PBGC Insurance of Multiemployer Pension Plans

Report to Congress required by the Employee Retirement Income Security Act of 1974, as amended

Pension Benefit Guaranty Corporation
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Office of the Director

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U.S. House of Representatives Committee on Education and the Workforce
U.S. House of Representatives Committee on Ways and Means
U.S. Senate Committee on Health, Education, Labor, and Pensions
U.S. Senate Committee on Finance

Every five years, PBGC is required under section 4022A(f)(1) of ERISA to review its multiemployer insurance program, to determine the premiums needed to maintain the current guarantee levels and whether the guarantee levels may be increased without increasing the premiums.

The report notes that Congress will need to review broader changes to multiemployer plans prior to the sunset of certain provisions of the Pension Protection Act of 2006, and suggests that changes to the PBGC program and premiums be considered as part of that review.

Sincerely,

PBGC Multiemployer Insurance Program

Summary

Multiemployer defined benefit pension plans are insured by PBGC. When a multiemployer plan becomes insolvent, PBGC provides financial assistance to cover the cost of guaranteed benefits to participants and the plan's administrative expenses. (Unlike single-employer plans, PBGC cannot intervene in multiemployer plans prior to insolvency, and multiemployer plans continue to pay full benefits until they run out of assets.)

The statutory guarantee limit for participants in multiemployer plans is $12,870 per year for a participant with 30 years of service; this is less than the benefits many multiemployer plans provide and less than PBGC guarantees in single-employer plans. Plans pay PBGC a premium for this insurance, currently $9 per participant per year, rising to $12 in 2013 and indexed thereafter.[1]

PBGC is required every five years to conduct a study to determine the premiums needed to maintain the basic-benefit guarantee levels for multiemployer plans and whether such guarantee levels may be increased without also increasing basic-benefit premiums for multiemployer plans.[2]

As explained below, although the timing is uncertain, PBGC projects that current premiums ultimately will be inadequate to maintain benefit guarantee levels. However, since significant changes may be contemplated in the laws governing such plans, it is not possible to say now what corresponding changes in PBGC's multiemployer program will be necessary or appropriate. If, as expected, Congress undertakes a broader review of multiemployer plans as it considers the extension of the multiemployer provisions of the Pension Protection Act of 2006 (PPA)[3] **then changes to PBGC's program or premiums should be made part of that review. At this time, PBGC is neither requesting Congressional action nor making any recommendations.**[4]

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[1] Premiums were raised in 2012 in the Moving Ahead for Progress in the 21st Century Act (MAP-21).

[2] Section 4022A(f)(1) of ERISA requires PBGC to report the findings of the study to PBGC's committees of jurisdiction in the House of Representatives and the Senate.

[3] Under PPA, certain provisions affecting multiemployer plans will sunset at the end of 2014. PBGC anticipates that the Congress will consider proposals that would affect the funding and future prospects of multiemployer plans, particularly distressed plans. PBGC expects to make recommendations for its own program over the next two years.

A separate report, required by section 221(a) of the PPA, is being submitted simultaneously by the ERISA agencies. That report offers general information on multiemployer plans that may be useful as Congress prepares for the reconsideration of the multiemployer funding provisions.

[4] Under section 4022A(f)(2) of ERISA, if the five-year report under section 4022A(f)(1) indicates that a premium increase is necessary, PBGC is required to transmit to its committees of jurisdiction by March 31 of any calendar year in which congressional action is requested (i) a revised schedule of basic-benefit guarantees which would be necessary in the absence of an increase in premiums, (ii) a revised schedule of basic-benefit premiums which is necessary to support the existing benefit guarantees, and (iii) a revised schedule of basic-benefit guarantees for which the schedule of premiums necessary is higher than existing premium schedule but lower than the revised schedule of premiums in clause (ii). For the reasons discussed in this report, PBGC is not yet able to determine what change to PBGC premiums will be appropriate in the future. **Therefore, PBGC is not requesting Congressional action at this time and this report is limited to the first step in its responsibilities under section 4022A(f)(1).**

