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Positioning Pensions for the Twenty-First Century

Edited by Michael S. Gordon,
Olivia S. Mitchell, and Marc M. Twinney

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Chapter 7

Funding of Defined Benefit Pension Plans

Mark J. Warshawsky

Funding of defined benefit pension plans has long been an important topic to financial analysts and government policymakers. Knowing the funded status of sponsored plans is often an essential part of knowing the financial health of a corporate sponsor. Similarly, the funded status of plans is relevant to the financial prospects of the Pension Benefit Guaranty Corporation (PBGC) and to the necessary level of tax expenditures for the private pension system.

This chapter has three specific goals: (1) to explain fully the evolution of the complex minimum funding requirements imposed by the federal government on plan sponsors by highlighting three legislative eras; (2) to give a short history of financial accounting standards for pension sponsors, focusing on the current regime of measurement, recognition, and disclosure; and (3) to present statistics on funding from plan sponsors' financial statements. This chapter also discusses the broad motivations of government and accounting policymakers in adopting various rules, as well as the impact of these rules on the current and future funding of private defined benefit plans in the United States. Finally, a simple set of minimum funding requirements and maximum limits, akin to financial accounting standards, is recommended here to partially replace the complex requirements currently in place.

Defined Benefit Plans, Funding, and the PBGC

There are two main categories of qualified retirement plans offered in the United States, defined benefit (DB) and defined contribution (DC) plans. In a DB plan, the employer promises to pay the worker a specified retirement benefit that generally increases with each additional year of

work. In a DC plan, the employer, and sometimes the worker, contributes an amount of money every year into the worker's account, available, with accrued investment earnings, upon retirement. Although DC plans, particularly 401 (k) plans, expanded greatly during the 1980s as both primary and secondary plans, DB plans still provide most of the retirement benefit coverage to workers at large private and public employers.

In order to provide the benefits, the DB plan sponsor must have assets on hand when workers retire and benefit payments start. If the sponsor were to default on its obligation and did not set aside enough assets, retirees and workers will have lost hard-earned benefits important to their financial security. Despite generous tax incentives adequately to fund their pension obligations, through the 1960s some private employers defaulted without sufficient pension assets, and retirees and workers lost promised benefits.

With the passage of the Employee Retirement Income Security Act (ERISA) in 1974, Congress established minimum funding requirements and a federal government agency—the PBGC—to insure retirement benefits, up to a maximum level, earned through most private DB plans. When compliance with the minimum funding requirements is poor, or the requirements themselves are either inadequate or incomplete, a terminating plan sponsor in distress will probably have insufficient assets to fund its plan. In such cases, the PBGC will step in and pay the promised, but unfunded, benefits.

Through the 1980s, the financial situation of the PBGC worsened considerably. Successive legislative actions in the mid-1980s to tighten minimum funding requirements and raise premiums charged by the PBGC apparently did lead to some stabilization of PBGC finances. Nevertheless, concerns about the PBGC in the media, Congress, the administration, and among plan participants continued to mount in the late 1980s and early 1990s. One measure of the risk exposure of the PBGC—the liabilities less assets of underfunded plans—began to increase after several years of decline, and projections indicated that the long-term financial health of the PBGC was in jeopardy. The 1990–1991 recession weakened some plan sponsors and caused the value of some assets held by plan sponsors, particularly real estate, to fall. Moreover, during this time there have been very few new DB plans, and numerous DB plan terminations, thus lowering the premium base of the PBGC.

Actuarial Valuations

The funded status of a DB pension plan is determined by comparing the plan's assets with its liabilities. Assets are generally measured at market

value. The liabilities are measured as the actuarial present value of the plan's benefits. Such a valuation reflects the probability that the various benefits will become payable and the discounting effect of the time value of money. Therefore, among the important actuarial assumptions involved in a valuation are rate of investment earnings, mortality, retirement, future salary increases, and employee turnover.

The purpose of the valuation can influence the calculation of liability by changing the relative importance of the various actuarial assumptions or even in some cases by changing the actuary's best estimate of a particular actuarial assumption. For example, in a forecast valuation, the open group technique is used, that is, it is assumed that the plan sponsor will hire additional workers in the future. Moreover, other actuarial assumptions reflect the plan as an on-going entity. By contrast, in a termination valuation, the closed group technique is used. Moreover, in such a valuation, there will be no assumption necessary concerning future salary increases, and the relevant interest rate and mortality tables should reflect the cost of annuitizing benefits.

In practical terms, the most important valuations are those mandated by federal law (ERISA) for purposes of determining a plan's minimum funding requirements and those mandated by generally accepted accounting principles for purposes of the recognition and disclosure of pension expense in the financial statements of the plan sponsor. Neither type of valuations allows an open group technique. Beyond this consideration, however, these valuations employ different blends of ongoing versus termination assumptions. Indeed, as will be explained in detail below, the funding requirements and financial accounting standards over time have increased the relative weight given conceptually to the likelihood that the plan will terminate.

The Evolution of Funding Requirements

Federal law requires that defined benefit plans sponsored by private employers be funded before benefits are due to be paid to plan participants. In particular, contributions of cash or, within strict limits, other employer securities must be made within a range specified in the law. The evolutionary history of these requirements can be divided into three distinct periods: first, that of the original ERISA rules; second, the Omnibus Reconciliation Act (OBRA) of 1987 was enacted; and finally, the Retirement Protection ACT (RPA) of 1994 was passed. As will be shown, the scope of plan sponsor discretion in funding has been narrowed over time and the consideration given to termination has become more prominent.

ERISA's Original Minimum Funding Requirements

In the years prior to the passage of ERISA, thousands of DB pension plans, mostly small and only in operation for a few years, terminated with some loss of benefits to participants. The failure in 1962 of the Studebaker plan, a large plan with sizable losses to many participants, however, particularly focused attention on plan benefit security. In order to protect participants against losses and to make feasible the federal pension insurance programs administered by the PBGC, Congress, when passing ERISA in 1974, added section 412 to the Internal Revenue Code to require minimum funding.

Under section 412, a funding standard account is set up to determine a DB plan's minimum funding requirement for a plan year. The requirement is the net sum of charges and credits, including (1) a normal cost charge, (2) any funding deficiency charge (or credit balance) carried over from the prior year, (3) an amortization charge for the initial unfunded accrued liability, (4) amortization charges (or credits) for increases (or decreases) in liabilities owing to plan amendments, (5) amortization charges (or credits) due to experience losses (or gains), and (6) amortization charges (or credits) for losses (or gains) resulting from changes in actuarial assumptions.

Excise taxes are imposed on the funding deficiency of a plan until the minimum required contribution is made. For plans unable to meet the minimum funding requirement because of the substantial business hardship of the plan sponsor, ERISA provided that a waiver of the requirement could be requested. If the IRS granted the request (subject to the satisfaction of certain conditions on the plan), the amount waived became a charge base to be amortized over the next 15 years in the funding standard account. If the request were denied and the plan sponsor failed to make the required contribution, excise taxes would be levied on the funding deficiency until the contribution is made.

ERISA listed six actuarial cost methods as acceptable for calculating normal costs and accrued liabilities. Each cost method has a unique way of calculating normal cost, related either to the actual accrual of benefits (unit credit method) or to the projected costs funded in the form of level annual payments. The accrued liability is defined as the present value of future benefits minus the present value of future normal costs; for the same plan and participant groups, the accrued liability differs depending on the cost method chosen. The unfunded liability is that part of the accrued liability in excess of assets. A plan can have an initial unfunded accrued liability if, when it is created, benefits are given based on the past service of current workers.

