The Economics of Pension Insurance

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CHAPTER 4

_____Revenue Implications of _____
_____Claims Experience_____

The previous chapters indicate there is much room for reform in the insurance policies practiced by the Pension Benefit Guaranty Corporation. Whatever its policy, however, any insurance company must determine the revenue needs implied by the contract it writes. The problem of trying to set the premium level implied by expected claims has plagued Congress and the PBGC since ERISA was enacted. In this chapter, past experience is summarized, the results of past exposure and premium studies are reviewed, and an attempt is made to use available information to characterize the magnitude of expected claims facing the PBGC under the law existing in 1987. These estimates provide a basis to discuss the likely impact of new legislation enacted in 1987 (see Chapter 8).

EVOLUTION OF CLAIMS EXPECTATIONS

Evidence from the Early Years

The first study of termination pension losses was done by the Departments of Treasury and Labor. Their report, entitled *Study of Pension Plan Terminations, 1972*, was published in August 1973. The study assumed that (1) termination activity during the year 1972 was representative of pre-ERISA experience and (2) benefit losses incurred in 1972 would be a good index of activity after the enactment of ERISA.

The first assumption was accurate. In fact, the evidence suggests 1972 witnessed an unusually high number of terminations (Ippolito, 1986). Moreover, the interest rate in 1972 was certainly no higher than the range of interest rates after ERISA. (Moody's Aaa bond rate in 1972 averaged 7.2 percent—see Appendix A to book, Table A–17. Compare

this to the PBGC close-out rates from 1975 through 1986, which ranged from 6.75 percent to 10.50 percent—see Table 3–6.) Thus, calculations of termination-value benefits should not have been unrealistically low. The second assumption, we shall see, was not met.

Some of the characteristics of the insufficient terminations included in the study are shown in Table 4–1. Most of the terminated plans with losses had experienced economic problems, as evinced by the significant decline of participants in the five years prior to termination: 55 percent of the plans (weighted by participants) had at least a 25 percent reduction in participants. The funding ratios in these plans averaged 47 percent; and, as would be true of later experience, the results were dominated by a few plans (two plans accounted for fully one third of all losses in 1972).

The implied pension losses from these events (evaluated on a termination basis) are summarized in Table 4–2. There were roughly 19,400 participants in terminated plans that incurred losses; 8,500 were vested prior to termination. ERISA initially required vesting to occur within 10 years. During the period of the study, however, vesting usually occurred much later, often only at retirement age. Thus, many of the unvested losses prior to ERISA would be vested under ERISA rules and therefore subject to PBGC coverage.

Total benefit losses (liabilities minus assets in the pension plans) amounted to $48.6 million; losses to vested participants were $34.4 million. Because ERISA vesting standards would be more liberal than pre-ERISA standards in most plans and because the PBGC would insure only vested benefits, it is reasonable to infer from this experience that post-ERISA losses facing the PBGC would be in the range of $40 million.

The roughly 23 million participants in the single-employer pension plan universe suggest that a premium equal to $1.75 should have been established. Congress chose to be optimistic and set the rate at $1. As it

TABLE 4–1 Characteristics of Insufficient Plans, 1972

Category	Quantity
Percent with participant decline over 5 years (weighted by participants)	
At least 25% decline	55.7%
With some decline	96.7
Percent losses attributable to 2 largest plans (out of 546 plans with losses)	33.0
Funding ratio (including unvested benefits)	47.0

SOURCE: U.S. Departments of Treasury and Labor, *Study of Pension Plan Terminations, 1972,* (Washington, D.C.: U.S. Government Printing Office, August 1973).

TABLE 4–2 Losses from Terminated Plans, 1972

Category	Quantity
Participants	
Total	42,000
With losses	19,400
Vested with losses	8,500
Losses*	
Total	$48.6 million
Vested	34.4 million
Participants in all single employer plans	23 million
Participants with losses (19,400/23 million)	.08 %

* Losses are defined as termination-value liabilities minus the sum of trust assets and 30 percent of the plan sponsor's equity.

SOURCE: U.S. Departments of Treasury and Labor, *Study of Pension Plan Terminations, 1972,* (Washington, D.C.: U.S. Government Printing Office, August 1973), Tables 3–1 and 3–5A.

turned out, the $1.75 number would have been almost precisely what was needed to ensure a zero deficit at the end of the second fiscal year (September 30, 1976).