DISCLAIMER

Readers should be aware that this report is an actuarial evaluation and contains estimates and projections. Unlike the historical financial balance sheet and income statement values, which are subject to accounting and audit standards, the standard for actuarial projections is that they be reasonable. The values shown are estimates, not predictions; they reflect the range of values that might result based on the assumptions that underlie our projection models. The results shown in this report are mean values. The mean values (PBGC's probability of insolvency and net position in 2022) are highly variable and unpredictable stochastic projections of many factors, such as future interest rates and future equity returns. **The results that ultimately occur can and often do vary materially from the reported results.**

The projections in this report are subject to limitations. Although **the Multiemployer Pension Insurance Modeling System (**ME-PIMS) currently is our best available tool for undertaking the exposure analysis required by ERISA, it was designed before implementation of the Pension Protection Act (PPA) changes for multiemployer plans. Experience with multiemployer plans since implementation of PPA changes has caused PBGC to revisit certain assumptions underlying ME-PIMS which we discuss below and on page 14 ("Possible Future Refinements to the ME-PIMS Model").

After commissioning an external review of ME-PIMS by an outside consulting firm with substantial multiemployer expertise, in September 2012 we received recommendations that certain ME-PIMS assumptions and methods should be modified to better reflect current experience. The primary modifications addressed four areas: (1) The population of active plan participants should be assumed to decline in the future; (2) Per capita active participant contributions should be assumed to increase at a lower rate than currently assumed; (3) Some plan outcomes should be modified to reflect that many plan trustees have decided not to follow all of the plan steps under the law, a decision that is permitted under the "reasonable measures" provision of PPA; and (4) Employer withdrawal and mass withdrawal[5] assumptions based on pre-PPA experience should be modified to reflect how plans have responded to changes under the PPA rules. In addition, when management reviewed the process of preparing the FY 2010 Exposure Report, we identified two other issues that affect projections for the multiemployer system and require modification. First, we determined that ME-PIMS under-sampled probable plans. Second, we identified two algorithms that need to be modified to better reflect future cash flows. These algorithms affect projected multiemployer plan cash flows because of assumptions about retirement ages and about the timing of withdrawal liability payments. We expect to continue to modify and improve our models in the future.

We cannot predict with confidence how projections will change when various modeling modifications are implemented.[6]

[5] A mass withdrawal occurs when every contributing employer withdraws from a multiemployer plan, which results in the plan's termination.

[6] In addition, the Moving Ahead for Progress in the 21st Century Act (MAP-21) requires an annual peer review of PIMS, which may result in additional recommendations for modifications.

Current and Historical Premium Rates

The PBGC premium rate for multiemployer plans is a flat $9 per participant for 2012 and $12 per participant for plan years beginning in 2013.

The Deficit Reduction Act of 2005 increased the annual premium rate for multiemployer plans from $2.60 per participant to $8, effective for plan years beginning after December 31, 2005. For the first time, the multiemployer premium was indexed to the National Average Wage Index. As a result, the rate increased to $9 per participant for the 2008 plan year, but did not increase again through 2012. The flat per-participant premium is paid by multiemployer pension plans for all active and inactive (retired and separated vested) participants in the plan.

MAP-21 increased multiemployer premiums to $12 per participant beginning in 2013, and called for indexing the rate thereafter. Total multiemployer premiums during the fiscal year ended September 30, 2012, were $92 million.[7]

For single-employer plans, on the other hand, the flat per-participant premium increased to $42 for plan years beginning in 2013 under MAP-21; the single-employer flat rate is also indexed. Underfunded single-employer plans also pay a variable-rate premium, but there is no variable-rate premium for underfunded multiemployer plans.

Current Guarantee

By statute, PBGC's maximum guarantee for a multiemployer participant with 30 years of service is $1,072.50 per month ($12,870.00 per year).

The guarantee is calculated based on the participant's annual accrual rate. The maximum guaranteed accrual rate is $35.75 per year of service. (This maximum rate applies once a participant's accrual rate reaches $44 per year of service or more.) The guarantee formula is 100% of the first $11 of the accrual rate, plus 75% of the next $33 of the accrual rate, multiplied by the participant's years of service. Congress increased the guarantee limit to this amount in 2001; there is no indexing provision.