Gains and losses result from changes in actuarial assumptions and/or

are the differences between the actual experiences of the plan and those expected in accordance with the actuarial assumptions. Depending on the cost method, experience gains and losses are amortized either over 15 years (as originally enacted in ERISA) (immediate gain methods) or as part of the normal cost (spread gain methods). ERISA also required that the actuarial assumptions used in determining plan costs be reasonable in the aggregate.¹

For determining the minimum funding requirement, the amortization bases giving rise to the amortization charges and credits in the funding standard account are amortized over a specified number of years generally at the valuation interest rate. ERISA provided that the initial unfunded past service accrued liability be amortized over forty years for plans already in existence on January 1, 1974, and over thirty years for plans formed after January 1, 1974. If a plan is amended and the amendment results in a change in the unfunded accrued liability, such change is amortized over thirty years. (Most amendments increase benefits, and hence result in charges.) As originally enacted in ERISA, gains or losses resulting from changes in actuarial assumptions were also amortized over 30 years and, as already indicated, experience gains and losses and waivers were amortized over 15 years.²

The funding requirement is capped by the full-funding limitation. The limitation is the sum of the accrued liability and normal cost (both brought to the end of the year with interest) minus the lesser of the fair market value or actuarial (smoothed) value of plan assets (also brought to the end of the year with interest). The assets are also decreased for any credit balances in the funding standard account. When a plan has a funding requirement in excess of the full-funding limitation, a credit is given in the funding standard account for the amount of the excess, and all amortization bases are considered fully amortized.

Scope of Allowable Discretion Under Original ERISA

ERISA allowed implicitly for a range of funding levels in pension plans. It is possible for a plan to satisfy the minimum funding requirements and yet be underfunded if the plan should terminate. Alternatively, a plan may be well funded on a termination basis and still have a substantial required contribution for the plan year under section 412. Under original ERISA, the plan sponsor had considerable discretion to choose the funding scenario it desired.

The plan sponsor is allowed a choice of funding methods and, furthermore, is allowed, subject to IRS requirements, to switch funding methods.³ Some methods amortize past service liabilities over 30 years, while other methods fund these liabilities over the average working lifetime of

plan participants. In most plans, average working lifetime is shorter than thirty years; therefore, choosing a method that amortizes past service liability over thirty years reduces the rate at which the plan accumulates assets.

Among immediate gain methods, for the same group of employees and in a plan where benefits accrue ratably to retirement age, annual plan costs under the unit credit funding method are lower in earlier years and higher in later years than those under the entry age normal method. Even with the entry age normal method, a level dollar approach will fund more quickly in early years than a level percent of pay approach when contributions increase as overall participant compensation increases.⁴

There are two other sources of variability in funding status within the context of sponsor choice within the funding rules. First, subject to the full funding limitation, plan sponsors could contribute on a tax-deductible basis by amortizing unfunded accrued liabilities over no fewer than ten years. Second, it has been alleged that actuarial assumptions were sometimes manipulated to effect smaller or larger contributions, notwithstanding the requirement that the actuary use assumptions reflecting his or her best estimate of anticipated experience.

Despite the wide discretion given plan sponsors, there are certain correlations of funding levels with plan types in which the funding rules seem to play an important role. A plan with a flat dollar formula provides a specified dollar amount for each year of service. In order for this plan to provide a benefit equivalent to a consistent percentage of compensation, the flat dollar benefit must be increased periodically to keep pace with inflation and compensation increases. The plan cannot fund for these increases before the plan amendment is negotiated but, under most funding methods, instead funds the resulting increases as unfunded liabilities over 30 years. This problem generally does not exist in a plan which bases benefits on compensation because funding for such plans is required to be based upon the projected benefits at retirement, including expected increased compensation.

OBRA '87 Minimum Funding Requirements

When ERISA was passed, plan sponsors had quite a bit of latitude in their funding decisions before they approached either the Scylla of exceeding maximum allowable contributions or the Charybdis of failing the minimum funding requirements. To a large extent, this latitude was the intent of Congress in order to encourage the formation of DB plans and the granting of new benefits. If the funding decision was too narrowly circumscribed, existing plan sponsors would lack flexibility and could

even be forced into bankruptcy or other forms of financial distress. Of course, the PBGC was left exposed, but it was probably hoped at the time that the PBGC would confront minimal plan failures.

The experience of the 1980s, however, forced changes. Some small DB plans sponsored by highly paid professionals were claiming very large income tax deductions. At the same time, losses at the PBGC were mounting as certain industries declined and some large plan sponsors failed, leaving large unfunded pension liabilities. Congress responded in 1987 with a tightening of limitations on deductions and attempts to strengthen the minimum funding requirements. In 1987 and again in 1989, Congress raised the premiums DB plan sponsors paid to the PBGC.

The most important concept introduced by OBRA '87 was the "current liability." It is the sum of the present values of accrued benefits for each participant, calculated as if the plan purchased annuities for these benefits, using an interest rate within a permissible range of rates. The permissible range is defined as an interest rate not more than 10 percent above or below the weighted average of the thirty-year Treasury bond yields for the preceding four-year period. Current liability is therefore determined independently of the actuarial cost method of the plan and is related to the termination liability.⁵

OBRA '87 uses this concept to establish the "current liability full funding limitation," which prevails if it is less than the old limitation based on the accrued liability. The new limitation equals 150 percent of the current liability plus the expected increase in current liability due to benefits accruing during the year (brought to the end of year with interest, using the current liability interest rate) minus the lesser of the fair market value or the actuarial value of assets (also brought forward with interest).⁶ When the new limitation applies and the plan has a funding deficiency (prior to contributions) in excess of this limitation, a ten-year amortization charge base is established for the amount which would have been a required contribution except for application of the new limitation.

The lower current liability limitation can make funding less smooth over time due to the deferred amortization payments, particularly for plans using funding methods other than unit credit. The new limitation also may defer funding for a compensation-based plan covering relatively young employees. In particular, the accrued liability (even when calculated using the projected unit credit method) for a new group would reflect a significant amount of benefits based on projections of increased future compensation; 150 percent of the current liability (wherein such increases cannot be anticipated) may be less than the accrued liability. Schieber and Shoven (1994) claim that this limitation as well as other legislative and regulatory changes of the 1980s and 1990s

will lead to a delay in the funding of the baby boom generation's defined benefit plans. It is unclear, however, how the fact that a smaller percentage of the baby boom generation is covered by the private DB plan system than in the prior generation is included in their model.

OBRA '87 tried to improve funding in underfunded plans as well as to limit overfunding. It provided that the deductible limit for non-multiemployer plans with more than 100 participants would not be less than the plan's unfunded current liability. For all DB plans other than multiemployer plans, OBRA '87 required that a plan's minimum funding requirement be paid in quarterly installments, rather than the previously permitted situation where sponsors could delay contributions until 8½ months after the end of the plan year.⁷

OBRA '87 also shortened the length of several of the amortization periods used in determining a non-multiemployer plan's minimum funding requirement. Experience gains and losses arising in plan years after 1987 are amortized over five years, gains and losses arising from changes in actuarial assumptions are amortized over 10 years, and funding waivers granted after 1987 are amortized over five years. The interest rate applied to the amortization of the waiver is related to current market rates rather than the valuation interest rate. The conditions for granting waivers were also tightened.⁸

OBRA '87 did not shorten the amortization periods for initial liability created on the granting of past service credit in a new plan or for increases in liability due to benefit increases. Rather, it introduced an additional funding scheme in new section 412(l) to reduce underfunding in addition to the old ERISA minimum funding rules. This scheme—the additional funding charge—applies only to single-employer plans with 100 or more participants and whose current liability exceeds the value of assets reduced by any credit balance in the funding standard account. The additional funding charge equals the “deficit reduction contribution” (DRC) offset by certain amortization payments.

The DRC equals the unfunded old liability amount plus the unfunded new liability amount. The unfunded old liability is the current liability less the actuarial value of assets reduced by the credit balance as of the 1988 plan year. (Plans formed after 1988 have no old liability.) The unfunded old liability *amount* is the payment amortizing the unfunded old liability over 18 years beginning in 1989. The unfunded new liability is the unfunded current liability in the current plan year less the outstanding balance of the unfunded old liability. The unfunded new liability *amount* is the “applicable percentage” of the unfunded new liability. The applicable percentage is 30 percent if the funded current liability percentage is less than 35 percent; it decreases by .25 of one percentage point for each percentage point by which the plan's funded cur-

rent liability percentage exceeds 35 percent. An applicable percentage of 30 percent is equivalent to an amortization period of about four years.