In 1977, the PBGC released the results of its first premium study. Data from the study are shown in column 1 of Table 4–3. The data show that based on the $1 premium, a $41 million deficit had been accumulated. To remedy this, the study recommended a premium

TABLE 4–3 The PBGC Deficit, 1976 and 1981 (dollars in millions)

Category	Cumulative Amount from Inception	
	9/30/76	9/30/81
Revenues		
Premiums	$48.2	$336.6
Investment income	5.0	55.8
Total revenues	53.2	392.4
Expenses		
Net claims from termination	59.3	429.8
Actuarial adjustment*	7.7	56.5
Pending terminations	15.0	—
Administrative expenses	12.2	94.9
Total expenses	94.2	581.2
Net deficit	($41.0)	($188.8)

* The actuarial adjustment reflects (1) charges caused by the passage of time that shortens the discount period before benefit payments are scheduled to be paid and (2) charges due to changes in the interest rate between the date of plan termination and the financial statement date. Assets and liabilities are reported on a market-value basis.

SOURCE: PBGC, *Premium Requirements for the Single-Employer Basic Benefits Insurance Program,* 1977 and May 1982.

increase to $2.25, which was roughly consistent with the original Treasury/Labor study, except a provision now was required to amortize the deficit and to account for inflation. Congress took the conservative route and enacted a premium of $2.60 effective January 1, 1978.

By 1981, this premium was obviously insufficient. Part of the problem was that the premium was not indexed to benefit levels. For example, wages (to which most pensions are explicitly or implicitly indexed) increased by 50 percent in the five-year period from 1976 to 1981 (see Appendix A, Table A–1). The other part was that claims rose at an ever-increasing rate even after adjusting for wages. Annual claims during the first two years of operation averaged $25 million; claims in the next five years increased by 140 percent in real terms, averaging over $60 million.

In 1982, the PBGC released its second premium study. The financial statement presented in the study is shown in the second column of Table 4–3. By the end of 1981, the deficit was $188 million. Based on this study, the PBGC asked for a premium increase to $6 effective January 1, 1983. Otherwise, the deficit, based on recent claims experience, would increase to $470 million by year-end 1986. Congress did not enact a premium increase.

Reappraisal of Claims and Policy: The 1982–1983 Experience

Though claims had increased to approximately $60 million per year during the five-year period ending in 1981, this still represented a problem of small magnitude. With defined benefit plan participation approaching 30 million, a flow of $60 million in claims could be financed by a premium of $2 per participant. Amortization of the deficit (over five years) and administrative expenses could also be accommodated by a $6 premium, which was the recommendation of the 1982 PBGC study.

In addition, interest rates in 1982 were historically high. Moody's Aaa in 1982 averaged 16.1 percent (see Appendix A, Table A–17); the PBGC immediate close-out rates averaged 10.7 percent (Appendix C, Table C–2). As discussed in previous chapters, high interest rates reduce the current deficit and reduce expected claims (benefit obligations are discounted at higher rates). In short, given the experience of the previous five years and the existence of high interest rates, the PBGC had every reason to expect that a $6 premium (perhaps with some inflation adjustments) would make the institution solvent.

This institutional confidence had another subtle effect. As long as the policy of the PBGC implied a "small" numbers problem (that is, if claims resulting from a cavalier insurance policy implied a small premium), it was not necessary to reconsider the adequacy of insurance principles practiced by the institution.

This collective attitude, shared by the PBGC and Congress, began to change during 1982. Prior to this time, the PBGC had accepted two extraordinary claims: $40 million resulting from Alan Wood Steel Company in 1978, and $58 million from Wisconsin Steel in 1980. After completing its 1982 premium study, however, the PBGC received four large claims: White Motors (truck manufacturer), Rath Packing (meat packer), Braniff (airline), and White Farm (farm machinery manufacturer). These claims totaled $223 million. All claims in 1982 amounted to $280 million. This rate of claims exceeded the prior five-year annual experience by over 300 percent.

