The Economics of Pension Insurance

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___Toward Controlling Exposure___

Chapter 6 observed that, despite the introduction of a variable-rate premium structure, the maximum allowable premium set by Congress was sufficiently low ($50) so as to preclude setting prices proportional to exposure. Risk was ignored entirely, and insured benefit levels were not reduced. In some cases, the subsidies inherent in these prices account for over 80 percent or more of estimated market premiums (VanDerhei 1988). Thus, the emphasis on reform has been on rewriting the minimum funding rules to reduce exposure to the corporation in the long run and to work in the direction of controlling the amount of defunding prior to termination.

These efforts have helped policymakers focus on the intended exposure level of the insurance: is insurance available to protect only against volatility in asset prices (target funding ratios should be 100 percent) or is some degree of systematic exposure permissible under the program (target rates can be less than 100 percent)? The drift in legislation appears to be toward its first concept. In this chapter, the funding proposals developed by the PBGC and sent to Congress in 1987 are considered, as are the provisions of legislation ultimately enacted in the form of the Pension Protection Act of 1987. In the next chapter, the resource cost of these reforms compared to alternatives is considered.

PBGC FUNDING PROPOSAL

In response to a deficit that had grown to $4 billion by the end of 1986, the Pension Benefit Guaranty Corporation developed a comprehensive set of funding proposals. The proposals retained current funding rules for plans that were at least 110 percent funded on a termination basis

(using interest rates assumed in the plan). For firms below this level, a series of rules were imposed to encourage all firms to attain a 110 percent funding level.

Given that some defunding prior to termination was still possible and given volatility in asset values and interest rates, the 110 percent target funding ratio proposal did not guarantee zero claims to the PBGC. Rather, it generated an expected reduction in exposure by requiring all firms to work in the direction of maintaining generally higher levels of funding.

Faster Amortization Rules

Past service liability. The main element of the proposal was a provision for shorter periods to amortize underfunding attributable to past service liability. It is important to recognize that underfunding for purposes of this provision is calculated on a termination basis. It is mainly intended to affect plans that use flat benefit formulas and unit credit funding methods.[1]

Plans characterized by salary-related formulas, using projected funding methods, would not likely be affected by either the PBGC proposal or the rules enacted in the Pension Protection Act (see below). This is because funding on a projected benefits basis almost certainly would generate overfunding on a termination basis. In contrast, as described in Chapter 7, flat benefit plans would more likely be affected because they routinely create past service liability by periodically increasing the benefit level.

In general, the proposal reduced the amortization period for past service liability from 30 years to some shorter period; the length of the period would be shorter if the existing funding ratio in the plan were lower and the plan's liabilities more mature. The proposal suggested various approaches to setting these limits. One is illustrated by the schedule of amortization periods given in Table 8–1.

The independent variables in the proposal are shown in the row and column labels. The columns reflect various levels of termination funding ratios based on actuarial interest rates.[2] The row elements represent the percent of total contributions required by Section 412 of the Internal Revenue Code not attributable to normal cost contributions. This ratio is higher if the portion of total contributions attribu-

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[1] This is the funding method used to illustrate funding problems for flat benefit plans in Chapter 7.

[2] An actuarial interest rate is the one assumed by the plan's actuary for purposes of calculating required funding. This rate typically has been lower than market long-term interest rates.

TABLE 8-1 PBGC Proposed Amortization Periods for Past Service Credit

Percent 30-year Amortization of Total 412 Contribution*	Termination Funding Ratio				
	90%	70%	50%	30%	10%
10	30	30	30	30	30
30	30	30	30	30	20
50	30	28	14	10	7
70	25	13	9	7	6
90	16	11	8	6	5

*Numbers in table are representative of several similar PBGC proposals; the table assumes a 7.5 percent interest rate.

table to amortization of past service liability and actuarial gains and losses is high.

The higher this ratio and the lower the plan's funding ratio, the faster the required amortization for new past service liability. In Table 8-1, which assumes a 7.5 percent interest rate, the amortization periods range from 5 to 30 years.

Several aspects of the proposal deserve attention. First, the amortization period was not static; the plan's contribution rate would be recalculated based on the plan's status each year. Thus, as the plan's funding condition improved, its required contribution rate would decrease. Second, the proposal did not exempt past underfunding from the rule; therefore its implementation would have generated relatively rapid changes in observed funding ratios among poorly funded plans. Third, the proposal was directed toward plans underfunded in a termination sense, most likely flat benefit plans. It would have substantially reduced the ability of such plans to maintain perpetual underfunding, merely as a result of periodically increasing benefits to reflect wage increases.

Actuarial gains and losses. Because the proposal permitted plans to choose their own interest rate assumption, an obvious loophole was available: firms could escape the intention of the faster amortization rules by changing their interest rate assumptions. Prior to the Pension Protection Act of 1987, the difference between the assumed rate of return and actual investment experience was amortized over 15 years. In the proposal, the difference was amortized over five years. Thus, attempts to evade the funding rules triggered a requirement for firms to redeposit the monies soon thereafter.

Other Rules and Provisions

In addition to faster amortization periods; the proposal was characterized by rules designed to prevent reductions in funding levels under other circumstances. These provisions were not applied in addition to

the contribution rates described in Table 8–1. The proposal required each plan to calculate the funding contribution under all three rules plus the old funding requirements and to choose the highest resulting contribution. The other two rules are as follows.

Funding deterioration. If for any reason other than a waiver an underfunded plan's funding ratio fell below the level in the prior year, incremental underfunding attributable to gains and losses and a portion of benefit increases would be amortized over three years.

Cash flow. As a complement to Table 8–1, a special rule would apply when the pension plan's benefit payments exceeded contributions. The special rule required (notwithstanding the amortization schedule in Table 8–1) contributions to be sufficient at least to cover benefit payments, including lump-sum distributions and annuity purchases.

Waivers. The amortization period for waivers was set at 15 years multiplied by the plan's funding ratio, but in no case to exceed 15 years. Thus, a plan with a 60 percent funding ratio that obtained a waiver would be required to amortize its value over nine years.