To arrive at the additional funding charge, the DRC was reduced by the net of amortization charges and credits for the initial unfunded liability, waivers, and increases and decreases in the unfunded liability due to amendments. Because these offsets to the DRC did not include amortization charges and credits for changes in actuarial assumptions or experience losses and gains, it was entirely possible for an underfunded plan to have no additional funding charge. In particular, old flat dollar benefit plans which started funding under ERISA with low interest rate assumptions (resulting in large amortization charges) would have a large offset to the DRC. In addition, if the plans increased their interest rate assumptions in the 1980s, they would have large credits in their funding standard accounts. By contrast, newer plans established with high interest rate assumptions which then lowered their assumptions would experience the contribution burden in extra measure.

RPA '94 Minimum Funding Requirements

Although the immediate financial situation of the PBGC had not changed much since the passage of OBRA '87, there were indications that the underfunding of plans was a growing problem. Following intense scrutiny of the FSLIC-savings-and-loan debacle and the resulting review of other government-sponsored insurance programs, Congress, in the RPA, significantly altered the minimum funding rules. These changes were passed in December 1994 as part of the legislation implementing GATT and are generally effective beginning in the 1995 plan year.

The RPA makes three important changes to the formulas used to calculate the DRC and the additional funding charge. First, the applicable percentage of 30 percent for calculating the unfunded new liability amount now holds if a plan's funded current liability percentage is less than 60 percent (rather than 35 percent as before). The applicable percentage decreases by .40 of a percentage point for each percentage point by which the funded current liability percentage exceeds 60 percent, to a minimum of 18 percent for a plan that is 90 percent funded. For example, a plan which is 70 percent funded would now have an applicable percentage of 26 percent rather than 21.25 percent, as under OBRA '87. Second, the DRC now includes as a component the expected increase in current liability due to benefits accruing during the plan year. Third, all amortization charges and credits are now included as offsets to the DRC in computing the additional funding charge, including experience gains or losses, changes in liabilities due to changes in actuarial cost methods,

and gains and losses due to changes in actuarial assumptions. Thus, the minimum required contribution for underfunded plans, in general, is the greater of the amount determined under the normal funding rules or the DRC.

The RPA gradually narrows the interest rate corridor used to calculate current liability for purposes of the DRC and specifies a mortality assumption. More specifically, for the 1999 plan year and beyond, the maximum interest rate used to calculate current liability is 105 percent of the weighted four-year moving average yield on 30-year Treasury bonds. Until then, the maximum is reduced by 1 percent per year from 110 percent, that is, the maximum is 109 percent in 1995, 108 percent in 1996, and so on. For the 1995 plan year, the mortality table used to determine current liability (to be prescribed by the Secretary of Treasury) will be based on the 1983 Group Annuity Mortality (GAM) Table.⁹ The underlying logic of this requirement is that, in recent years, when pricing group annuities for terminating pension plans, life insurers typically use the 1983 GAM table.

The combined impact of these changes in the minimum funding rules probably would have increased substantially the required contributions of many plans, especially compared to the very low level of additional contributions induced by section 412(l) introduced in OBRA. Furthermore, the required changes in actuarial assumptions would have drawn in plans heretofore untouched by the special funding rules for underfunded plans.¹⁰ Hence, Congress designed numerous permanent and transitional items in the RPA that exempt some plans from the strengthened funding rules and limit the immediate impact of the rules.

There are two permanent exemptions from the additional funding charge for underfunded plans. First, the charge will not apply for a plan year if the plan has a "funded current liability percentage" of 90 percent or greater. Second, the charge does not apply for a plan year if (1) the plan's funded current liability percentage is at least 80 percent, and (2) the plan had been 90 percent or better funded for any two consecutive years of the previous three plan years. For purposes of these thresholds, the funded current liability percentage is calculated using the highest allowable interest rate, and assets are *not* reduced by credit balances.

There are also two transition rules exempting plans in near years. The first rule is that a plan is exempt from the additional funding charge in the 1995 and 1996 plan years if the plan's funded current liability percentage is at least 80 percent and the plan meets one of three special tests in each of any two of the 1992, 1993, or 1994 plan years.¹¹ The second transition rule is that a plan is exempt from the additional funding charge in the 1996 and 1997 plan years if (1) the plan's funded current

liability percentage is at least 80 percent, (2) the plan's funded percentage was at least 90 percent in 1995, and (3) the plan met one of the special tests in 1994.

The net effect of these permanent and transitional exemptions is probably to remove most plans with a funded percentage of at least 80 percent in the 1995 and 1996 plan years from the application of the strengthened additional funding charge. Some, but progressively fewer, 80 percent-funded plans will be exempted in the 1997 plan year and beyond.

For those plans not exempted from the additional funding charge, the charge is limited into the next century under various other transition rules. The RPA permits a plan to amortize over twelve years the increase in current liability in 1995 due to the mandated interest rate and mortality table (as compared to the relative interest rate and mortality table actually used in the 1993 plan year). This amortization is called the "additional unfunded old liability amount." Alternatively, the plan sponsor can make an irrevocable election to amortize over twelve years the entire unfunded post-1987 increase in current liability. If this alternative is chosen, however, the additional funding charge cannot be less than if the OBRA '87 version of the law remained in effect. This election may prove to be popular with many severely underfunded plans.

For plan years 1995 to 2001, the RPA limits the additional funding charge, at the option of the plan sponsor in any year, to the amount necessary to achieve certain funding ratio targets.¹² Under this optional rule, however, the additional funding charge must be at least that required under OBRA '87.

In its 1987 Annual Report, the PBGC stated the following: "Companies such as Allis-Chalmers Corporation terminated plans with large liabilities but virtually no assets, yet the companies had satisfied the existing minimum funding requirements" (PBGC, 1987:4). In response to these situations, the RPA added a solvency requirement to minimum funding as a third independent element. This requirement applies to non-multi-employer plans less than 100 percent funded for current liability, and requires these plans to maintain cash, marketable securities, or other liquid assets equal to three years' worth of disbursements, generally calculated based on payments made from the plan during the prior 12 months. If the necessary assets are not maintained in any quarter, either additional contributions must be made to achieve the necessary level or excise taxes are imposed and the plan is prohibited from making payments (such as lump-sum or annuity purchases) to participants in excess of the amount payable as a single life annuity.¹³

The PBGC justified the complexity of its initial legislative proposal by stating that it was carefully crafted to reach only problem areas. The final

funding requirements passed as RPA became even more complex as a result of the political legislative process. The question remains, however, whether essentially the same goals and expected outcomes could have been accomplished in a much less complex manner. Complexity, of course, translates into large administrative burdens, particularly for small- and medium-size plans.

Financial Accounting Standards for Pension Obligations of Single-Employer Plan Sponsors

The link between the funding status of plans and financial accounting standards for pensions can never be as direct as the link of funding status with the minimum funding requirements for contributions. The former reflects accounting transactions, while the latter represents requirements for actual cash outlays. Moreover, initially financial standards were quite amorphous, and then were changed to match the range of actuarial funding practice eventually refined and reflected in the original version of ERISA. More recently, however, financial accounting standards for pensions have been standardized and may serve as an influence, independent of the funding requirements, on the funding decisions of plan sponsors. Unlike the evolution of funding requirements, where older conceptual elements coexist with newer ones, the history of accounting standards is more revolutionary, being characterized by the disappearance of past conceptual structures.

The financial statements of plan sponsors (including income statements, balance sheets, and accompanying notes) are examined intensively by financial analysts on behalf of investors and creditors for a view of the overall long-term profitability of the company as well as for any signs of financial weakness. Through their influence on the flow of investment funds to plan sponsors, it is likely that financial accounting standards also have an influence on the funding decisions of plan sponsors. In particular, these standards may provide a cynosure for financial analysts, in turn establishing a funding goal for the community of plan sponsors.

