in 2004 and thereafter.

Employer premium payments to PBGC would decrease with the use of a higher interest rate because their plans' current liabilities would become better funded. Generally, ERISA requires plans with assets that are less than the value of their accrued vested benefits to pay an additional premium, termed the variable-rate premium.[39] Assuming an increase in the interest rate, some plans would no longer be subject to the variable-rate premium because the reduction in their current liabilities would cause them to reach the full funding limit and therefore become exempt from the payment. Plans still subject to the variable-rate premium would pay less because their current liabilities would become better funded.

Conclusions

The choice of an interest rate has important implications for federal revenue, employer cash flow, and participant retirement income. A single percentage point increase in the interest rate would reduce a typical pension plan's current liabilities by 12 percent to 15 percent, depending on participant demographics. Rules for using current liability calculations to determine minimum contributions, full funding limits, and PBGC premiums are extremely complex. However, in general, with an increase in the interest rate, some under-funded plans would become adequately funded, some plans would reach full funding limits, and additional plans would avoid variable-rate premiums. Additionally, the minimum allowable value of the lump-sum equivalent of a participant's annuity benefit would decline. The magnitude of the decline would depend on the participant's age and proximity to the plan's normal retirement age.

Each alternative has characteristics that may make it more or less appropriate as an interest rate. To the extent that policymakers continue to want the interest rate tied to group annuity purchase rates, the PBGC interest rate factors have the most direct connection to the group annuity market. Other than the survey conducted for PBGC, no mechanism exists to collect information on actual group annuity purchase rates. Although the PBGC interest rate factors may track group annuity purchase rates

[39]Variable-rate premiums are calculated on the basis of a plan's unfunded current liabilities, taking into account only vested benefits discounted using 100 percent of the 30-year Treasury rate for the month preceding the beginning of the premium payment year. Under the Job Creation and Worker Assistance Act of 2002, the percentage of the 30-year Treasury rate for variable-rate premium calculation purposes was temporarily increased from 85 percent to 100 percent for plan years beginning in 2002 and 2003. In 2004, under current law, it will revert to its former 85 percent of the 30-year Treasury rate until such time as the Secretary of the Treasury specifies a new mortality table for calculating current liabilities at which time it is scheduled to go back up to 100 percent of the 30-year rate.

more closely than other rates do, the PBGC interest rate factors are less transparent than market-determined alternatives. Long-term market rates, such as corporate bond indices, may track changes in group annuity rates over time, but they are less directly connected to group annuity rates and their proximity to group annuity rates is uncertain. In addition, an interest rate based on some long-term market rates, such as corporate bond indices, may need to be adjusted downward to better reflect the level of group annuity purchase rates.

Finally, the suitability of any interest rate used is likely to change over time and, unless some entity is given the responsibility for monitoring its relationship to group annuity purchase rates, the Congress and pension plans regulatory agencies will have difficulty determining when changes are needed. The Congress has made several ad hoc adjustments to the mandatory interest rate for pension calculations and can continue to make changes to the rate through the legislative process. Given the significant technical issues associated with such decisions as well as the time it takes to enact such a legislative change, the Congress could decide to delegate this authority to the executive branch and establish a process to monitor the mandatory rate. This would provide an opportunity for needed adjustments to the rate to occur in a timelier manner. We are offering suggestions to the Congress on a possible process for adjusting the mandatory rate as well as a way to periodically monitor the rate over time.

Matters for Congressional Consideration

To improve the timeliness of adjustments to the mandatory interest rate for pension calculations, the Congress should consider establishing a process for regulatory adjustments of the rate. The Congress should consider providing the cognizant regulatory agencies—Labor, Treasury, and PBGC—the authority under ERISA to jointly adjust the rate within certain boundaries as specified under the law.