The extraordinary 1982 experience was followed in fiscal 1983 with several additional steel terminations, beginning with McLouth Steel's $57 million claim, followed by Phoenix Steel and Mesta Machine with over $70 million in combined claims. Total claims in 1983 amounted to $174 million. The deficits on September 30 were $332 million in 1982 and $523 million in 1983, in comparison to $188 million in 1981.

The claims experience of 1982 and 1983 caused great concern at the PBGC. The sheer magnitude of the claims that lay behind this experience, however, created a tendency to treat them as aberrations. Congress shared this attitude. Despite the huge additional claims beyond those that justified the $6 premium request, Congress did nothing to augment PBGC's revenues. The ensuing experience in 1984 appeared to justify this wait-and-see attitude: claims during 1984 were only $27 million.

The 1982–83 activity, however, began a process of reassessing both the magnitude of claims that might characterize the insurance program and the policies followed by the institution. First, among the four large terminations in 1982, only one had a guaranteed funding ratio (assets divided by PBGC guaranteed benefits) greater than 33 percent (Braniff's funding ratio was 46 percent). Rath had a funding ratio of 16 percent. And recall that these funding ratios are evaluated at historically high interest rates.

The reasons underlying these funding situations gradually became apparent. Waivers from required contributions were found to be an important contributing factor. This became obvious in 1982 when Rath Packing terminated its plans. As Table 4–4 shows, Rath had received waivers for the maximum five years from 1977 to 1982 before it terminated in 1982 with a claim of $59.8 million. Accumulated unpaid waivers (unadjusted for interest) amounted to $29.5 million, approximately half of the claims amount.

The PBGC also began to appreciate the true cost of regulations issued early in the program to guarantee full benefits prior to normal retirement age, including shutdown benefits (see Chapter 5). In essence, auto and steel unions, among others, had retirement provisions

TABLE 4-4 Waivers Example—Rath Packing (numbers in millions)

Year	Amounts
1977	$ 4.9
1978	5.1
1980	6.3
1981 and 1982 combined*	13.2
Total†	$29.5
Claims (September 1982)	59.8
Waivers as portion of claims	49.3%

* Figures not separately available for each year.

† At time of termination, Rath had repaid roughly $1.8 million of its cumulative waivers to the plan.

SOURCE: PBGC Termination Case File. Because I did not have access to Internal Revenue Service documents (which are not publicly available), the data in the above table should be considered estimates.

that paid full benefits at age 55 with 30 years' service, 10 years prior to normal retirement age. In addition, they had contract provisions that made full unreduced benefits available to most middle-aged workers after a plant shutdown even though they otherwise did not qualify for full pension benefits. Thus, on a plant shutdown, benefits might be payable to an individual at age 45 with 20 years' service. Because shutdowns tended to be concentrated shortly before termination dates, huge unfunded new benefits were imposed on the PBGC.

An early example of this was the Alan Wood Steel termination for hourly workers in 1977. Table 4-5 summarizes the data describing the plan and the nature of the claim. The plan had a "30-and-out" requirement for full benefits (after age 55) and full benefits on shut-

TABLE 4-5 The Alan Wood Steel (Hourly) Termination

Category	Descriptions/Amounts	
Facts of the case		
Date of terminations	November 1977	
Normal retirement age	Age 65	
Full benefits rule	30 and out at age 55	
Shutdown provision	Age 55 with 15 years, or when the sum of age and service is 80	
Number of participants	1,955	
Breakdown of the claim		
Amount of claim ($ millions)	$34.8	100%
Shutdown benefits	3.6	10.3
Other early full benefits	5.9	16.9
Total early supplements	$ 9.5	27.2%

down to all workers age 55 with 15 years' service or a combined age-and-service total of 80 (for example, a 50-year-old worker with 30 years' service). Of 1,955 participants in the plan, 354 were collecting shutdown benefits.

Of the total claim of $34.8 million, $3.6 million was attributable to PBGC guarantees to pay shutdown benefits until normal retirement age, and $5.9 million was attributable to guarantees to pay full benefits prior to age 65 (normal retirement age in the plan). Fully 27.2 percent of the claims were attributable to PBGC guarantees to pay unreduced benefits prior to normal retirement age.