*Accounting Standards Under ARB No. 47,
APB No. 8, and FAS No. 36*

Accounting Research Bulletin (ARB) No. 47 was issued in 1956 and called simply for pension costs to be spread over the current and future service of employees in a systematic and rational manner. It was discovered, however, that under ARB No. 47 there were wide ranges in

amortization periods, and past and prior service costs were sometimes charged to retained earnings instead of current income.¹⁴ Other problems included lower pension expense being recorded when profits were low, and instances of pay-as-you-go and terminal accounting.¹⁵

The accounting treatment of pension costs was stabilized somewhat when the Accounting Principles Board (APB) issued Opinion No. 8 in 1966; the opinion was operative until 1987. Annual charges of pension expense to current income were required regardless of actual funding practices. Despite a desire for standardization, however, APB No. 8 only specified minimum and maximum allowable pension cost accruals.¹⁶ It allowed the charge to expense to be based on reasonable actuarial assumptions and any reasonable actuarial cost method (other than pay-as-you-go and terminal accounting) chosen by the plan sponsor. The methods eventually allowed by ERISA were allowed by APB No. 8.

Because the minimum and maximum charges, with few exceptions, bracketed the contributions allowed by ERISA, pension expense for accounting purposes usually equaled actual contributions to the plan. If, however, contributions to a plan during a given year were less than pension expense, the difference was a liability for accrued pension cost shown on the balance sheet. If contributions exceeded pension expense, an asset for prepaid pension cost was established. A required disclosure was the unfunded vested benefit.

In 1980, the Financial Accounting Standards Board (FASB) issued Statement No. 36 requiring additional disclosures by plan sponsors. In particular, Financial Accounting Statement (FAS) No. 36 required that the notes to the financial statement include listing the vested and non-vested accumulated plan benefit obligations (and the interest rate used to determine them) and net assets available for benefits. The accumulated benefit obligation is essentially the accrued liability calculated under the traditional unit credit method, that is, without salary projections. All plans of the employer could be aggregated. No other changes were made to APB No. 8 until an entirely different accounting approach was promulgated in 1985.

Accounting Standards Under FAS No. 87

Beginning in 1987 (earlier application was encouraged), new accounting standards for the recognition of pension expense and the disclosure of funding status by plan sponsors were required by the FASB. Statement No. 87 reduced considerably the discretion of plan sponsors in their accounting choices for pensions and, moreover, completely broke the link with federal funding requirements. As will be explained below, FAS

No. 87 reflects at least two views of the economic exchange between plan sponsors and employees: termination and on-going plan views. (See also DeBerg, Mittelstaedt, and Regier 1987.) FAS No. 87 does consistently reflect the principle, however, that amortizations should occur over the remaining service lifetimes of active plan participants, rather than arbitrary fixed periods.

Pension Expense

Under FAS No. 87, pension expense is generally not materially different from "net periodic pension cost." Such cost is the combination of the following six components: (1) service cost, (2) interest cost, (3) actual return on plan assets, (4) amortization of unrecognized prior service cost, (5) gain or loss to the extent recognized, and (6) amortization of unrecognized net transition obligation (asset). Certain components will be positive, and others usually negative; the sum will usually be positive. Each component will now be explained in turn.

Service cost is the normal cost calculated under the projected unit credit method for compensation-based plans and under the traditional unit credit method for flat-dollar plans. No other actuarial cost methods are allowed. Generally, therefore, the cost for the year for a compensation-based plan would be the actuarial present value of the participants' anticipated benefits attributed to that year of service. By using projected benefits, FAS No. 87 reflects the ongoing plan view, whereby it is assumed that the plan will continue in existence beyond the year, and, therefore, the plan sponsor's obligations will generally be greater than if the plan were to terminate in the current year.

The interest assumption used to calculate service cost (and pension benefit obligations) must reflect the rates at which the pension benefits could be effectively settled. These discount rates can be based on yields on high-quality bonds or those implicit in group annuity contracts. (In September 1993, the SEC stated that high-quality bonds are those receiving one of the two highest ratings given by a recognized rating agency.) This requirement reflects the termination view, whereby it is assumed that the plan can be terminated immediately and that the termination liability represents the sum total of the sponsor's obligation. All other actuarial assumptions must be individually reasonable and chosen on the premise that the plan will continue into the future.

Interest cost is the amount by which the projected benefit obligation (the accrued liability calculated under the projected unit credit method) is expected to grow during the year because of interest. The actual return on assets is investment income for the year, including realized and unrealized depreciation and appreciation of assets. The return component

is subtracted from expense; if the return on assets has been positive for the year, pension expense is reduced.

Amortization of unrecognized prior service cost is the amortization of the unfunded initial accrued liability for a new plan and of the increase in accrued liability due to plan amendments, both adopted after the implementation of FAS No. 87. The amortization period is the expected future period of service of active plan participants.

Gain or loss to the extent recognized is a change in the amount of the projected benefit obligation or plan assets resulting from experience different from that expected or from changes in assumptions. It is negative if a gain, and positive if a loss. It includes two main subcomponents: the difference between the actual return on plan assets and the expected return on plan assets, and amortization of the unrecognized net gain or loss from previous periods. The expected return on plan assets is based on the expected long-term rate of return (potentially different from the discount rate) and the market-related (actuarial) value of plan assets. The first subcomponent essentially neutralizes which the volatility would have been induced by the second component of plan expense—the actual return on assets. Amortization of unrecognized net gain or loss (excluding asset gains and losses not yet reflected in market-related value) from previous periods occurs at a minimum rate of one divided by the average remaining service life of active participants.¹⁷

The sixth component of expense is the amortization of the excess of the projected benefit obligation over the market value of assets (at the date of adoption of FAS No. 87) plus previously recognized unfunded accrued pension cost or less previously recognized prepaid pension cost. The amortization period of the net obligation (loss) or the net asset (gain) is the average remaining service period of employees; if this period is less than fifteen years, the plan sponsor may choose fifteen years.

Recognition and Disclosure of Liabilities and Assets

Like APB No. 8, FAS No. 87 requires the recognition in the balance sheet of unfunded accrued pension cost or prepaid pension cost. If the accumulated benefit obligation exceeds the market value of assets, FAS No. 87 requires the recognition of a liability (including unfunded accrued pension cost) that at least equals the unfunded accumulated benefit obligation. This is called the “additional minimum liability.”¹⁸

Required disclosures under FAS No. 87 include the amount of net periodic pension cost showing separately the service cost, interest cost, actual return on assets, and net total of the other components. Also FAS No. 87 requires separate disclosure for underfunded and overfunded plans (where funded status is defined on basis of the accumulated bene-

fit obligation) of the market value of assets and the projected benefit obligations, also identifying the vested and non-vested accumulated benefit obligations.

A Comparison with Minimum Funding Requirements

The FASB engendered much controversy when it first proposed an accounting standard for pensions like FAS No. 87. Discretion was taken away from accountants and actuaries, and the link to the funding requirements was being broken; two entirely different actuarial valuations would now need be done. Although the funding requirements themselves were changed at the same time (and continue to change) to limit discretion, the new accounting standard has come to be viewed as a success and no changes are contemplated. Unlike the current funding requirements, which result from layer after layer of legislative and regulatory changes, the current financial accounting standard represents a fairly consistent logical construct. In addition, by standardizing the actuarial cost method, by limiting somewhat the choice of actuarial assumptions, and by tying most amortization periods to the expected remaining service life of active participants, the accounting standard has succeeded in making possible the reporting and comparative analysis of the funded status and expense of DB plans on a realistic economic basis. Indeed, as will be proposed at the end of this chapter, the accounting standard represents a good model for a reform of the minimum funding requirements.

Statistics on the Current Funded Status of Plans

Two primary sources of information on the funded status of defined benefit pension plans are the pension notes to the financial statements of sponsors of (single-employer) plans, as required to be reported under FAS No. 87, and the Schedule B (Actuarial Information) of the Form 5500 filed with the IRS and Department of Labor. Databases from these two sources, representing nearly all private large DB plans, were collected, edited, and analyzed for statistical evidence on funded status and analysis of the impact of the funding requirements. The results are presented below.