PROVISIONS OF THE PENSION PROTECTION ACT OF 1987

In December 1987, new funding rules were enacted as part of the Pension Protection Act (PPA). The legislation follows the general nature of the rules contained in the PBGC proposal. The major funding provisions of the new law are shown in Table 8–2. These will be the subject of discussion in this section and the remaining sections of the chapter.

Faster Amortization Schedules

The hallmark of the new law is shorter amortization periods for prospective increases in underfunding. In a nutshell, the law borrows the idea behind the amortization schedule in the PBGC's proposal shown in Table 8–1, without taking explicit account of the plan's maturity; it reflects only the plan's funding ratio. Like the PBGC proposal, the funding ratio is calculated on a termination basis, except the interest rate used in the calculations is not the actuarial interest rate but instead some market rate.

Specifically, if the plan is underfunded, then new past service liability arising after December 31, 1987, must be amortized annually for plan years beginning January 1, 1989, or later according to the following schedule:

$$\text{Percent} = .30 - .25(F - .35) \le .30,$$
$$F < 1.00 \tag{8–1}$$

TABLE 8-2 Funding Provisions of the Pension Protection Act

Provision	Old Law	New Law
Amortization periods (number of years)		
Existing past service liability	30	18
New past service liability	30	$.30-.25(F-35)$†
Gains and losses—asset values	15	5
Gains and losses—actuarial assumption	30	10
Waivers	15	5
Shutdown benefits (post-event)	15	7‡
Actuarial assumptions		
General: "reasonable"	In aggregate	Individually
Interest rates	None	Within 10% of 30-year Treasury (4-year weighted average)
Defunding protection		
Waivers each 15 years	Five	Three
Liens for unpaid contributions	None	Arise 60 days after due date
Control group liability for contributions	No	Yes
Benefit increase limit	None	Security required if $F<60\%$
Effective date of new law	1988 plan year except 1989 for new past service credit and shutdown provisions	
Steel transition rule	Annual increase in funding ratio not required to increase by more than 1 percent per year for five years.	

Note: For more detail, see Appendix E to book.
*"New" past service credit is past service credit arising after 1988.
†Contribution as percent of underfunding: F denotes the plan's funding ratio on a termination basis (using interest rate assumption stated in table). The maximum contribution does not exceed .30.
‡Under some conditions, the rate of amortization could be higher.

where F is the plan's termination funding ratio calculated after new benefits are awarded using a rate within the range of 90 to 110 percent of the 4-year average of the 30-year Treasury bond rate.[3]

The required contribution for past service liability is the greater of

[3]Technically, the legislation requires the plan to use a rate consistent with annuity purchase rates, subject to the restriction that they remain within the corridor described above. In addition, the U.S. Treasury has the authority to use a weighted average of the 4-year average of 30-year rates. At the time of this writing, it was contemplating a 4-3-2-1 weight scheme with the highest weight attached to the most recent year.

TABLE 8-3 First-Year Contributions for New Past Service Liability after 1988

Termination Funding Ratio	Contribution as a Percent of New Underfunding
100% or more*	8.79%
80	18.75
60	23.75
40	28.75
20	30.00
0	30.00

*This is the first-year amortization amount assuming an 8 percent actuarial interest rate. In subsequent years, the amortization rate falls in real terms. To be directly comparable with the other numbers in the table, the assumption must be made that the actuarial assumed interest rate is equal to the rate calculated by the U.S. Treasury for purposes of enforcing the funding rule in Equation (8-1). See footnote 4 in text.

the value implied by the schedule in Equation (8-1) or the required contribution under the old law. There are no other cash flow funding deterioration rules as in the PBGC proposal.

The schedule of contribution requirements implied by Equation (8-1) is shown in Table 8-3. If the termination funding level falls below 100 percent, the contribution requirement for benefit improvements increases markedly. If the funding ratio is 80 percent, the first-year contribution is 18.75 percent; if 60 percent, the requirement is 23.75 percent, and so on, up to a maximum of 30 percent.

If the funding ratio is 100 percent or more, the amortization schedule remains the same as under the previous law: new benefits may be amortized over 30 years. These amounts are amortized in equal nominal installments (like a house mortgage) and thus depend on the actuarial interest rate. Using continuous compounding and an 8 percent rate (a typical actuarial rate used in 1986), the first-year contribution over 30 years is 8.79 percent.[4]

Notwithstanding the faster amortization requirements, large[5] benefit increases in the plan are not permitted under the new law if, either before or as a result of the benefit increase, the funding ratio is less than 60 percent, unless security is posted to cover the incremental underfunding caused by the benefit increase (up to the 60 percent level).

To illustrate how the schedule works, consider the one-worker

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[4]This rate, however, is not directly comparable to the ones described in Equation (8-1). This is because once the plan is fully funded, it must follow the pre-PPA minimum funding rules. But these rules use an actuarial interest rate, which is typically lower than market rates, and thus the 8.79 percent contribution rate is applied against a higher underfunding number. For simplicity, I depict the 8.79 percent number in Table 8-3 under the assumption that the actuarial assumed rate equals the rate required in Equation (8-1).

[5]Large is defined to include benefit increases amounting to $10 million.

TABLE 8–4   Illustration of Faster Amortization Schedule

Year	Contributions		Funding Ratio	
	Old Law	New Law	Old Law	New Law
0	—	—	—	—
1	$500	$2,812	80.6%	83.7%
2	500	2,172	81.3	86.6
3	500	1,711	81.9	88.9
4	500	1,372	82.6	90.7
5	500	1,114	83.3	92.2

Note: Liabilities increase from $60,000 to $75,000 at the end of year zero; assets equal $60,000 in year zero (100 percent in Treasury bills); the interest rate and asset earnings are zero; there are no existing service liability or experience gains or losses; plan frozen after benefit increase in year zero.

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pension discussed in Chapter 7. A 45-year-old worker with 20 years of service has an annual pension benefit of $120 per year of service beginning at age 55. The interest rate is zero, and all assets are invested in three-month T-bills so that earnings on assets are also zero. If death occurs at age 80 (with certainty), the termination liability equals $60,000 for service incurred to date. Assuming assets also equal $60,000 and there are no amortized required contributions for gains and losses and no past service liability, the plan sponsor would be required to contribute only normal cost to the plan ($3,000 per year).