Escalation of Activity: 1985–1986

The reduction in claims activity in 1984 turned out to be short lived. In 1985, the flow of large terminations resumed. Allis-Chalmers (farm implements) made a claim of $142 million. In 1986, further steel terminations occurred, including Wheeling-Pittsburg's claim of $383 million. Also in 1986, however, the event that PBGC had hoped would not occur did occur. Previous large threatened terminations involving Chrysler Corporation and International Harvester never occurred (though the Wisconsin Steel termination was a spinoff of International Harvester). LTV Corporation entered Chapter 11 of the Bankruptcy Code, and the PBGC terminated four of its pension plans, resulting in a claim of over $2 billion. The deficit at the PBGC doubled to almost $4 billion.

These claims together with the post-1981 experience ultimately conveyed the notion that the cost implications of the pension insurance program would be much greater than the one-dollar-per-participant premium that Congress originally envisioned. As a consequence, policies that had been established in the ERISA legislation began to be reevaluated.

The Allis-Chalmers termination provided an illustration of the ineffectiveness of minimum funding standards enacted under ERISA. This firm's terminated plans had an overall funding ratio of 19 percent. One plan for its unionized workers terminated with enough assets to pay two months of benefits to existing retirees: This occurred even though the plan sponsor never received a waiver and never violated the minimum funding requirement.

The problem occurred for two reasons. First, the plan had a "flat dollar" benefit (dollars per year of service). Even though the union and firm renegotiate the flat benefit each three years to reflect inflation (it essentially mimics a final pay plan), the Internal Revenue Code does not recognize that the flat benefit will increase regularly over time. Thus, if a firm uses a flat benefit plan, it receives a license of sorts to underfund persistently.

Second, the existence of underfunding is permitted to be amortized over as long as 30 years. In a dying firm like Allis-Chalmers, the participants are dominated by older workers and retirees. The amortization period is much longer than the average life of plan participants.

Exposure Measurements

To augment the paucity of historical data, the PBGC developed a system to measure its exposure beginning in 1981. The first exposure calculations, however, were done outside the PBGC. The first post-ERISA study I am aware of was included in a book published in 1976 by Jack Treynor and colleagues, *The Financial Reality of Pension Funding under ERISA*. That book reported the results of a survey done by the authors of 40 large pension plans. They found that in 1974, only one fourth of the plans were fully funded (using actuarial interest rates). They ranked underfunded vested benefits (UVB) as a proportion of total assets in the firms. The average firm had UVB equal to 9 percent of firm assets. Interestingly, of the 14 firms with pension burdens higher than this (up to 25 percent of asset value), 4 were automobile companies, 1 was a farm equipment manufacturer, 2 were automobile-related tire firms, and 4 were steel firms.

During the same year, *Business Week* reported the results of a survey by Investor's Management Sciences, Inc. (IMS—a subsidiary of Standard & Poor's Corporation) of 1,644 large firms in 1976. *Business Week* listed the amount of underfunding for the 74 largest firms. This report was noticed by the PBGC, and a staff analysis of the data was made on an industry basis. Apparently no formal report was ever made, but I found a handwritten note dated August 3, 1977. The note, reproduced in Figure 4–1, reports an alarming amount of systematic underfunding in one industry, steel (amounting to almost $1 billion in 1976 dollars), and warns of pending catastrophe at the PBGC "if the steel industry (goes) sour."

Subsequent to the issuance of a rule by the Financial Accounting Standards Board requiring firms to report underfunded pension liabilities and assumed interest rates (*FASB 36*), the PBGC began a systematic evaluation of its exposure. It calculated unfunded vested pension liabilities from the Compustat, Inc., database and applied various measures of firms' financial stability available from the financial literature. An algorithm for classifying firms as "very high risk," "high risk," and "moderate risk" was employed.