FAS No. 87 Database (1987-93)

The database came in a fairly uniform manner for corporate fiscal years 1987 through 1993 from Standard and Poor's Compustat Services and includes information about the general, financial, and pension charac-

teristics of single-employer DB plan sponsors who filed annual financial statements with the SEC (generally those whose equity was traded on the national stock exchanges). The Compustat computer data files for the fiscal years 1987 through 1993 were searched for United States-domiciled companies reporting, under the framework of FAS No. 87, the sponsorship of one or more DB pension plans. Companies filing annual statements in 1992 and 1993, and companies currently bankrupt or merged but filing annual statements in prior years, were included in the search. Subsidiary companies, even if they filed their own annual statements, however, were excluded. Because FAS No. 87 requires separate reporting of underfunded and overfunded plans, but otherwise allows the combination of all plans sponsored by a corporation, information on funding status on a group basis for each plan sponsor is available from the FAS No. 87 database. In contrast, information on the funded status of individual single-employer plans, any multiemployer plans, or any plans sponsored by privately held companies is only available from the Schedule B databases.

As shown in Table 1, the number of corporate sponsors with underfunded plans rose over the period 1987 through 1993, the number of sponsors with overfunded plans declined, and the number of sponsors with defined benefit plans declined slightly. These results should be caveated, however, because it is likely that for the 1987 year, as defined by Compustat, some plan sponsors still had not adopted FAS No. 87. The large increase in the number of underfunded plans from 1992 to 1993

TABLE 1 Number of Corporate Sponsors of Defined Benefit Plans: All Funded Statuses, with Underfunded, and with Overfunded Plans

<i>Year</i>	<i>All Funded Statuses</i>	<i>With Underfunded Plans</i>	<i>With Overfunded Plans</i>
1993	1,781	755	1,416
1992	1,752	589	1,517
1991	1,814	603	1,602
1990	1,788	651	1,544
1989	1,848	599	1,627
1988	1,892	593	1,681
1987	1,767	531	1,573

Source: See text. Author's computations from Compustat data only include those United States-domiciled corporations reporting under FAS No. 87 the sponsorship of at least one defined benefit plan. All subsidiaries reporting separately are excluded. For 1987, some plan sponsors may still not have adopted FAS No. 87.

Note: In each year, the number of corporate sponsors with underfunded and overfunded plans combined exceeds the number of sponsors of plans with all funded statuses because some sponsors have both underfunded and overfunded plans.

TABLE 2 Ratio of Assets to Accumulated Benefit Obligation (Funded Ratio of ABO) of DB Plans Sponsored by Corporations

<i>Year</i>	<i>All Plans</i>	<i>Underfunded</i>	<i>Overfunded</i>
<i>Simple Averages</i>			
1993	1.13	.73	1.34
1992	1.23	.71	1.43
1991	1.29	.71	1.51
1990	1.27	.72	1.50
1989	1.36	.68	1.61
1988	1.38	.70	1.62
1987	1.47	.71	1.73
<i>Weighted Averages</i>			
1993	1.13	.69	1.28
1992	1.22	.71	1.35
1991	1.28	.69	1.40
1990	1.26	.71	1.40
1989	1.40	.78	1.54
1988	1.37	.78	1.52
1987	1.39	.73	1.51

Source: See Table 1.

may be explained by the dramatic fall in market interest rates in 1993. An additional possible explanation may be the spotlight shown during 1993 by the SEC on corporate compliance with the requirement to compute benefit obligation with an FAS No. 87-mandated discount rate. Also there are plans hovering around funded ratios of 100 percent flipping between underfunded and overfunded status; this fact explains some of the year-to-year volatility in the statistics.

Table 2 shows the funded status of plans sponsored by these corporations, measured by the "funded ratio (ABO)," that is, the market value of plan assets divided by the accumulated benefit obligation (ABO). The ABO is closely related to the OBRA current liability, although different actuarial assumptions are sometimes used for each. Simple averages of funded ratios are shown in the upper panel of Table 2, while weighted averages are shown in the lower panel. By definition, the funded status of plans with larger ABOs are given more prominence in the lower panel.

The simple average of the funded ratio of all plans declined from 1.47 in 1987 to 1.13 in 1993. Among underfunded plans, the funded ratio remained quite steady over the period, at around .71, while among overfunded plans, the funded ratio declined significantly from 1.73 in 1987 to 1.34 in 1993.

The weighted averages of the funded ratio also showed declines, al-

though at different levels and with different patterns. The weighted-average funded ratio for all plans declined from 1.39 in 1987 to 1.13 in 1993. Among underfunded plans, the funded ratio declined somewhat over the period, from .73 to .69; the ratio, however, rose to .78 in 1988 and 1989 before declining to .71 in 1990, following the general pattern of stock market returns experienced in those years.¹⁹ Among overfunded plans, the funded ratio declined from 1.51 to 1.28. The differences between simple and weighted averages in level and pattern can be explained by larger plans generally having lower funded ratios and a higher proportion of assets in equities.

The period of examination here—1987 to 1993—coincides with the period just prior to and following the implementation of OBRA. As explained more fully above, the pension provisions of OBRA were intended to enhance the funding status of underfunded plans and to trim the funded status of overfunded plans to no more than 150 percent of current liability. Apparently, the law change was very successful in accomplishing the latter, while it failed in the former. (More evidence of the failure of OBRA to improve funding in underfunded plans is given below.) At the beginning of 1993, plan sponsors were limited to fund up to 150 percent of current liability, computed using an interest rate no lower than 7.27 percent at a time when all interest rates were declining rapidly and group annuity contracts were yielding around 6½ percent.²⁰

The top panel of Table 3 shows the dollar amount of the unfunded liability (ABO less assets) reported for all underfunded plans. Over the period, the unfunded liability increased by US \$44 billion, from US \$16.6 billion in 1987 to US \$60.4 billion in 1993. The increase is, in part, explained by a rapid deterioration in the funding status of the General Motors hourly plan indicated on GM's public financial statements (US \$22.2 billion in unfunded liability in 1992). By mathematical identity, because the overall weighted-average funded ratio declined only somewhat, while the amount of unfunded liability more than tripled over the period, the aggregate ABO for underfunded plans must also have more than tripled. This is the case; the ABO for underfunded plans increased from US \$61.8 billion in 1987 to US \$193.7 billion in 1993.

The lower panel of Table 3 shows the unfunded accrued and prepaid pension cost for underfunded and overfunded plans, respectively. As explained above, an unfunded accrued pension cost is recognized in the financial statements of the plan sponsor if the net periodic pension cost (expense) exceeded amounts the employer had contributed to the plan since implementation of FAS No. 87. By 1992, sponsors of underfunded plans had contributed US \$33 billion less than what generally accepted accounting principles deemed a reasonable rate of pension expense accrual. This can be mostly attributed to the fact that the Internal Revenue

TABLE 3 Corporate Defined Benefit Pension Obligations and Costs over Time

<i>Unfunded Accumulated Benefit Obligation of Corporations (US \$ M)</i>		
<i>Year</i>	<i>Underfunded Plans</i>	
1993	\$60,397.7	
1992	39,615.3	
1991	33,902.5	
1990	32,997.0	
1989	20,768.4	
1988	20,205.2	
1987	16,589.5	

<i>Prepaid (Unfunded Accrued) Pension Cost of Corporations (US \$ M)</i>		
<i>Year</i>	<i>With Underfunded Plans</i>	<i>With Overfunded Plans</i>
1993	(\$28,269.1)	\$42,747.1
1992	(33,276.2)	33,353.5
1991	(29,976.5)	27,859.7
1990	(26,648.9)	27,002.2
1989	(17,425.9)	17,591.8
1988	(11,902.3)	11,989.6
1987	(11,006.7)	6,226.1

Source: See Table 1.