If the firm increases the benefit to $150, the liability increases to $75,000, and the termination funding ratio is now 80 percent. Thus, according to Equation (8–1), in addition to normal cost the firm is required to make a first-year contribution equal to 18.75 percent of the new $15,000 in liabilities, or

$$\text{Contribution} = [.30 - .25 (.80 - .35)] \times 15,000$$
$$= .1875 \times \$15,000 = \$2812 \tag{8–2}$$

Assume for the sake of maintaining a simple calculation that the plan is frozen following the benefit increase: service beyond age 45 is not counted in the pension benefit. Then, in the second year, if asset values do not change, the funding requirement falls to 17.8 percent because the funding level after the year-one contribution is 83.75 percent (assets are $62,812, and liabilities are $75,000).

According to the previous law, the annual minimum contribution using a zero interest rate was only 3.33 percent of $15,000 (the underfunding was amortized over 30 years), or $500. Table 8–4 compares funding levels under the old and new laws for five years after the benefit increases when the interest rate is zero. After five years, the funding ratio under the old law is increased from 80.6 percent to 83.3 percent, compared to 92.2 percent under the new law.

The above example is given for illustration only. For positive interest rates, the pre-1987 30-year amortization schedule is more front loaded than it would be with a zero interest rate. For example, if an 8 percent interest rate is used, the first-year contribution under the new rules would only be roughly twice the first-year contribution under the old rules, rather than over five times as depicted in the table.[6] Thus, though the example shown in Table 8–4 serves to illustrate the qualitative impact of the new amortization periods, it generally overstates their quantitative effect.

Changes in underfunding attributable to reasons other than benefit increases are also amortized over shorter periods in the new law. Gains and losses attributable to plan investment experience or to changes in actuarial assumptions must be amortized over 5 and 10 years, respectively, instead of 15 and 30 years. In addition, waivers are amortized over 5 years, and shutdown benefits are amortized over 7 years instead of 15 years.

Transitional Rules

The new amortization schedules do not apply to past underfunding. Underfunding that existed as of December 31, 1987, is not amortized according to Equation (8–1) but instead over 18 years. This is in comparison to the 30-year schedule for amortization of past service liability used under the old law. Thus, in the case of a zero interest rate, the contribution rate for existing underfunding is increased from 3.33 percent to 5.55 percent. For an 8 percent interest rate, the contribution rate increases from 8.79 percent to 10.49 percent.

In addition, special transitional rules apply to certain large integrated firms in the steel industry. These firms, which comprise a large portion of the PBGC's current risk and exposure, have a special rule: they are not required to make contributions by amounts that would increase their funding ratios by more than 1 percent per year for five years. Ultimately, however, as transitional rules are gradually replaced by the new amortization rules, funding ratios across pension plans ought to be higher than they otherwise would have been under previous law.

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[6]Using an 8 percent interest rate, the present value of a $2,400 annuity from age 55 to age 80 discounted back to age 45 is approximately $11,655. A benefit increase from $120 per year of service to $150 increases this amount by $2,913. If assets equal $11,655, the termination funding ratio is 80 percent; thus, the new rules require a contribution equal to .1875 × $2,913, or $546. In comparison, amortizing the amount $2,913 like a house mortgage over 30 years generates a payment of $256. This example assumes the actuarial interest rate equals the interest rate used by the U.S. Treasury for calculating Equation (8–1).

SHORTCOMINGS OF NEW MINIMUM FUNDING RULES

The new law instituted stricter funding rules than those originally specified in ERISA and addressed some of the ways to defund prior to filing a claim. The law, however, may not be successful in reducing PBGC claims in all cases or under all economic conditions, and much depends on how successful firms will be in circumventing the intent of the new law. In this section, I consider several reasons why future claim levels might not be affected by the amounts perhaps intended by Congress when it enacted the new funding requirements.

Defunding

The previous chapter indicated that a significant portion of the PBGC's claims arise not so much from low funding levels as from rapid defunding prior to termination. The new funding laws affect only underfunded plans, calculated in a termination sense. Because substantial underfunding among firms with risky exposure has historically tended to arise during the few years prior to termination, it becomes important to learn the efficacy of the new funding laws in preventing defunding during the pretermination period.

Steps toward controlling defunding. Virtually all the ways to defund a pension plan enumerated in the previous chapter are still available at some level under the new law. Most have been curtailed, however, some perhaps in important ways. At the same time, it must be recognized that gaming potential is dynamic: firms may find new ways to defund under the new law.

The steps taken in the Pension Protection Act to reduce the defunding problem are worth considering. First, consider waivers. The number of permissible waivers has been reduced from five to three every 15 years, which reduces the underfunding potential for terminations like Rath Packing and Continental Steel, who each obtained five waivers prior to termination (see Chapter 7). In addition, contributions are now required quarterly instead of 8.5 months after the end of the plan year. This requires firms to make their waiver requests sooner than was previously allowed, thereby reducing the periods of zero contributions pending resolution of a waiver request.

Much depends, however, on how the Internal Revenue Service treats the waiver process. The Pension Protection Act requires the IRS to determine that the waiver request is based on a "temporary hardship," not imminent failure.[7] And further, the IRS is permitted (though not required) to obtain collateral for the plan from the plan sponsor for all waiver requests over $2 million. If the IRS takes a conservative

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[7] The temporary hardship requirement refers to the entire control group.

approach to granting waivers, this method of defunding could be substantially reduced. Because tax records are not publicly available, however, empirically measuring the IRS's behavior over time will not be possible, except as claims show up at the PBGC.

Unpaid contributions also have been addressed in some detail in the new law. As stated above, contributions are required quarterly instead of 8.5 months after the end of the plan year; thus, the IRS can learn of missed payments sooner. The likelihood of firms making no contributions for two years prior to termination and being undetected (a not uncommon experience prior to 1987—see Chapter 7) becomes remote.