This could be done by the Congress establishing an interagency committee to adjust, with the input of key stakeholders, including plan sponsors, labor unions, actuaries and others, the mandatory interest rate. This could be a transparent process consistent with the Administrative Procedures Act. Under this option, the Congress could either require that the Committee's adjustments to the mandated interest rate obtain congressional approval and be enacted into law or it could provide for congressional review and disapproval. The disapproval role could be similar to the role the Congress provides for itself under the Congressional Review Act. Under the act, federal regulations are held for 60 days to give the Congress the opportunity to pass a resolution of disapproval. This

process provides the advantages of allowing for more timely adjustments to the interest rate if needed and providing the Congress with the opportunity to intervene if it so chooses without requiring direct congressional involvement for the adjustments to take effect.

Whether the Congress decides to maintain its current role in setting and adjusting the mandatory interest rate or delegates this authority to the executive branch, it should consider establishing a process to better monitor changes to the rate in relation to group annuity purchase rates. If the Congress selects one of the market-based rates as the new mandatory rate, it should consider amending ERISA to require the cognizant regulatory agencies to (1) periodically evaluate the relationship between the rate and the group annuity purchase rates and report to the Congress and (2) provide comments about how any changes to the mandated interest rate they would recommend would likely affect federal revenue, employer pension contributions, plan funding levels, and participants' lump-sum benefits. This would provide the Congress and the regulatory agencies an opportunity to respond in a timely manner to changes that might affect the relationship between the market-based rate and the group annuity purchase rate.

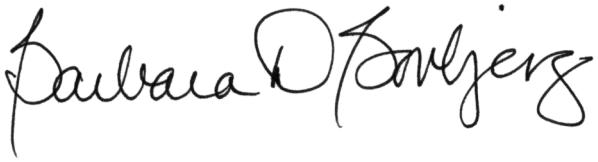
Alternatively, if the Congress decides to select the PBGC interest rate factors as the mandatory interest rate, it should consider requiring an independent review to validate PBGC's methodology and calculations for developing the factors and require PBGC to publish its methodology, both before they are selected as the mandated interest rate and periodically thereafter.

Agency Comments

We provided a draft of this report to Labor, Treasury, and PBGC. The agencies jointly provided written comments, which appear in appendix III. They generally agreed with our findings and conclusions and noted that our report will help interested parties better evaluate possible alternatives to the 30-year Treasury rate. They also provided technical comments, which we incorporated as appropriate.

We are sending copies of this report to the Secretary of Labor, the Secretary of the Treasury, the Secretary of Commerce, and the Executive Director of the Pension Benefit Guaranty Corporation, appropriate congressional committees, and other interested parties. We will also make copies available to others on request. In addition, the report will be available at no charge on GAO's Web site at http://www.gao.gov.

If you have any questions concerning this report, please contact me at (202) 512-7215 or George A. Scott at (202) 512-5932. Other major contributors include Daniel F. Alspaugh, Joseph Applebaum, Kenneth J. Bombara, Mark M. Glickman, Michael P. Morris, Corinna Nicolaou, John M. Schaefer, and Roger J. Thomas.



Barbara D. Bovbjerg
Director, Education, Workforce
and Income Security Issues

Appendix I: Scope and Methodology

To determine the characteristics of a suitable interest rate, we reviewed pension laws and their legislative history with respect to the calculation of current liability and lump-sum amounts. We also interviewed officials at the Pension Benefit Guaranty Corporation (PBGC) and other policymakers who played a role in assessing alternative interest rates. We obtained information about group annuity pricing, and the availability of information about group annuity purchase rates, from representatives of the American Academy of Actuaries, the American Council of Life Insurers, the National Association of Insurance Commissioners, and insurance companies.

To identify and examine the advantages and disadvantages of potential alternative interest rates, we interviewed representatives and reviewed documents from a number of government, pension plan sponsor, and investment entities, including PBGC, the Department of the Treasury, and Department of Labor. We also compared rates and other market statistics for suggested alternative debt securities with rates for 30-year Treasury bonds from 1987 to 2002. We discussed transparency, rate construction, and liquidity issues for the alternatives with economists at the Department of the Treasury and the Federal Reserve and with financial experts at the Bond Market Association, Federal National Mortgage Association, and pension plan consultants.