Firms in these risk categories were listed with calculations of their unfunded vested pension liabilities. Firms with at least $5 million in underfunded benefits were analyzed. A summary of these exposure calculations is shown in Table 4–6. Exposure in the two highest risk classes amounted to approximately $2 billion in all years except 1987,

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FIGURE 4–1 Observation on Underfunding, 1977

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OUT OF 1644 FIRMS STUDIED BY
IMS INC., 1321 REPORTED DATA ON
UNFUNDED VESTED BENEFITS. OF
THESE, 43 HAD UNFUNDED VESTED
BENEFITS IN EXCESS OF 30% OF
NET WORTH. OF THESE, 11 ARE
IN THE STEEL INDUSTRY. APPARENTLY,
THIS IS THE ONLY INDUSTRY TO FOLLOW
THE PRACTICE VIRTUALLY ACROSS THE
BOARD OF POOR FUNDING OF PENSION
BENEFITS. THESE 11 COMPANIES HAVE
A COMBINED EXPOSURE TO PBGC OF
$964.9 MILLION. IF WE WERE TO
HAVE A CATASTROPHE RESERVE, THE
EVENT WHICH WOULD BE A MAJOR
CATASTROPHE FOR PBGC WOULD BE
IF THE STEEL INDUSTRY WENT SOUR.

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SOURCE: Note from Robert Klein to John Hirschmann

when the number increased to roughly $3 billion.[1] Adjusted to 1986
dollars and interest rates, however, and adding exposure in the LTV
restored plans (not reflected in the 1987 study database), these numbers
are closer to $5 billion in most years (see the last column in Table 4–6).

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[1]The data in Table 4–6 reflect *FASB 36* rules for reporting underfunding on the
balance sheet. It permits firms to combine all pension plans for purposes of calculating
underfunding. Because the PBGC is liable for underfunding in insufficient plans but
has no claim to excess assets in overfunded plans, the true PBGC exposure in risky
firms is greater than shown in the table.

TABLE 4–6 Risk Exposure to the PBGC (numbers in billions)

Year of Study*	Very High Risk	High Risk	Total	Adjusted†
1982	$1.6	$.1	$1.7	$4.3
1983	1.2	.4	1.6	5.5
1984	1.5	.1	1.6	3.6
1985	1.4	.5	1.9	5.4
1986	N/A	N/A	N/A	N/A
1987	2.6	.8	3.4	5.0

Amount of Underfunding

* Data for each study pertain to the year prior to the study date. Thus, the 1982 exposure data relate to the 1981 reporting year. Data for 1981 are not presented on a basis consistent with other years. Also, see footnote 1 in text.

† Numbers in this column are adjusted to the same PBGC interest rate and price level that characterize the numbers reported in the 1987 study. The 1987 results were adjusted to include LTV, which otherwise was excluded from the database.

SOURCE: PBGC exposure measurements, various years.

Virtually all large claims absorbed by the PBGC after 1981 have been "flagged" by the exposure calculations. Table 4–7 lists the 10 largest terminations after 1981. All appeared as very high risks in exposure lists prepared in previous years.

The major shortcoming of using exposure lists is that no probability

TABLE 4–7 Risk Categories of 10 Largest Terminations after 1981

Plan Sponsor	Year Terminated	Very High Risk	High Risk	Moderate Risk
LTV	1986	84, 85	81, 83	82
Wheeling-Pittsburgh*	1986	82, 84	83	81
Allis-Chalmers*	1985–86	84	83	—
White Motors	1982	81	83	—
Rath Packing	1982	81	—	—
Continental Steel*	1986	82, 83, 84	—	—
McLouth Steel	1983	82	—	81
Braniff	1982	81	—	—
White Farm Equipment†	1982	81	—	—
Phoenix Steel	1983	81, 82, 83	—	—

Category of Risk Reflected in PBGC Exposure Calculations 1981–1985

* Not included in 1985 for following reasons: Wheeling-Pittsburgh (pending termination); Allis-Chalmers (terminated subsequent to the 1984 plan year); Continental Steel (in process of involuntary termination).

† White Farm was a subsidiary of White Motors and therefore was included with the figures for White Motors in 1981.

SOURCE: PBGC exposure measurements, various years.

of failure is attached to firms in various categories, and presumably these probabilities are not constant within each class. If better probability estimates could be developed, the beginnings of a usable forecast model would be at hand at the PBGC. (One such model is presented in Chapter 6 in the context of an estimated risk and exposure pricing model.) Notwithstanding their shortcomings, however, these measurements have been successful in identifying a population of plans that are clear candidates for claims in ensuing years; and together with claims experience, the data help formulate expectations about future claims activity.