Code allows a thirty-year amortization of the cost of amendments increasing benefits. In contrast, FAS No. 87 requires amortization over the future period of service of each active employee or over the average remaining service period of employees expected to receive benefits under the plan—generally less than 15 years for mature plans. It is also possible that some plan sponsors used a lower interest rate for FAS No. 87 than for funding purposes; a lower interest rate increases the relevant pension expense amounts. The decline in 1993 in the net aggregate unfunded accrued pension cost may be attributed to the sudden (and probably temporary) movement of many plans with prepaid pension cost into the underfunded plan category.

By 1993, sponsors of overfunded plans had contributed about US \$43 billion more than they had recognized as pension expense in their financial statements. This is probably mostly explained by plans substantially overfunded in 1986 recognizing large credits owing to the amorti-

TABLE 4 Ratio of Assets to Projected Benefit Obligations
(Funded Ratio [PBO]) of DB Plans Sponsored by Corporations
(Weighted Averages)

Year	Weighted Average		
	All Plans	Underfunded	Overfunded
1993	.99	.63	1.10
1992	1.05	.65	1.14
1991	1.09	.63	1.18
1990	1.06	.64	1.16
1989	1.18	.73	1.27
1988	1.14	.73	1.24
1987	1.16	.66	1.24

Source: See Table 1.

zation of the net transition obligation. It also may be due either to plan sponsors using Internal Revenue Code provisions allowing amortization of the cost of amendments increasing benefits as rapidly as over ten years, or to using higher interest rates or lower rates of future salary increases for FAS No. 87 than for funding purposes.

Table 4 shows the weighted-average funded ratio calculated using the projected benefit obligation (PBO) as the denominator. For final-pay and career-average plans, the PBO exceeds the ABO because the former concept includes a projection for the effect of future salary increases. The funded ratio (PBO) is therefore uniformly lower than the funded ratio (ABO). This, however, is less notable for underfunded plans, which are more likely to be flat benefit plans and therefore do not usually require salary projections under FAS No. 87. Overall, in 1993, plans had assets just below the projected benefit obligation.

Results from more recent financial statements were not available at the time of the writing of this chapter. Market conditions in 1994, however, indicate that the funded status of plans improved. As Bader and Ma (1995) calculate, the discount rate soared 130 basis points over 1994, and pension liabilities therefore would plummet. Even the poor investment returns of most pension funds generated large gains relative to their falling liabilities, strengthening their funded ratios. They estimate that the funded ratio of a typical plan rose by 9.1 percent during 1994.

Schedule B Data Base (1990)

Form 5500 series returns for all DB plans are required to be filed with an accompanying Schedule B under the mandate of ERISA. For better comparison with financial accounting data, however, only DB plans with

more than 100 participants for the 1990 plan year were included in the analysis of this section of the chapter. There were about 19,400 such plans, of which 18,300 were single-employer and 1,100 were multiemployer plans. More than four-fifths of the plans were overfunded. This 1990 Schedule B database includes plans with over 39 million participants. Compared to earlier years, a higher portion of the participants in 1990 were non-active, a reflection of the continued aging of participants in the defined benefit plan system.

Statistics on funded ratios and unfunded liability from the database are shown in Table 5. The funded ratio and unfunded liability are calculated using the market value of plan assets and current liability, as reported on line six of the Schedule B. For all plans, the funded ratios in 1990 were 1.39 (simple average) and 1.35 (weighted average). For underfunded plans, the funded ratios (simple averages) were .77 for single-employer plans and .84 for multiemployer plans. For overfunded plans, the funded ratios were 1.56 for single-employer plans and 1.29 for multiemployer plans.²¹ The unfunded liability (in aggregate) was US \$30.3 billion.

One can compare the (beginning-of-plan-year) 1990 numbers on a (single-employer) plan basis from the Schedule B data base (Table 5) to the (end-of-fiscal-year) 1989 numbers on a sponsor basis from the FAS No. 87 data base (Tables 2 and 3). The funded ratios (weighted average) for underfunded and overfunded plans are approximately the same, and the unfunded ABO on a sponsor basis (US \$20.8 billion) is not much lower than the unfunded liability on a plan basis (US \$23 billion). It is unlikely that actuarial assumptions differ much between the two data sources. Any remaining differences can probably be explained by the

TABLE 5 Funded Ratios by Entity Type and Funded Status, 1990

<i>Plan Type</i>	<i>Funded Ratio</i>		<i>Unfunded Liability (US \$ M)</i>
	<i>Simple Average (%)</i>	<i>Weighted Average (%)</i>	
All plans	1.39	1.35	30,303
Single employer			
Underfunded	.77	.75	23,094
Overfunded	1.56	1.52	0
Multiemployer			
Underfunded	.84	.86	7,209
Overfunded	1.29	1.23	0

Source: See text. 1990 Form 5500/Schedule B returns filed with the IRS of DB plans with more than 100 participants.

TABLE 6 Distribution of DB Plans by Actuarial Cost Method Number of Plans

	Plan Cost Method (# of plans)							
	A	B	C	D	E	F	G	Missing
All Plans	46	4379	6632	1665	4483	11	2097	99
Single Employer Underfunded	6	674	1746	120	746	2	282	21
Single Employer Overfunded	23	2902	4753	1512	3611	9	1806	67
Multiemployer Underfunded	8	167	52	6	35	0	5	5
Multiemployer Overfunded	9	636	81	27	91	0	4	6

Source: See Table 5.

Note: Key to actuarial cost methods: A = Attained age normal; B = Entry age normal; C = Accrued benefit (unit credit); D = Aggregate; E = Frozen initial liability; F = Individual level premium; G = Other.

fact that the Schedule B database represents more plans than the FAS 87 database.

The distribution of plans by actuarial cost method is shown in Table 6. The "other" actuarial cost method usually denotes the projected unit credit method. The three most popular cost methods are unit credit (traditional and projected), frozen initial liability, and entry age normal. Compared to earlier years, more plans are using unit credit methods (see Applebaum 1992). This may reflect a desire to match pension accounting expense more closely with contributions or may owe to the introduction of tighter funding limits. Underfunded plans are more likely to use unit credit and less likely to use the aggregate method than overfunded plans. Multiemployer plans, whether underfunded or overfunded, prefer the entry age normal method.

IRS Underfunding Study Sample (1990)

In 1993 and 1994, a random sample of 360 underfunded plans underwent comprehensive examinations for the 1990 plan year conducted by IRS Employee Plans revenue agents and field actuaries as part of an Underfunding Study by the Office of Assistant Commissioner for Employee Plans and Exempt Organizations of the IRS. Single-employer and multi-employer plans with at least 100 participants were included in the sample. As part of the study, the complete Schedule B for each of the 360 examined plans was carefully transcribed in the National Office; in the (universe) Schedule B database described above, transcription of only certain items was done by the IRS Service Centers. Some information on the study plans is presented here.

There were over 1.5 million participants in the examined plans, and

over US \$30 billion in asset holdings. The overall funded ratio (weighted average) was 80 percent and the unfunded liability was US \$7.6 billion for these plans. The examined plans can be described as aging—there were only 1.3 active workers for every non-active participant—and expected benefit payments far exceeded the increase in liability owing to the accrual of new benefits. Although employers contributed US \$1 billion to the plans, the aggregate credit balance declined by US \$400 million over the 1990 plan year. The decline would have been greater but for significant actuarial gains. The additional funding charge (discussed in more detail below) made only a drop in the bucket—US \$15 million more in charges to the funding standard account.

The distribution of funded ratios of underfunded plans examined for the study (not shown) is now described. More than one-third of the plans approach fully comfortable levels of funding, with funded ratios in excess of 90 percent. In contrast, about one-seventh of the plans were rather poorly funded (funded ratios below 60 percent), with a few plans containing almost no assets. Thirteen plans held assets (of any type) at a level less than three times expected annual benefit payments.