By contrast, the statutory maximum guarantee for single-employer plans is adjusted each year, and for 2013 will be $4,789.77 per month ($57,477.24 per year) at age 65, payable in the form of a single-life annuity. For 2012, the single-employer maximum guarantee at age 65 was $4,653.41 per month; this amount is indexed annually.

Maintaining the Multiemployer Program

PBGC's multiemployer and single-employer insurance programs are separately funded and administered. As of September 30, 2012, the multiemployer program had total assets of $1.8 billion, while PBGC's multiemployer liabilities totaled $7.0 billion.[8] (Multiemployer liabilities are obligations, measured in present value, for future financial assistance payments [FFAP] for plans

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[7] $9 per participant for 10.3 million participants.

[8] As stated on page 52 of PBGC's 2012 Annual Report, "PBGC values its financial assets at estimated fair value, consistent with the standards for pension plans contained in the FASB Accounting Standards Codification Section 960, *Defined Benefit Pension Plans*. PBGC values its liabilities for the present value of future benefits and present value of nonrecoverable future financial assistance using assumptions derived from annuity prices from insurance companies, as described in the Statement of Actuarial Opinion. As described in Section 960, the assumptions are 'those assumptions that are inherent in the estimated cost at the (valuation) date to obtain a contract with an insurance company to provide participants with their accumulated plan benefits.' "

that are already insolvent or expected to become insolvent.[9]) As a result, the program reported a negative net position or "deficit"[10] of $5.2 billion, as of September 30, 2012.

To maintain the multiemployer program, premiums must be sufficient to cover current and future financial assistance obligations.

The net deficit reported in our financial statements does not take into account either future premiums or future plan insolvencies that are not yet sufficiently certain to be recorded as liabilities.

Estimating Future Claims and Premiums

In PBGC's risk exposure projections, by comparison, we attempt to capture and estimate other potential future insolvencies.[11] To anticipate future claims and premiums, PBGC developed a stochastic model that analyzes a range of potential future economic scenarios. This model, PBGC's Multiemployer Pension Insurance Modeling System (ME-PIMS), is described in the attached Appendix.

ME-PIMS does not predict a single outcome or scenario. Rather, it runs many simulations to derive a range of possible outcomes over a 10- or 20-year projection period. ME-PIMS projects outcomes of hundreds of possible future scenarios that incorporate many possible economic patterns. Those patterns include varying levels of investment returns, inflation, and interest rates.

The structure and assumptions used in ME-PIMS have been developed in consultation with outside experts and the model uses a detailed database comprised of multiemployer plans that currently represent more than half of PBGC's insured liabilities. Nonetheless, there have been only a small number of plan failures, so there remains considerable uncertainty about the actual likelihood and timing of future multiemployer plan insolvencies.

One of the greatest areas of uncertainty is the modeling of plan terminations due to the mass withdrawal of contributing employers from multiemployer plans. The experience with mass-withdrawal terminations and the information about the range of businesses that contribute to multiemployer plans is very limited, providing only a limited basis on which to validate mass withdrawal modeling.

Adequacy of Current Premiums

Projections of premiums at current rates, plus current assets and likely returns on those assets, are insufficient to cover PBGC's existing obligations, even before consideration of as-yet unrecognized future plan insolvencies.