CALCULATION OF AN ECONOMIC PREMIUM

Magnitude of Expected Claims

The discussion in this chapter essentially includes all the information available to reassess the magnitude of expected claims. As discussed above, a predictive model to pension default risk has not been implemented at the PBGC. Nevertheless, estimates of exposure and default can be based on past experience on the assumption that sufficient time has passed to permit a fair representation of long-term experience.

This section reports the results of the most recent PBGC premium study, *Pension Promises at Risk* (1987). This study based its projections solely on historical claims received during the PBGC's first 12 years. In some sense, it updates the U.S. Departments of Treasury and Labor study, which was based on one year of data, 1972.

The first step taken in the study was the recalculation of historical claims in 1986 dollars. Claims variation attributable to variation in interest rates was not eliminated from the data; thus, there was an implicit assumption that interest rates over the period were representative of future experience. This claims experience is presented in column 2 of Table 4–8. For the sake of comparison, I adjusted these numbers to a common 7.25 percent interest rate, which was the average of the 1986 PBGC close-out rates. These numbers are shown in column 3 of Table 4–8 and are shown separately in Figure 4–2.

The data show that claims have been increasing steadily over time. Two alternate claims assumptions were made. First, a 12-year average was used. This assumes historical claims exhibit a cyclic pattern with some high-claims years and some low-claims years and 12 years is sufficient, in some sense, to characterize average expected claims experience. Second, the experience of the latest five years was used. This approach assumes that the early years of the insurance are not useful indicators of the future, that firms have since learned how to take

TABLE 4–8 Claims Experience, Adjusted for Interest Rates (numbers in millions)

Year	Actual	$1986	7.25 Percent Interest Rate ($1986)
	(1)	(2)	(3)
1975	$ 30	$ 56	$ 62
1976	18	31	33
1977	23	37	35
1978	73	109	103
1979	45	62	65
1980	85	110	136
1981	73	87	134
1982	263	300	487
1983	183	199	316
1984	35	36	52
1985	177	190	233
1986	2,895	2,895	3,226
Total	$3,900	$4,112	$4,882
Average			
12 years	325	341	406
5 years	710	724	862
5 and 12 years	518	532	634

Note: 1986 numbers reflect LTV terminations.

advantage of the PBGC, and therefore that more recent experience is more predictive of future experience.

In the study, both claims projections were used independently for sensitivity tests (see below). But for the so-called baseline forecast, the two numbers were averaged: essentially all 12 years of experience were incorporated into the expectation of future claims, but extra weight was given to the most recent five years of data. This resulted in a claims expectation of $532 million in 1986 dollars. The 12 and 5 years' numbers are also shown in Table 4–8.

Translating Claims to Premiums

The study presumed Congress would enact a premium formula that would yield a high (but unspecified) probability that the PBGC would not need to return to Congress for 30 years. Because the claims numbers are based on a weighted average interest rate in the vicinity of 8.25 percent, the forecast could be susceptible to reductions in the interest rate. As the numbers in Table 4–8 illustrate, if the interest rate is 7.25 percent, claims would be almost 20 percent higher.

Because the structure was to last 30 years, Congress would not be able to adjust the premium for inflation, and thus a model was designed