Plans in the study employed a panoply of mortality tables, with a tendency toward tables based on mortality experience of, or projected through, the 1960s and 1970s. The average assumed retirement age was 63.6, and many plans assumed 65. Most studies of retirement show that a majority of plan participants retire on or before the earliest age for receipt of Social Security benefits, 62. Hence, the mortality and retirement age assumptions for these examined plans can best be described as liberal. The assumed interest rates “for all other calculated values” (used in calculating normal cost and accrued liability), by contrast, tended to be conservative (averaging 8.2 percent), particularly when viewed in comparison to the experience of the 1980s and reasonable expectations in the 1990 plan year. In fact, a majority of the plans assumed an interest rate of 8 percent or less for all other calculated values.

The interest rate used in current liability calculations averaged 8.5 percent for the sample of plans examined for the study. The actual interest rates used by plans to calculate current liability were cross-tabbed against the highest interest rate allowed for a plan with its year beginning in a certain month. Because most plans use calendar years, the highest rate allowed for calculating current liability for the 1990 valuation for most plans was 9.42 percent. About 10 percent of the underfunded plans examined chose the highest allowable interest rate. Most plans, however, chose a rate lying somewhere between 8 and 9 percent—generally the rate identical to the one these plans assumed for calculations in the funding standard account.

TABLE 7 Extent and Characteristics of Underfunded Plans with Additional Funding Charges as Required Under OBRA

Number of Plans	Total	Plan Creation Date		Actuarial Cost Method		Funded Ratio (Current Liability)	
		After 1980	Before 1980	Aggregate	Other	≥ 90%	< 90%
(1) With Actual Additional Funding Charge	111	41	70	5	106	29	82
(2) Indicated Potentially Subject to Additional Funding Charge	301	98	203	6	295	60	241
Percent [(1) ÷ (2)]	36.9%	41.8%	34.5%	83.3%	35.9%	48.3%	34%

Source: See text. IRS Underfunding Study for the 1990 plan year. 360 randomly selected underfunded single-employer and multiemployer plans with at least 100 participants were included in this sample.

The calculation of the additional funding charge is now analyzed in more detail. Of the 360 plans, 59 did not do the calculation. Most of these 59 plans are multiemployer plans—explicitly exempted by the Internal Revenue Code from the additional funding requirement in section 412(1)—but others incorrectly skipped the calculation. The calculated deficit reduction contribution was large—nearly US \$1 billion—but the offsets reported were even larger. Hence, the additional funding charge was quite small. Further information about additional contributions is shown in Table 7. Just more than one-third of the plans made any additional contribution; plans with more recent creation dates, using the aggregate cost method and with higher funded ratios, were more likely to be required to have an additional funding charge.

Some Speculation About Future Trends in Funding

The first issues in evaluating the impact of the new minimum funding requirements on future trends in funding are identifying the class of plans potentially affected by the new rules and calculating the average funded ratio. In particular, which plans will be less than 90 percent funded in 1995 and beyond when their current liability is calculated with an interest rate at the top of the permissible corridor and the 1983 GAM mortality table? What will be their funded ratio?

For those plans with a plan year beginning in January 1995, the mandated value of the current liability interest rate is 109 percent of 7.27,

that is, 7.93 percent. Only 10 percent of plans in the 1990 plan year were at the top of the interest rate corridor (9.42 percent). The average current liability interest rate was 8.5 percent at a time when corporate bonds were yielding about 9 percent. That is, the average rate used for current liability was about 50 basis points below the prevailing corporate bond yield. It is therefore likely that most plans will not have to move down much from the interest rates chosen from a corridor of 6.68 to 8.17 percent for their 1994 calculations of current liability, at a time when corporate bonds were yielding 7 percent, to meet the requirement of 7.93 percent for 1995, when bonds were yielding 8½ percent.

The requirement to use the 1983 GAM mortality table is probably more significant. A majority of underfunded plans in 1990 used the 1971 GAM or 1984 Unisex Pension tables, based on mortality experience of the 1970s. At 8 percent, an immediate annuity for a male age 62 is about 5 percent less if calculated using the 1984 Unisex Pension table rather than the 1983 GAM table. Hence, conversion to the required 1983 GAM table is likely to cause a general, but modest, increase in current liability and therefore a modest decline in funded ratios. The decline in funded ratios coming from both mandated changes in interest rates and mortality table, however, is unlikely to be more than 10 percent.

In summary, the plans potentially affected by RPA (those less than 90 percent funded with mandated actuarial assumptions) are generally the same plans that were subject to the OBRA minimum funding requirements (those less than 100 percent funded). Assuming that these are also the same plans indicated by the FAS No. 87 database as being underfunded in 1993 (see Table 2) and that the same assumptions were used for current liability and FAS No. 87 purposes, the average funded ratio in 1995 of plans to which the new rules will apply is probably around 65 percent.

The next issue in evaluating the impact of the new minimum funding rules is the effect of the strengthened rules relating to the additional funding charge. In the near term, it is difficult to predict the net impact because of the complexity of the various transition rules and the uncertainty of plan sponsor elections. In the long run, however, average funded ratios will inevitably rise above 80 percent owing to the faster amortizations of the amounts of underfunding outstanding or newly created for most plans with funded ratios below 90 percent. Whether the dollar amount of underfunding will be much reduced in the long run depends on whether the improvements in funded ratios occur faster than the increases in liability owing to periodic plan amendments.

There were only minor changes in RPA affecting the funding rules for overfunded plans. There is some evidence that the decline in funded ratios of these plans should soon stop and then level off, probably at

around an average of 120 percent. According to the FAS No. 87 database, in 1987 over 56 percent of the companies with overfunded plans had funded ratios in excess of 150 percent. By 1993, however, the proportion of these "excess funded" plans had dropped to 21 percent. Because there are no incentives and some potential penalties to being excess funded and because, if they are able, plan sponsors will generally try to avoid having underfunded plans to avoid the higher PBGC premiums and the complex web of funding and other rules applying to underfunded plans under RPA, sponsors of overfunded plans probably have a target funded ratio of 120 or 125 percent.

A Funding Reform Proposal

A proposal to reform the minimum funding requirements and maximum contribution limits is now outlined. Each element of the proposal will be described briefly, along with a short justification. The proposal applies only to single-employer plans because concerns about complexity and PBGC financial exposure are concentrated there.

Eliminate the Special Funding Rules for Underfunded Plans

The current rules applying to underfunded plans with more than 100 participants (additional funding charge and solvency requirement) are extremely complex and therefore administratively burdensome and costly, particularly for small and medium-size plans. In addition, extra volatility is introduced in required funding, as changes in asset values may move plans among various funded statuses, and therefore different funding requirement regimes, over short time periods. The solvency requirement, while applying to all underfunded plans, will actually cause very few plans to increase their funding. The current funding rules create the requirement to fund unfunded past service liabilities over short time periods, thereby increasing the cost of starting a DB plan. When the suspicion, lack of understanding of sometimes complex provisions, and general dislike of many workers (especially young mobile ones) is also factored into the new plan sponsor's decision calculus, it is no wonder that relatively few DB plans are created nowadays. Concerns about plans with endemic underfunding can be addressed more simply, as proposed below.

Eliminate the Current Liability Full Funding Limitation

As explained in the section on OBRA, this limitation introduces extra volatility to funding patterns and discriminates against plans with young

workforces expecting large wage increases. The full funding limitation would be based on accrued liability, as under original ERISA. Concerns about excess funding and the loss of federal tax revenues can be addressed more simply, as proposed below.

Change (Generally Shorten) the Amortization Period for the Creation of New Plan Liabilities

As under FAS No. 87, the amortization period for the creation of new plan liabilities, either for past service for a newly created plan or owing to plan amendments increasing benefits, should be the expected future period of service of active plan participants. Thus, the amortization period will be long for young workforces and short for older workforces. In nearly all conceivable cases, however, it will be shorter than the currently allowed 30-year period. This change should reduce future underfunding, particularly among flat benefit plans that continually increase benefits to keep pace with wage inflation.