To determine how alternative rates might affect employers, plan participants, and PBGC, we created hypothetical examples in which we tested the effect of changes in rate levels on current liabilities and lump-sum payments. We designed the hypothetical examples based on discussions with several actuaries and pension consultants, including PBGC and the American Society of Pension Actuaries. Additionally, in order to better understand the possible effects of a rate change on employers and plan participants, we spoke with several organizations that represent their interests. In order to better understand the implications of a change in the interest rate on PBGC, we spoke with PBGC, Department of Labor, Internal Revenue Service, and the Department of the Treasury.

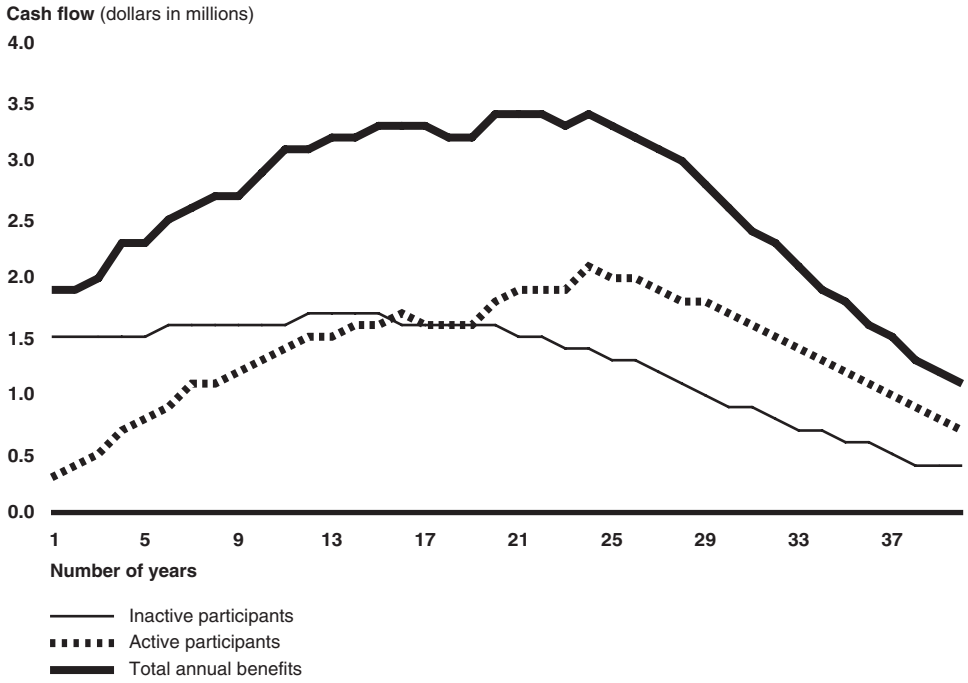
Appendix II: Group Annuity Purchase Rate Would Be Affected by Cash Flow Projection and Yield Curve at Termination

Group annuity purchase rates would vary among plans depending on the pattern of each plan's projected cash flows over time and the yield curve at the time the plan is terminated.

Cash Flows Vary by Plan

Figure 8 shows the projected cash flow over a 40-year period for a sample plan at termination. The figure shows that, in the early years, payments to inactive participants of the sample plan, primarily current retirees, constitute a majority of total cash flow. In later years, however, payments to active participants make up the majority of total cash flow as current employees retire.

Figure 8: Projected Cash Flow for Sample Defined Benefit Plan for the First 40 Years after Plan Termination



Sources: Victor J. Modugno, 'Terminal Funding', Transactions of the Society of Actuaries, 1986 Vol. 38.

Note: Inactive participants are primarily current retirees, but also includes some terminated-vested participants.

All else being equal, the projected cash flows of plans with a larger percentage of retirees at termination than the sample plan would be more heavily weighted toward the early years, and the cash flows of plans with a larger percentage of active participants at termination would be more heavily weighted toward the later years.