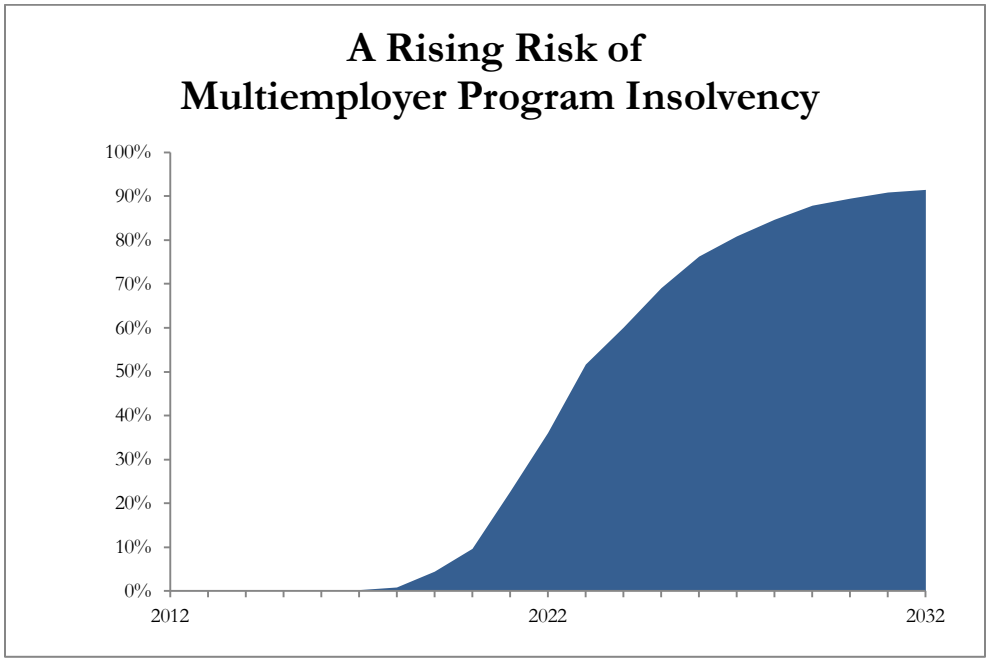
PBGC used the ME-PIMS model to estimate the probability that our multiemployer funds will be exhausted during the projection period. The chart immediately below projects the increasing likelihood that the multiemployer program trust fund will be insolvent (i.e., the assets will be exhausted) over a 20-year projection period. These projections depend heavily on the timing of projected cash flows, which in turn are very sensitive to variations in the occurrence and timing of mass withdrawals. The distribution of that timing is also sensitive to small changes in the starting data and assumptions. Recognizing these limitations, we present these probabilities as a general

[9] As shown on page 78 of PBGC's 2012 Annual Report: for 41 plans currently receiving financial assistance, the present value of FFAP is $1.388 billion; for 61 terminated plans that will receive financial assistance in the future, FFAP is $1.725 billion; for 46 ongoing plans that PBGC expects will need financial assistance in future years, FFAP is $3.897 billion.

[10] "Deficit" in this Report means total booked liabilities less total assets in the multiemployer program as of a certain date.

[11] Every year PBGC is required to estimate and report on our single-employer and multiemployer program exposure.

measure of the very real risk to PBGC's multiemployer program and to the protections that the program provides.



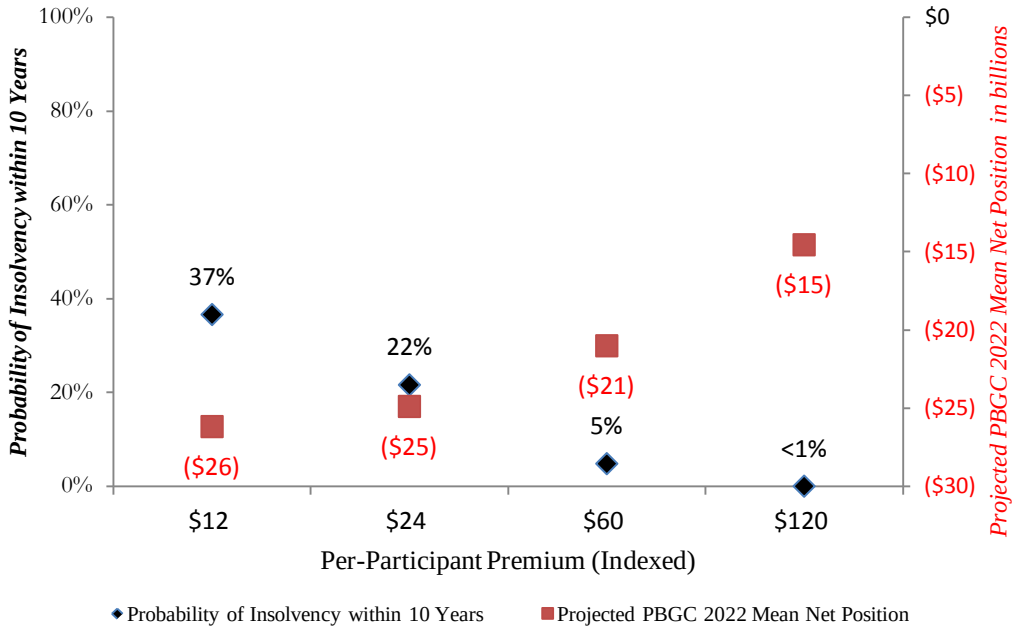
The financial position for the multiemployer program is -$5.2 billion as of FY 2012, the result of liabilities of $7.0 billion and assets of $1.8 billion. Because the multiemployer program has only a small base of assets, the program's large negative net position carries a substantial risk of exhaustion of multiemployer fund assets in the foreseeable future. Based on these projections, and assuming no changes either in multiemployer plans or in PBGC's multiemployer program, there is about a 35% probability that the assets of PBGC's multiemployer insurance program will be exhausted by 2022 and about a 90% probability of exhaustion by 2032.