More important, if firms miss contributions, a lien automatically arises against the plan sponsor (including the entire control group) for the full amount of the missed contribution. If the PBGC can "perfect" the lien against the plan sponsor's assets, the claim becomes secured in bankruptcy and has a higher priority than unsecured creditors' claims.[8] If the lien cannot be perfected, the amount of the missed contributions takes on a tax-status priority in bankruptcy, which is lower than secured status but higher than general unsecured status.

In addition to the above changes, the new law requires collateral to be posted to fund benefit increases amounting to $10 million in plans less than 60 percent funded. Also, amortization periods have been reduced for shutdown benefits, changes in actuarial assumptions, and waivers, thereby reducing the amount of defunding affiliated with these events.

Potential shortcomings of the new provisions. Though the new law is intended to reduce defunding prior to termination, the potential for continued moral hazard continues to exist. For example, consider that under the new amortization rules, contribution requirements typically will tend to increase when firms are in financial difficulty, perhaps because of plant shutdowns or falling funding ratios attributable to lower contribution amounts. This may make it easier for firms to convince the IRS to grant waivers and may push some firms into bankruptcy that otherwise might survive.

In addition, the new funding rules might make it easier to meet the distress tests under SEPPAA, as amended by the Pension Protection Act. PPA requires as a condition of receiving a PBGC transfer, that the bankruptcy court determine that without the PBGC transfer, the plan sponsor will be unable to emerge from a Chapter 11 reorganization proceeding. The combined effect of faster amortization of shutdown benefits, past underfunding, and waivers may make it easier to demon-

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[8]Because this provision has a size threshold of $1 million in missed contributions, it will not affect the behavior of most PBGC claimants, though it will substantially affect those posing the largest dollar exposure to the PBGC.

strate the burden of high contribution requirements on the future survival of the firm, unless the pension plan is terminated.

Greater contribution requirements may also result in more unpaid required contributions. While the PBGC in principle can perfect liens against unpaid contributions (that is, file a notice in a court to attach assets), other creditors, knowing the potential that the lien will be perfected, may not leave any assets unattached for the PBGC to perfect. The race to attach assets has two negative implications. First, liens for unpaid contributions will more likely take the form of priority claims rather than secured claims (which still is significantly better than general creditor status). Second, the race itself could precipitate more bankruptcies than would otherwise occur.

There is also some downside potential from the IRS becoming overly aggressive in its waiver process. As shown in Chapter 7, waivers among PBGC claimants have accounted for a significant portion of the claims amounts. But the vast majority of waivers have not resulted in claims against the PBGC, suggesting that most "loans" granted through the waiver process are not written off as "bad" in some sense. If the IRS becomes too stringent in its handling of the process, it could contribute to failure of some financially troubled firms, thus leading to more failures and more (though perhaps smaller) claims against the PBGC.

Plant shutdown decisions may also be affected by faster required amortization. Instead of shutting down plants three to five years prior to termination, it may now be optimal for firms to close them, say, one to three years prior to termination, thereby evading much of the impact of faster funding requirements. In effect, the cost of shutting down a plant has been increased by the Pension Protection Act.

None of this discussion suggests the new funding rules will not significantly reduce insurance claims to the PBGC. Rather, it suggests a final evaluation of the legislation must await a determination of the success of potential claimants in gaming the new system.

Falling Interest Rates

All of the stricter funding rules are predicated on the notion of underfunded pension plans at a point in time. For example, return to our one-worker example. A 45-year-old worker with 20 years of service will retire at age 55 and die at age 80; his annual pension benefit will be $120 for each year of service. If the 4-year average 30-year Treasury bond rate is 6 percent, the termination liability for this firm based on service as of age 45 is roughly $17,000. Suppose assets are also $17,000 so that this plan is fully funded.

For the sake of simplicity, I will assume the portfolio is composed entirely of three-month Treasury bills and thus is virtually unaffected by changes in nominal interest rates. This permits us to concentrate on

the first-order impact of interest rate changes on liabilities without having to carry along a second-order potential impact on the asset side. In general, as long as the pension plan is diversified across bonds and equity, plan assets should not be unduly sensitive to changes in interest rates.[9] Thus, the qualitative results illustrated using the Treasury bill portfolio is applicable in general.

To illustrate the point, consider a simple example: suppose the interest rate falls from 6 percent to zero. In this case, the potential liability facing the PBGC for this plan increases to $60,000: the funding level becomes 28 percent.

The rules do not require the firm to impose the faster amortization schedule in Equation (8–1) against the $43,000 in underfunding because the firm must calculate benefits using a 4-year average of 30-year Treasury bond interest rates.

Suppose the Treasury implements a simple four-year average interest rate requirement. In this case, the averaging rule requires the use of a 4.5 percent interest rate (6 percent for three years and zero percent for one year). Liabilities by law are calculated as approximately $23,000, implying a funding ratio of 74 percent instead of 28 percent. Thus, the first-year required additional contribution is only .30 − .25(.74 − .35) = .2025, × $6,000 ($23,000 − $17,000), or $1,215, which is less than three percent of the underfunding amount.

The U.S. Treasury could ameliorate this effect by using market interest rates instead of four-year averages. This is unlikely to occur, but the Treasury almost certainly will attach weights to the averaging process. A likely possibility is a 4–3–2–1 weighting scheme, with the highest weight attached to the most recent year. In this case, the plan would be required to use a 3.6 percent rate instead of 4.5 percent, which would increase the first-year contribution from $1,215 to $2,491. A market interest rate, however, would generate a contribution equal to $12,900.[10]

More generally, even if the Treasury used market rates, efforts to

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[9]The intuition behind the expectation that assets lose value with increasing interest rates is attributable to pension long-term bond holdings. When interest rates increase (say, owing to higher expected inflation), bondholders incur a capital loss. But bond issuers incur a capital gain. Because pension plans also hold corporate equity shares—the primary *issuers* of bonds—plans should earn corresponding capital gains on equity holdings to offset losses on the bond side. Thus, diversification across bonds and equity offsets the first-order impact of nominal interest rate changes. Changes in *real* interest rates will reduce values of all assets in the portfolio; but as a first-order approximation, most of the volatility in nominal long-term interest rates is likely attributable to changing expectations of future inflation, not changes in real rates.