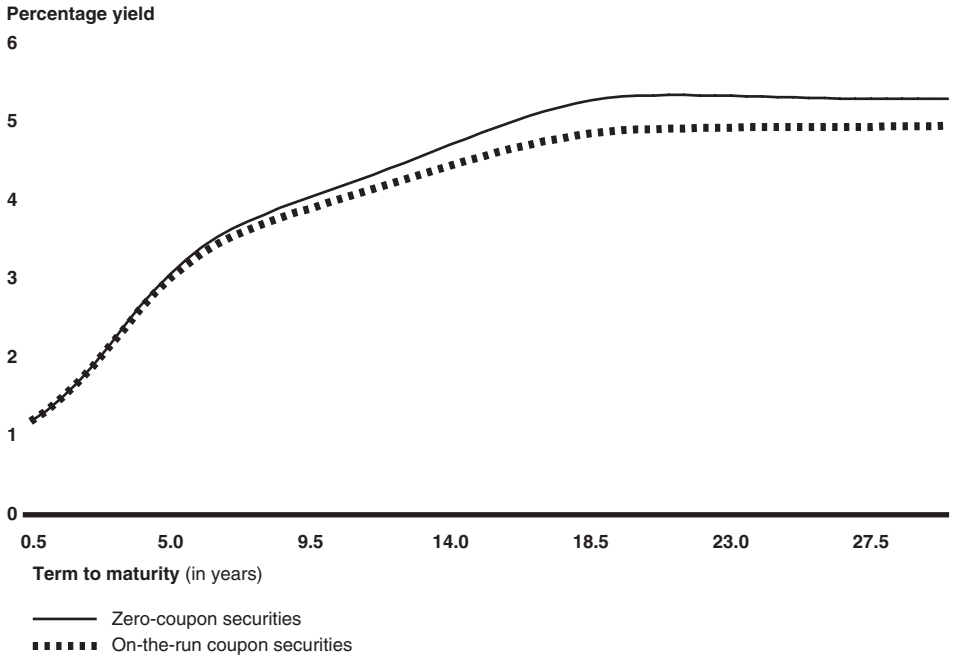
Group Annuity Purchase Rates Would Vary with the Yield Curve

Surveys of insurance company group annuity pricing practices performed as part of two studies for the Society of Actuaries indicate that insurance companies use different methods to price group annuity products.[1] In general, these methods may be described with respect to yield curves, which may be constructed for various types of securities, including Treasury securities, corporate bonds, and mortgages. Figure 9 shows, for example, two of the better know yield curves, the yield curves for on-the-run Treasury securities and zero-coupon Treasury securities, as of February 6, 2003.[2] The yield for on-the-run securities reflects interest rates for securities that make semiannual interest payments before they mature, followed by a final payment of interest and principal at maturity. The yield for zero-coupon securities reflects interest rates, called spot rates, for securities that make a single payment at maturity.

[1]Modugno, *30-Year Treasury Rates*, 4-7. Ryan Labs, Inc., *30-Year Treasury Rates*, 37-38.

[2]On-the-run securities are the most recently issued government securities at each maturity point.

Figure 9: Yield Curves for On-the-Run and Zero-Coupon Treasury Securities as of February 6, 2003



Source: Department of the Treasury.

Note: Treasury constructed the curve for zero-coupon securities, often referred to as Separate Trading of Registered Interest and Principal of Securities (STRIPS), from the yield on on-the-run securities. According to a Treasury official, spot rates constructed from the yield for on-the-run securities may differ from actual market rates on STRIPS.