FIGURE 4–2 PBGC Claims, 1975–1986 (adjusted for prices and interest rates)
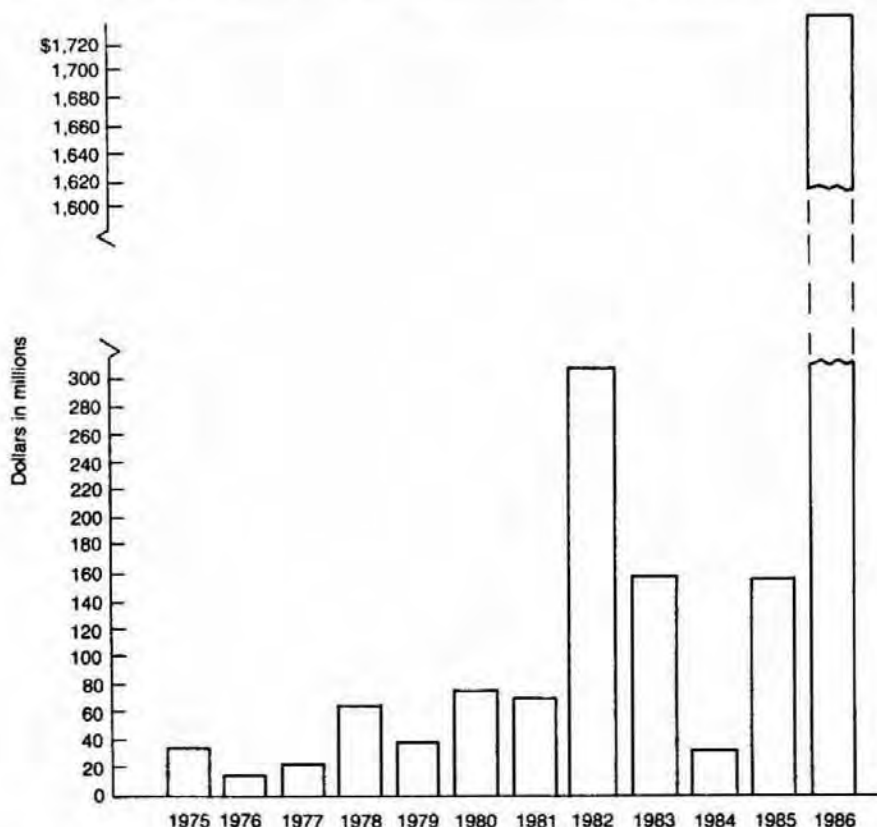
to calculate a premium per participant in 1986 dollars, which, if indexed to wages, would amortize the existing $4 billion deficit and finance claims over the next 30 years. The wage index was used because pensions are either directly or indirectly tied to wages.

A model was used to simulate the financial impact of future claims on the PBGC. It was assumed that wages would increase at the rate of 6.25 percent per year and that the number of defined benefit participants would increase at the rate 1.5 percent (consistent with employment growth over the past 30 years—see Appendix A, Table A–1). The discount rate was set at 7.25 percent. Claims per participant were expected to increase at the same rate as wages (6.25 percent). Funding ratios of terminated plans were assumed to remain at the average of recent experience, 41 percent. These assumptions are listed in Table 4–9.

TABLE 4-9   Economic Premium: Baseline Model

Premium (per participant)	
Indexed	$25.64
Flat	$54.05
Claims ($1986)	$532 million
Claims growth	7.75%
Interest rate	7.25%
Wage growth	6.25%
Participant growth	1.5%
Funding ratio at termination	41%

Note: Except for the last entry, all numbers are expressed on a per annum basis.

SOURCE: PBGC, *Pension Promises at Risk* (Washington, D.C.: Pension Benefit Guaranty Corporation, 1987).

Solving this model over 30 years yielded a required premium of $25.64 in 1986, indexed to wages. If Congress enacted a flat premium instead (one not indexed to wages), it would have to set the rate equal to $54.05. This rate is higher because in a flat premium scheme, the PBGC must collect "too much" money early to offset the inflation erosion of the premium in later years. These price schemes in real terms are shown in Figure 4–3.

FIGURE 4-3   Indexed versus Flat Premiums
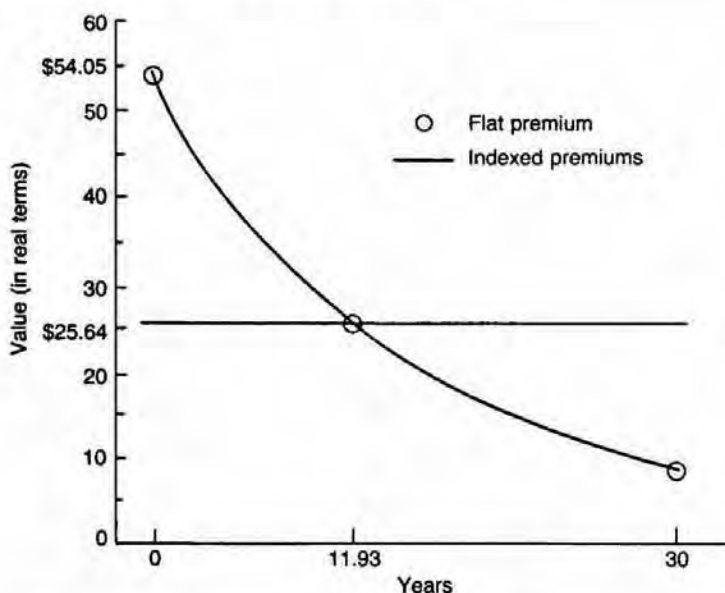
Sensitivity Tests