[10]Using the zero market interest rate, the funding ratio is 28 percent and total underfunding is $43,000. Substituting the 28 percent funding ratio into the funding formula, the contribution requirement is 30 percent [see Equation (8–1)]; multiplying this by $43,000 yields a total contribution of $12,900.

improve funding do not prevent large exposure levels from arising when interest rates fall. Thus, when termination funding ratios are high, potential claimants could increase benefits during periods of high interest rates. If this is followed by a period of low interest rates, additional exposure could arise.

Actuarial Asset Values

Similar problems arise if trust assets experience substantial reductions in value, because the law permits actuaries to "smooth" asset values instead of using market valuations. Thus, if asset values fall, plans can pretend they are still high, thereby forestalling the requirements for higher contributions.

More particularly, the Internal Revenue Code permits actuaries to value assets using a consistent averaging formula if the resulting estimate is within 80 percent to 120 percent of market-value assets. Average value can reflect the average of asset prices over a five-year period, including the current year.

Consider an example. Liabilities are $100 million; assets also equal $100 million. Asset values weighted by the security composition of the portfolio have not changed for four years; say this index is 100. In year five, asset values fall by 20 percent to $80 million. When this occurs, exposure to the PBGC increases by $20 million, yet actuarial assets are calculated as the five-year average, or $96 million.

Because this number is within 20 percent of actual market value (80), assets in this example can be set equal to 96 for funding purposes. Even though the funding ratio is 80 percent and exposure to the PBGC is $20 million, plans can mitigate the new minimum funding rules by portraying the plan as if it had a 96 percent funding ratio and $4 million in exposure.

These problems could have been largely circumvented had the law required the use of market-value assets and market interest rates in the funding rules. By not doing so, the law imposes a potential wedge between actual exposure facing the insurance company and exposure calculated by actuaries for purposes of satisfying the funding requirements.

IMPLICATIONS OF THE NEW FULL FUNDING LIMIT

Thus far, discussion of the Pension Protection Act has been limited to the new rules it imposes on underfunded plans. While this was supposed to be the focus of the new law, the overall impact of the legislation may be more constraining to well-funded plans. This is because as part of the Omnibus Budget Reconciliation Act of 1987

(OBRA), Congress imposed a new *full funding limit* on well-funded plans, thereby reducing their ability to contribute to the pension plan on a tax-deductible basis.

Impact on Pension Plan Funding

Under the previous law, firms were permitted to contribute the following amounts to the pension plan: the sum of the normal cost contribution, which essentially is an amount that funds the current-year increase in service accruals (see Chapter 7), plus an amount to amortize existing levels of underfunding attributable to past service liability and experience gains and losses. Plans were permitted to be fully funded in an ongoing sense (recognizing salary projection); once this level was attained, only normal cost contributions were permitted. Because the actuary was reasonably free to choose assumptions, the plan could still become moderately overfunded in an ongoing sense, despite the so-called full funding limit. For example, Table 7–1 showed that in 1986, roughly 20 percent of participants were in plans over 125 percent funded in an ongoing sense.

The Pension Protection Act changed the full funding limit in the following way: it prevents *all* contributions to the pension plan (including normal cost) if the plan has assets in excess of 150 percent of *termination* liabilities. For purposes of the test, the actuary must use an interest rate within the range of 90 to 110 percent of the 4-year average of 30-year Treasury bond rates.

Table 8–5 shows the distribution of termination funding ratios for 1986 using 90 percent of a simple average of this rate over the 1982–86 period (the Secretary of the Treasury has the authority to change the weights on these rates through regulation). The data show that fully 57.9 percent of all plans, representing 55.8 percent of all participants, will be precluded from making contributions to their plans (plans with fewer than 100 participants are not included in the table).

Interestingly, the data show that though the law was originally intended to affect only a small number of relatively underfunded plans, it actually will impact most plans. Only 27.8 percent of the plans have termination funding ratios within the 100–150 percent corridor where much of the old law prevails (some faster amortization schedules still apply to these firms). A portion of these firms, however, will potentially "bump" against one or the other of the corridor constraints.

The impact on the funding limit is large for several reasons: (1) 150 percent of termination liabilities is small in relation to ongoing liabilities at current interest rates (see below); (2) the new constraints do not even permit contributions for normal cost; and (3) the actuary has no opportunity to effectively expand the limit by adjusting the plan

TABLE 8–5   Funding Ratios Using Four-Year Treasury Rate, 1986

Funding Ratio	Plans	Participants
Less than 25%	0.4%	0.2%
5–49	1.6	1.8
50–74	4.1	3.7
75–99	8.2	9.6
100–124	12.1	11.9
125–149	15.7	17.0
150 or more	57.9	55.8
Average: 144		

Note: Liabilities are discounted at 90 percent of the simple average of constant-maturity 30-year Treasury bond rates from 1983 to 1986. This rate turned out to be 9.5 percent.
Table reflects plans with 100 or more participants only.
SOURCE: 1984 Form 5500 Annual Pension Plan Reports, projected to 1986.

assumptions.[11] As such, the new law ensures defunding of all plans in excess of the 150 percent limit.

That is, suppose contributions are set so that combined with investment returns, benefits can be financed without liquidating pension plan trust assets. Then, if the new rule sets contributions at zero, benefit payments will erode the asset base until the funding ratio falls below 150 percent of termination liabilities.

The impact of the new limit will be broader and more significant if the interest rates drift higher than current levels. This can be seen in Table 8–6. This table represents the average pension plan in 1986 (based on Form 5500 Annual Report data). Column 2 shows that on an ongoing basis, the typical plan was 87.8 percent funded in 1986. Ongoing liabilities are calculated at a 2 percent interest rate. The ability to retain this funding level depends on the calculation of termination liabilities which in turn primarily depend on the long-term nominal rate of interest.