In figure 9, interest rates for the on-the-run securities that make coupon payments are lower than rates for zero-coupon securities, at the same maturity. This reflects the fact that coupon yields are a blend of zero-coupon spot rates, and the term structure of spot rates on February 6, 2003, was upward sloping.[3]

To determine the present value of plan cash flows using a zero-coupon yield curve, the spot rates at various maturities may be used as the interest rates for calculating the present value of cash flows at the corresponding

[3]Bruce Tuckman, Fixed Income Securities: Tools for Today's Market, John Wiley & Sons, Inc., (New York, 1995).

points in time.[4] For example, the spot rate at a 10-year maturity might be used to calculate the present value of a cash flow at 10 years because the timing of the single payment from the security would match the timing of the cash flow by the plan.

In using a yield curve based on securities that make payments prior to maturity, maturity is inadequate for deciding which interest rate should be used to calculate the present value of a given cash flow because the security's interim interest payments must be considered. In these cases, a concept called "duration" may be used to select a single interest rate for all cash flows in the present value calculation. Duration measures the average time that it takes for a security to make all interest and principal payments, or a pension plan to make all benefit payments, with the time until each payment weighted by its present value as a percentage of the total present value of all payments. The total present value of a security's payments is its market price and the total present value of a plan's benefit payments is its current liabilities. An interest rate is selected for plan present value calculations from the yield curve that results in the same duration for the security and plan's cash flow.

Duration is a measure of the sensitivity of a security's price, a lump sum, or a pension plan's current liability to changes in the interest rates used to calculate them. For example, actuaries estimate that the duration of the liabilities for pension plans with a "typical" distribution of participants is between 12 years and 15 years.[5] Durations of 12 years and 15 years indicate that a 1-percentage point increase in the interest rate used to

[4]Spot rates may need to be converted from semiannual compounded rates, the convention used in U.S. fixed-income markets, to annual rates, the convention used by actuaries to specify interest rates for employee benefit plan liabilities.

[5]Treasury officials believe that the maturity structure of many large plans is shorter than what has been described by other actuaries as typical, and that, moreover, for all plans, the maturity structure has become shorter over the last two decades.

calculate a plan's liabilities would decrease those liabilities by roughly 12 percent and 15 percent, respectively. In February 2003, the duration of the 30-year Treasury bond issued in February 2001 was about 15 years.

Appendix III: Comments from the Department of Treasury

DEPARTMENT OF THE TREASURY
WASHINGTON, D.C.

UNDER SECRETARY

February 21, 2003

Ms. Barbara D. Bovbjerg
Director
Education, Workforce, and Income Security Issues
United States General Accounting Office
Washington, DC 20548

Dear Ms. Bovbjerg:

Thank you for sharing a draft copy of *Private Pensions: Process Needed to Monitor the Mandated Interest Rate for Pension Calculations* with the Departments of Treasury, Labor and Commerce and the Pension Benefit Guaranty Corporation. On behalf of these agencies, Treasury staff earlier provided GAO staff with technical comments on the draft report.

As you know, some propose replacing the 30-Year Treasury interest rate with a pension discount rate that is a composite of long term corporate interest indexes. We are concerned that this approach, or any other single interest rate, ignores the time structure of benefit payments that make up pension liabilities. In particular, using a long-term interest rate to discount expected benefit payments for a pension plan whose participants are either retired or nearing the end of their working lives is likely to understate the plan's liabilities since a substantial portion of total benefit payments are due in the near future.

Likewise using a short-term interest rate to discount the liabilities of a plan whose participants are predominantly in their twenties and thirties will tend to overstate liabilities because most of these workers will not begin to receive pension benefit payments for twenty years or more. The Administration currently is evaluating different methods of computing pension liabilities that could reflect the underlying time structure of pension plan liabilities.

We are pleased to see that an appendix to the report describes the concept of matching discount rates to the time structure of pension liabilities. Our research indicates that the concept is consistent with the best and prudent pricing and design practices of financial intermediaries, including the issuers of annuity products. Your review of the concept in the report will help all interested parties better evaluate possible replacements for the 30-Year Treasury rate.

Again, the agencies appreciate the opportunity to review the draft report.

Sincerely,

Peter R. Fisher
Under Secretary for Domestic Finance

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