These high probabilities of insolvency and the current program net deficit suggest that current premium levels will not support an increase in the multiemployer guarantee level.

Factors Relevant to Assessing Appropriate Future Premium Levels

Estimating the premium levels necessary to continue to provide financial assistance is not straightforward because of the substantial uncertainties about the timing and magnitude of future plan insolvencies, and about whether efforts to prevent them will succeed. Nonetheless, in response to the requirement in Section 4022A(f)(1)(A)(i) to report on the premiums needed to maintain current guarantee levels for multiemployer plans, PBGC provides the following order-of-magnitude analysis. In it we estimate the effect of varying premium increases on PBGC's risk of insolvency within 10 years and our projected financial position at the end of those 10 years. The graph below shows the percentage of modeling outcomes at each premium rate that result in the exhaustion of the multiemployer program's funds, and the value of PBGC's mean pro forma net financial position, in 2022. Progressively higher premium levels result in a decreasing probability of program insolvency, and an improving pro forma financial position.

Effect of Varying Premium Levels on
Projected Multiemployer Program Financial Condition in 2022
Current-Law Guarantee Levels



It is uncertain how plans will utilize the existing tools and authorities at their disposal to improve their financial standing. Therefore, these projections should be recognized as being only rough order-of-magnitude estimates. Based on current trends, there is a substantial chance that currently severely distressed multiemployer plans will become insolvent within 10-15 years. However, both the timing and magnitude of the PBGC obligations that might result are highly uncertain.

The ultimate level of PBGC's obligations will depend on the ongoing finances of these distressed plans (and others) as well as the effects of any measures that the plans may take in the intervening years. Our projections assume that plans will take certain measures in response to PPA and legislation enacted since; those measures are chiefly increases in contributions and, in some cases, decreases in future and past (adjustable) benefits. There is only limited experience with the tools and authorities granted to plans under PPA (and that experience has been complicated both by substantial market dislocations and by subsequent changes in law); as such, the existing data provide only a limited basis to validate modeling assumptions about how these plans will respond. (See Appendix for a description of the methodology of the ME-PIMS modeling.)

Furthermore, for some plans the tools and authorities under PPA will be insufficient to ensure long-term solvency. Over the next two years, PBGC anticipates that the Congress will consider proposals that affect the future prospects of these plans. This could, in turn, affect the level of any necessary changes in premiums.

Next Steps

Although the timing is uncertain, currently PBGC is at risk of not having the tools to help sustain multiemployer plans or the funds to continue to pay benefits beyond the next decade under the multiemployer insurance program. If, as it has in the past, Congress acts to address the rules

governing multiemployer plans, PBGC's own program can and should be re-evaluated, too. For that reason, PBGC is not proposing any particular changes, whether in premiums or benefits, at this time.

The Administration expects to engage with Congress and the multiemployer community in a cooperative process over the next several years, to develop a supportive, financially sound insurance program and to help preserve the multiemployer plans that provide lifetime retirement security for more than ten million participants and their families.