Ongoing liabilities are much less dependent on changing interest rates because the inflation component that determines interest rates also affects salary projections and inflation adjustments to retirees.[12] For the calculations in Table 8–6, I assume ongoing liabilities are based

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[11]By converting from an ongoing concept to a termination one, actuaries are denied the opportunity to choose worker turnover and wage growth assumptions. Further, the law specifies the interest rate that can be used.

[12]Even though payments during retirement are typically not explicitly related to inflation, as a practical matter firms, at least partially, adjust benefits for inflation, thus further insulating true economic liabilities from the inflationary component of nominal interest rates. The actuary can effectively fund for postretirement adjustments by increasing the assumed rate of wage growth for active workers.

TABLE 8-6 Relation of Termination to Ongoing Liabilities

Interest Rate	Termination Funding Ratio† (1)	Ongoing Funding Ratio*	
		Old Law (actual) (2)	New Law‡ (maximum)§ (3)
5.0%	106.8%	87.8%	123.2%
7.5	126.2	87.8	104.3
10.0	149.3	87.8	87.8
12.5	176.5	87.8	74.5
15.0	209.3	87.8	62.8
20.0	299.4	87.8	43.8

*Ongoing liabilities are approximated by discounting liabilities at a 2 percent interest rate.

†Calculated prior to deterioration of assets to meet the new 150 percent constraint.

‡Calculated after asset levels have deteriorated until the new 150 percent full funding limit has been attained.

§Funding ratios in excess of 100 percent might also be constrained by the old full funding limit which is still operable.

SOURCE: Simulations based on 1984 Form 5500 Annual Pension Plan Reports, projected to 1986.

on a constant 2 percent interest rate, regardless of the level of the nominal interest rate.

The table recalculates termination funding ratios and full funding limits as a percent of ongoing pension liabilities for interest rates from 5 to 20 percent. Evaluated at a 7.5 percent interest rate, the termination funding ratio for the typical plan is 126.2 percent; thus, at this interest rate, the full funding limit is similar in the new and old laws because both continue to permit some additional funding.

At a 10 percent interest rate, however, the average termination funding ratio is almost at the 150 percent limit (it equals 149.3 percent), and thus the typical pension plan is about to be constrained from making further tax-deductible contributions. As column 3 shows, this means the funding ratio for real or ongoing benefits is constrained to 87.8 percent, instead of the 100 percent allowed under the old law.[13] This essentially reflects the impact of the law in 1986: in 1986, 90 percent of the 4-year average of 30-year Treasury bond rates was 9.5 percent.

If the interest rate increases beyond 10 percent, plans are faced with even lower ceilings on their permissible funding ratios on an ongoing basis. For example, when the interest rate is 20 percent, the

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[13]This ratio is calculated as follows: The permissible termination funding ratio of 150 percent is proportional to the ratio 100/67, where 100 denotes assets and 67 denotes termination liabilities. Because the ongoing ratio is .878 and assets are 100, ongoing liabilities are 113.8. The full funding limit permits assets to be no higher than 100 (67 in termination liabilities times 150 percent). Thus, only 87.8 percent of ongoing liabilities may be funded (100 divided by 113.8).

termination funding ratio for the typical plan in 1986 would have been 299.4 percent. Because the plan sponsor would not contribute to the fund on a tax-deductible basis until assets fell below 150 percent of termination liabilities, its ongoing funding ratio would decrease.

If the interest rate remained at 20 percent, the ongoing funding ratio would effectively fall to 43.8 percent before further contributions would be permitted. At this interest rate level, firms are permitted to fund less than half of the ongoing liabilities they have incurred, in comparison to 100 percent under current law.[14]

Potential Impact on PBGC

The potential effects stemming from higher interest rates are not restricted to plans having no exposure to the insurance company. This can be demonstrated by a simple, stylized simulation. Suppose the current interest rate is 10 percent. Based on this rate, the distribution of termination funding ratios from the 1984 Form 5500 data projected to 1986 is given in columns 1 and 2 of Table 8–7. Consistent with Table 8–6, the average termination and ongoing funding ratios are 149 percent and 88 percent, respectively.

For the sake of simplicity, ignore the four-year averaging of rates and assume the full funding limit under the new law is calculated at the existing long-run rate. Let this rate increase suddenly from 10 to 20 percent owing to higher inflation expectations.

The distributions of funding ratios at the higher interest rates are given in columns 3 and 4 of Table 8–7. These numbers portray funding ratios the instant following the increase in the interest rate. They do not account for reductions in the asset base caused by the imposition of the new full funding limit. The termination funding ratio now averages 299 percent; the ongoing funding ratio is still 88 percent because it is essentially unaffected by higher inflation (recall that I calculate ongoing liabilities using a constant 2 percent interest rate). At the 20 percent interest rate, fully 94 percent of all plans (weighted by participants) are affected by the 150 percent termination funding limit and thus are precluded from making tax-deductible contributions to the pension plan.

Assume real rates of return in the portfolio are zero, and benefits are paid out at the rate of 8 percent of ongoing liabilities per year. Because contributions are not permitted for all plans above the 150 percent limit, assets will deteriorate accordingly until each plan's funding ratio falls below the 150 percent limit, after which I assume

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[14]Referring to the previous footnote, when the termination funding ratio is 299 percent, termination liabilities are not 67 but rather 33. One hundred and fifty percent times 33 equals 50, which is only 43.8 percent of ongoing liabilities (equal to 113.8).

TABLE 8-7 Potential Reduction in Funding Levels under New Full Funding Limit (dollars in billions)

| Funding Ratio | Interest Rate (in sequence) | | | | | |
| | i = 10 | | i = 20 | | i = 10 | |
	Termina-tion (1)	Ongoing* (2)	Termina-tion† (3)	Ongoing (4)	Termina-tion‡ (5)	Ongoing‡ (6)
Less than 25%	0.3%	0.6%	0.0%	0.6%	0.3%	0.6%
25–49	1.8	6.5	0.3	6.5	1.8	22.0
50–74	3.6	24.5	0.4	24.5	4.9	52.5
75–99	9.0	33.0	1.7	33.0	32.5	19.0
100–124	11.0	22.5	1.1	22.5	23.0	2.8
125–149	15.5	9.0	2.5	9.0	18.5	0.5
150 or more	58.8	3.9	94.0	3.9	19.0	2.6
Average	149%	88%	299%	88%	107%	62%
Underfunding	$19.5	$122.4	$1.4	$122.4	$37.3	$254.2

Note: Distributions are on a participant basis.