Restrict the Actuarial Cost Method to Be (Projected) Unit Credit

As under FAS No. 87, the only allowed cost methods should be the traditional unit credit method for flat benefit plans and the projected unit credit method for compensation-related benefit plans. This restriction will eliminate the technique of changing actuarial cost methods to influence the pattern of funding. Compared to other cost methods, use of the unit credit method generally reduces the level of funding in newly created plans and increases funding in older plans. In most instances, this restriction will also create economies in actuarial work, and perhaps eliminate the need for separate actuarial valuations for financial accounting and ERISA purposes. Any increase in accrued liability resulting from the mandated change in cost method should be amortized over no less than 15 years.

Amortize the Existing Unfunded Accrued Liability over 15 Years

Similar to some of the funding options available under RPA and the requirement of FAS No. 87 at the time of adoption of the new accounting standard, underfunding in existence at the time of adoption of the reform proposal should eventually be eliminated. A simple fifteen-year amortization period would not increase funding requirements for most underfunded plans too much.

Limit the Choice of Actuarial Assumptions

In order to control the outlay of federal tax revenues, as well to reduce underfunding, the ability to "game" the calculation of the accrued liability should be limited. In addition to the current restrictions on interest rate and mortality assumptions, legislative restrictions on the choice of other actuarial assumptions (particularly, the retirement age) should be imposed, or the ability of the IRS to police the choice of assumptions should be enhanced.

Conclusions

This chapter shows that the funded ratios of underfunded plans declined slightly and the amount of underfunding increased greatly over the 1987 to 1993 period, despite the intent of minimum funding requirements imposed by OBRA. The funded ratios of overfunded plans declined significantly over the same period, probably owing to the impact of a new full funding limitation. Changes in the minimum funding requirements in 1994 should cause an increase in funded ratios for underfunded plans over the long run. If the current regime of funding requirements can be simplified, this would contribute to an even greater reduction in underfunding.

Opinions expressed in this chapter are those of the author and not necessarily those of TIAA-CREF or of his former employer, the IRS. The author was senior economist with the Employee Plans Division of the IRS when he wrote the bulk of this chapter; he thanks the actuaries there, particularly Kathryn Marticello, for their comments and assistance. Lawrence Bader and Professor H. Fred Mittelstaedt also provided helpful comments.

Notes

1. In computing funding requirements and for certain reporting purposes, actuaries are allowed to use either the market value of assets or an "actuarial value" of assets. Actuarial asset valuation methods are used to smooth fluctuations in investment performance, by recognizing such fluctuations in a more gradual manner. The regulations originally required that allowable asset valuation methods must be applied on a consistent basis, take into account fair market value, and lie within a corridor of a minimum and a maximum of either market or average value. Guaranteed investment contracts issued by life insurance companies, however, are allowed to be carried at book value.

2. ERISA originally provided multiemployer plans longer amortization periods over which to amortize the initial unfunded liability and changes in liability

due to plan amendments (40 years) and experience gains and losses (20 years). The different amortization periods for multiemployer plans were removed by the Multiemployer Pension Plan Amendments Act of 1980 (MPPA), except for liabilities created before enactment of MPPA.

3. Prior to 1995, the IRS gave automatic approval to most changes in funding methods if done no more frequently than once every three years.

4. Yet another choice within some funding methods is whether normal cost is computed separately for each active employee and then summed together (individual basis) or calculated for the plan as a whole (aggregate basis). Although hardly utilized, ERISA also allows plans using the entry age normal cost method to elect to employ an alternative minimum funding standard. In particular, alternative funding standard account (ASA) charges are the sum of (1) normal cost (the lesser of those computed under the entry age normal or unit credit methods), (2) the excess, if any, of the present value of accrued benefits over the market value of assets, and (3) the excess, if any, of credits over charges to the ASA for all prior years. Also, for some collectively bargained plans, the shortfall method is allowed. This method allows contributions at a rate, expressed as cents per hour worked or dollars per units produced, *estimated* by an actuary as able to satisfy the minimum funding requirements.

5. The value of any "unpredictable contingent event benefits," such as plant closing benefits, however, are not included in current liability until the contingent event actually occurs.

6. For non-multiemployer plans, OBRA eliminated the minimum and maximum corridor for permitted actuarial value of assets around an average value of assets; only the corridor around market value remains.

7. Failure to make the required quarterly contribution results in an additional interest charge in the funding standard account on the unpaid amount and in excise taxes if still not paid 8-1/2 months after the end of the plan year. Liens are imposed when unpaid required installments exceed US \$1,000,000 and are not made within specified time periods.

8. The waiver must now be based on *temporary* substantial business hardship, each member of the sponsor's controlled group must experience hardship, the PBGC must be consulted on large waivers and security may be required, and plan participants must be notified of the initial request.

9. This table will remain in effect at least until the 2000 plan year and until the Secretary of Treasury issues a new mortality table based on the actual experience of pension plans and projected trends. Plans are permitted to use special mortality tables for disabled participants. Certain large underfunded plans cannot change other actuarial assumptions, such as retirement age and turnover rates, to cause a substantial decrease in the current liability unless the new assumptions are approved by the Secretary of Treasury.

10. Moreover, for large non-multi-employer underfunded plans, the heretofore largely dormant requirement under Code Section 401(a)(29) to post security upon adoption of a plan amendment increasing the current liability may become more relevant as current liabilities are increased by the mandated change in interest rate and mortality table.

11. The transition tests are met (under the law then in effect) if (1) the plan did not have an additional funding charge (or would not have had such a charge if the plan had used the highest allowable interest rate and did not reduce assets by the credit balance), (2) the plan's full funding limit was zero, or (3) the addi-

tional funding charge did not exceed the lesser of 0.5 percent of current liability or US \$5 million.

12. The target funding ratio is calculated by increasing the initial funding ratio (as of the beginning of the 1995 plan year) by a fixed number of percentage points each year. If the initial ratio is less than 75 percent, the target percentage is increased by three percentage points per year for plan years 1995 through 1999, four percentage points for 2000, and five percentage points for 2001. If the initial ratio is greater than 75 percent, the annual increments in the target percentage are somewhat smaller. The operation of this limit is independent of the limits tied to the permissible amortizations of old unfunded current liability described above.

13. Other changes directly relevant to funding made by the RPA include the repeal of the interest charge on quarterly contributions for plans funded in excess of current liability, an adjustment to the full funding limit to conform to the new minimum funding requirements, and relief from excise taxes on certain types of nondeductible contributions.

14. Past service cost is the unfunded initial accrued liability created when a new plan credits employees for service rendered before the initiation of the plan. Prior service cost is the addition to the accrued liability created when plan amendments increase benefits owing to service rendered prior to the effective dates of the amendments.

15. Terminal accounting refers to waiting until the participant is entitled to receive a benefit at retirement or termination before recognizing the expense.

16. The minimum charge to expense was the sum of (1) the normal cost, (2) interest on any unfunded past and prior service costs, and (3) for underfunded plans with a declining funding status, the lesser of (a) the amount of needed to bring about a 5 percent reduction in the unfunded vested benefit obligation or (b) the amount needed to amortize the unfunded past and prior service cost over 40 years. The maximum charge was the sum of (1) the normal cost, and (2) 10 percent amortization of any initial past service cost and any prior service cost arising from plan amendments (until fully amortized).

17. In the amortization, it is permitted to recognize only the gain or loss exceeding 10 percent of the greater of the projected benefit obligation or the market-related value of assets. In FAS No. 110, issued in 1992, the FASB revoked the former permission to value guaranteed investment contracts at contract value.

18. The additional liability generally may be offset in the balance sheet by an intangible asset rather than a reduction in equity.

19. One might challenge the explanation that the higher weighted-average funded ratios for underfunded plans in 1988 and 1989 were caused by financial market conditions by citing the decline in funded ratio in 1991 despite the strong stock market returns experienced that year. As will be noted below, however, the accumulation by 1991 of a very large unfunded liability by the General Motors hourly plan overwhelms the general pattern.

20. The decline in the funded ratio for overfunded plans in 1987 and 1988 can perhaps also be explained by continuing reversion activities.

21. Although employer securities and property are less helpful to benefit security than other assets, excluding employer securities and property from plan assets would change funded ratios very little in 1990 because, at US \$4.2 billion, employer securities and property represent a small portion of total net assets.

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