The next question posed by the study was the sensitivity of the premium requirement to the assumptions in the baseline model. Thus numerous additional scenarios were simulated. A representative selection of these scenarios is shown in Table 4–10. Scenario 1 is the baseline forecast. Scenarios 2 and 3 portray the 12- and five-year claims assumptions independently. Using the 12-year average, the economic premium is $18.56; using the five-year range, the premium is $32.73.

In scenario 4, the assumption that growth in defined benefit participants will continue to increase in approximate proportion to overall employment is replaced with the assumption that participant growth will be zero but claims will continue to increase at the 7.75 percent rate. Thus the number of premium payers evince a reduction in growth but not claims. This scenario results in a premium of $32.18. If participant growth remains at 1.5 percent but future funding ratios at termination fall in half to 20 percent, the economic premium is $33.48.

If the last three scenarios are combined, arguably a worst-case scenario is portrayed (scenario 6 in the table): the higher claims forecast prevails over 30 years; there is no growth in premium payers; and funding ratios at termination fall to 20 percent. This combination of events generates a required premium equal to $54.61, indexed to wages.

The last two scenarios (7 and 8) assume that interest rates will permanently increase or decrease by five percentage points in 1997. It is assumed that assets are all in bonds and matched to liabilities, which eliminates most of the effect on the balance sheet in 1997. Instead, it affects the amount of claims in the last 20 years of the horizon. The results show that if interest rates increase, the problems facing the PBGC will diminish. This is manifested by the need for a premium

TABLE 4–10 Economic Premium: Sensitivity Tests

Scenario	Change in Assumptions	Premium (Indexed)
1.	Baseline (see Table 4–8)	$25.64
2.	Lower claims: 12-year average ($341M)	18.56
3.	Higher claims: 5-year average ($710M)	32.73
4.	No growth in DB participants	32.18
5.	Lower funding ratios (20%)	33.48
6.	Combine 3, 4, and 5	54.61
7.	Higher interest rates* (12.25% beginning in 1997)	18.45
8.	Lower interest rates* (2.25% beginning in 1997)	39.11

* Assumes its entire asset/portfolio is in matching long-term bonds.

SOURCE: PBGC, *Pension Promises at Risk* (Washington, D.C.: Pension Benefit Guaranty Corporation, 1987).

equal to $18.45 indexed over the entire 30-year period. If the interest rate decreases to 2.25 percent (expected inflation is roughly zero), the economic premium is $39.11 over the period. In this scenario, the PBGC essentially insures real pensions after 1997 (see Chapter 2).

The model, including all sensitivity tests, tends to bound the economic premium at roughly $50, indexed to wages. The "best guess" in the study is roughly $25, but various plausible scenarios suggest this number could easily be in the range of $35, indexed to wages.

CONCLUSION

More than 15 years have passed since the first estimates of pension claims were made. Twelve years of claims and a series of risk and exposure studies are now in hand. These data demonstrate that the pre-ERISA estimates of claims were too low. Expected required premiums based on information available through 1986 turned out to be 25 to 50 times greater than originally expected.

The data also demonstrate the nonrandomness of the insurance events, evinced by large variation in claims over time. In addition, notwithstanding the continual reform efforts discussed in the next chapter, insureds may not have learned optimal gaming strategies against the PBGC. These two factors suggest that 12 years of data still may be insufficient to reliably estimate the true cost of the existing insurance contract; but we at least have a better ballpark estimate of the magnitude of claims. We also have confirmation of the nonrandomness of the events that make pensions a more difficult contract for the private sector to insure.

Current information also has implications for pricing. When pension insurance involved a cost of one dollar, devotion of resources toward control of moral hazard and development of proper pricing rules may have been uneconomic. Given that the problem is much greater than this, efforts toward reform are more rational. If the flow of claims is roughly $600 million per year, indexed to wages, and the real interest rate is 2 percent, approximately $13.5 billion (in 1986 dollars) will be transferred through the insurance system over a 30-year horizon.