Illustration is based on estimated 1986 data projected from the 1984 Form 5500 Annual Pension Plan Reports. The simulation assumes that (1) the interest rate increases from 10 to 20 percent; (2) the new interest rate is used immediately rather than smoothed by a four-year average; (3) the 20 percent rate remains in effect for five years; and (4) assets are drawn down at the rate of 8 percent of ongoing liabilities (representing benefit payments).

*Ongoing liabilities are calculated using a 2 percent interest rate.

†Calculated prior to deterioration of asset levels owing to the new full funding limit.

‡Calculated subsequent to asset deterioration owing to the new limit; and before additional contributions are made to reattain the new 150 percent full funding limit at the new, lower interest rate.

plans maintain this limit. I also assume all plans below the 150 percent limit maintain their ongoing funding ratios at the same level.[15]

Assume the 20 percent interest rate prevails for five years. At the end of this period, suppose inflationary expectations fall to their previous level, so that interest rates return to 10 percent. Because relatively well-funded plans were precluded from making contributions when interest rates were high, the funding ratios in the new equilibrium will have deteriorated over the five-year simulation period. The new funding distributions reflecting lower asset levels and the reemergence of the 10 percent interest rate are given in the last two columns in Table 8-7.

Ongoing funding ratios are 62 percent compared to 88 percent on average at the start of the simulation period, with $254 billion in unfunded liabilities compared to $122 billion at the start of the

[15]In reality, plans with funding levels below 100 percent ought to increase their funding levels over time owing to the stricter funding requirements in the law for such plans.

simulation. Termination funding ratios are 107 percent compared to 149 percent, with $37 billion in exposure compared to $19 billion. The latter numbers imply that the potential exposure to the pension insurance company roughly doubles.

In short, the imposition of the new funding limit can work at cross purposes to the intent of the legislation. While the law takes steps to improve funding for some plans, it raises the possibility that the insurance corporation's exposure could increase. Moreover, the legislation permits less than 100 percent funding on a tax-deductible basis for most plausible interest rate levels; and therefore, another bias in favor of defined contribution plans is created because those plans are still permitted to fully fund on a tax-deductible basis (more on this in Chapter 9).

The problems raised by the new full funding limit could be solved if Congress would redefine the full funding limit in terms of ongoing liabilities. Instead of permitting 100 percent of these liabilities to be funded, it could set the permissible level lower, say, at 90 percent (the exact number to be set to generate the same tax revenue as the 150 percent termination limit at interest rates prevailing at the time the law was enacted). This would generate the same target tax revenue but insulate ongoing funding ratios from changes in nominal interest rates.

OTHER REFORM PROPOSALS

The provisions of the Pension Protection Act were the result of a long discussion addressing how best to reduce the growing financial problem at the Pension Benefit Guaranty Corporation. The nature and magnitude of this problem was discussed at length in Chapters 3 through 5. Proposals submitted by the PBGC in 1987 as well as the provisions of the new law were evaluated in chapters 6 through 8. Not yet discussed are proposals raised during the debate process but not reflected in official proposals or legislation. It is appropriate to present these ideas now as a prelude to the next chapter, which discusses efficiency aspects of various reform ideas, and to Chapter 10, which deals exclusively with ideas for a rational economic insurance policy.

The areas not reflected in the new legislation that were actively considered and debated (inside and outside government) involve benefit reductions, provisions for liens, and changes in the bankruptcy law. The reform ideas I discuss below are listed in Table 8-8.

Benefit Reductions

Maximum benefit. Discussion of benefit reductions followed the standards set out in the Multiemployer Pension Protection Amendments Act of 1980 (MPPAA). As discussed in Chapter 5, MPPAA

TABLE 8–8 Ideas for Reform Not Legislated

Category	Description
Benefit reductions*	
Maximum guaranty	Reduce maximum to be consistent with multiemployer program
5-year cliff benefits	Freeze benefit accruals (except service) for five years prior to termination (replaces five-year phase-in)
Shutdown benefits	Eliminate from guarantees, or create separate trust protected by supplemental coverage
Age of first receipt	Normal benefits available at age 62; full actuarial reductions for earlier receipt
Liens†	Attach assets of plan sponsor to cover underfunding amounts
Bankruptcy‡	
Priority	Give pensions absolute priority in bankruptcy proceedings
	Eliminate 30 percent net worth limitation on tax-priority claims
Eliminate Chapter 11 termination	Restrict termination to Chapter 7 of the bankruptcy code
Chapter 11 with PBGC approval	Permits termination in Chapter 11 only if PBGC approves

*The Pension Protection Act restricted increases in benefit generosity if the plan's funding ratio was less than 60 percent funded (on a termination basis) and the benefit increases exceeded $10 million.

†The Pension Protection Act permits liens for due and unpaid contributions (not counting waivers) when these amounts reach $1 million.

‡The Pension Protection Act permits Chapter 11 terminations on finding of the court that reorganization otherwise will be unsuccessful.

guarantees maximum benefit levels roughly half as generous as the single-employer program. It was shown that the existing maximum benefit formula in the single-employer plan may have had a substantial impact on limiting the accumulation of the PBGC's deficit through 1987 (see Table 5–3). Application of MPPAA-like reductions in this maximum would have important effects on the amounts of claims for future years.

Five-year cliff guaranty. MPPAA also imposes five-year cliff guarantees compared to a five-year (20 percent per year) phase-in of new benefits in the single-employer program. As mentioned in Chapter 7, no effort has been made to quantify the impact of the phase-in on PBGC claims. But, based on their study, the General Accounting Office (see Chapter 7) concluded that the problem was substantial and recommended application of the five-year cliff rule.

Shutdown benefits. Shutdown benefits are also virtually nonexistent in multiemployer plans. In many multiemployer plans,

workers may be mobile among firms, and thus shutdown of one plant or firm may not affect employment or pension accruals. In addition, the shutdown of one plant in the group would translate into higher liabilities to all other firms.[16]

In single-employer plans, shutdown benefits are common among industries that pose the most risk and exposure to the PBGC; notably, the steel and automobile industries. On plan termination, benefits payable to participants affected by plant shutdowns prior to the termination event are guaranteed and thus payable by the PBGC (up to the maximum guarantee limit). Because these benefits are not pre-funded and represent unusually generous benefits to unusually young participants, they have been the subject of much debate.

Various ideas have been considered to control the shutdown problem, including requiring the benefits to be prefunded; separate funds to be used to accommodate these benefits with a different set of guarantees; and special surcharges to be applied to plans with these benefits to help offset their expected cost on the insurance system (see Chapter 6).

Standardized normal retirement age. Another idea discussed in Chapter 5 integrates the shutdown problem with the notion of benefit reductions for early retirement. The idea is to redefine the PBGC guaranty so that all full benefits would be payable at the age at which social security payments were available, say, age 62 or 65. If age 62 were chosen, then regardless of the plan provisions, insured full benefits would commence at age 62. Insureds could receive benefits earlier (say, as early as age 55), subject to full actuarial reduction. (The implications of this change were illustrated in Figure 5–1.) Essentially, this benefit change eliminates the problem of shutdown benefits, which are problematic only because they award full benefits much earlier than age 62. The change also reduces benefits in plans that have relatively generous early normal retirement ages.

Lien against Underfunding

Another reform idea involved the creation of liens against real property held by plan sponsors. This approach is essentially a substitute for funding rules. If some firms do not fund their plans sufficiently, the resulting exposure can be eliminated by attaching assets of the firm, thereby making the PBGC a secured lender to the firm.

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[16]Under MPPAA, the insurable event occurs when the plan is unable to pay current benefits at the guaranteed level. When this occurs, the PBGC is required to provide the plan with sufficient funds to pay benefits at the guaranteed level. The provision of funds is in the form of a loan subject to repayment to the PBGC. If one firm fails then the remaining participating plan sponsors absorb the underfunding previously allocated to the failed firm.

Perhaps the most dramatic lien proposal was made by the House Ways and Means Committee (HR 3345, 100th Congress). This bill proposed that if a pension plan's funding level fell below 70 percent, the PBGC could attach the plan sponsor's assets by the *entire* amount of the underfunding.

When the Pension Protection Act was enacted, these broad powers were not included. Instead, the PBGC was awarded the opportunity to attach liens (which must be perfected to be enforceable) in amounts equal to due and unpaid contributions (not counting waivers) when these amounts reached $1 million. This provision tends to restrict the lien potential to the last year or two prior to a termination.

Bankruptcy Law

Change pension priorities. It has long been known that workers' pensions could largely be protected by a simple change in the bankruptcy laws. That is, if pensions were put at the front of the queue of all creditors on bankruptcy (including secured creditors), the risk of bankruptcy would essentially be transferred from workers to creditors. Creditors, in turn, would risk-rate the pension liability by requiring higher interest rates for credit when the risk of default is larger and the amount of exposure posed by the pension fund is greater.

A variant of this proposal eliminates the priority claim now constrained to 30 percent of the plan sponsor's net worth. That is, ERISA permits the PBGC in bankruptcy proceedings to enter a priority claim (tax-status claim) for underfunded, guaranteed benefits up to 30 percent of net worth. The problem is that net worth is often not large in a bankruptcy proceeding. The alternative is to eliminate the net worth cap entirely, which would increase the PBGC's priority above general creditor status (though it would still be lower than secured creditor status).

Eliminate Chapter 11 as distress criteria. Another proposal would eliminate filing for Chapter 11 of the Bankruptcy Code (reorganization), leaving only Chapter 7 (dissolution) as criteria for transfers from the PBGC. This change alone may not have much impact on behavior because it keeps intact two other distress criteria that do not require any bankruptcy filing (see Chapter 5). Assuming all criteria except firm insolvency are eliminated, however, the essential idea is to substantially reduce the incentive for some firms to declare Chapter 11 bankruptcy for the sole reason of collecting government subsidies (much of this from the PBGC).

Chapter 11 with PBGC discretion. One advantage of precluding a termination until a Chapter 7 filing is that fewer claims would be presented to the PBGC. However, because the PBGC would not be part of the creditor group in earlier negotiations with the firm (perhaps in a

Chapter 11 filing), further deterioration in pension plan funding prior to the filing of Chapter 7 would likely occur.

One way to give the PBGC more leverage is to permit Chapter 11 termination if the PBGC agreed to it. Essentially, this would give the PBGC more leverage in the Chapter 11 proceedings because without the PBGC transfer, all creditors would receive less and the firm would be more likely to file for Chapter 7 of the bankruptcy code.[17]

The Pension Protection Act did not include any changes in the Bankruptcy Code. However, the law did modify the distress criteria under a Chapter 11 filing to require the bankruptcy judge to determine that unless a pension termination takes place, as a part of the Chapter 11 proceeding, the firm will not be able to successfully reorganize. The determination does not require PBGC approval.

CONCLUSION

The Pension Protection Act (PPA) of 1987 was an important change in pension law. Motivated by a growing deficit at the PBGC, legislators sorted through literally dozens of ideas for reform. The hallmark of the legislation was a substantive change in the minimum funding rules for underfunded pension plans and changes intended to reduce the pretermination defunding problem. Ironically, the Omnibus Budget Reconciliation Act of 1987 (the umbrella legislation for PPA) imposed equally dramatic changes in funding rules, limiting maximum contributions for the majority of better-funded pension plans.

The net effect of the Pension Protection Act on PBGC solvency will not be calculable for many years. Transitional rules soften the legislative impact in the short run. It is also unclear whether firms will be successful in outwitting the intent of the new law, so that claims will not be affected as much as Congress intended. More certain is that improvements to the solvency of the insurance fund have come at some cost. These costs as well as a broader discussion of other efficiency (cost) issues surrounding pension insurance will be presented in the following chapter.

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[17]A discussion of bankruptcies is found in White (1988).