Appendix

Overview of ME-PIMS

The analysis contained in this report was done using the Multiemployer Pension Insurance Modeling System (ME-PIMS). ME-PIMS projects long-term exposure by running many simulations, each modeling year-by-year changes over 10 years. Each simulation starts with known facts about the economy, the world of insured plans, and PBGC's financial position. Then the program introduces random year-by-year changes (within certain bounds) to model economic fluctuations, producing new outcomes a year at a time. Within a scenario, one year's outcomes form the next year's starting-point, and so on. The models recognize that all multiemployer plans have some chance of insolvency, and that these probabilities change over time.

ME-PIMS is not a predictive model. It does not, for instance, attempt to anticipate individual employers' behavioral responses to changed circumstances (e.g., the impact on premium revenue from a decline in the number of participants if the per-participant premium rate doubles or triples). Although ME-PIMS mathematically models the likelihood of mass withdrawal from a given plan, or plan insolvency prior to mass withdrawal, it does not anticipate behavioral responses by individual employers.

Throughout this report, we express all future outcomes in present value terms (i.e., discounted back to 2012). Each scenario's outcomes are discounted based on the 30-year Treasury bond yields projected for that scenario, regardless of whether the underlying simulated cash flows are generated from holdings of equities, high-yield bonds, corporate bonds, or U.S. Treasury bonds.

In our projections of net position, one important factor is the determination of the amount of money we owe in today's dollars. Changes in interest rates have a big effect on this calculation — the higher the interest rate by which we calculate what we owe, the lower the present value of the obligations (liabilities) that are reported on our balance sheet. ME-PIMS models uncertainty in future changes to these interest rates.

Each year, PBGC analyzes insured multiemployer plans to identify those plans that might present claims against the insurance program. In general, if a terminated plan's assets are less than the present value of its liabilities, PBGC considers the plan a probable risk of requiring financial assistance in the future, as recorded in our financial statements. The primary driver for large losses to the multiemployer program is mass withdrawal of all sponsors from a given plan (these are captured in projected new claims).

To project future claims against the multiemployer program that are not in the current financial statements, ME-PIMS mimics the same type of analysis for future years. By "booking" probable plans in each year of the projection, ME-PIMS mimics PBGC's analysis of multiemployer plans in which employers continue to make regular contributions for covered work, to determine whether any of these ongoing plans are probable or possible claims against the insurance program.

In each projection year, ME-PIMS combines measures of chronic underfunding, poor cash flow, a falling contribution base, and a lack of money on hand to weather temporary income losses, into one measure of the likelihood that a plan will fail. In the projections, these plans become ME-PIMS liabilities that year.

No single underfunding number or range of numbers is sufficient to evaluate PBGC's exposure and expected claims over the next 10 years. Claims are sensitive to changes in interest rates and investment returns, overall economic conditions, contributions, changes in benefits, the performance of some particular industries, and bankruptcies. In the multiemployer program a large

number of claims from the actual and projected insolvencies of medium-sized plans, and a small number of similar claims from large plans, have characterized the Corporation's historical claims experience and are likely to affect PBGC's potential future claims experience as well.

ME-PIMS portrays future underfunding, as prescribed by current law, as a function of a variety of economic parameters. The model anticipates that individual plans have various probabilities of positive and negative experience, and that these probabilities can change significantly over time. The model also recognizes the uncertainty in key economic parameters (particularly interest rates and market returns). The model simulates the flows of claims that could develop under hundreds of combinations of economic parameters and extrapolations of plans' respective 10-year historical patterns.

A multiemployer plan can go through a "mass withdrawal," which happens when all employers stop participating in a plan at the same time. For each plan in each of the projection years, ME-PIMS calculates a probability of mass withdrawal. The size of the plans is one factor in the calculation, as are several ratios: assets to cash flow; assets to liabilities; active to inactive participants; current year to previous year contribution amount; and the funding-standard account balance to contributions. For each year, a random number is drawn and compared with the plan's probability of mass withdrawal — the result determines whether or not a mass withdrawal happens[12].

Data

ME-PIMS has a detailed database of 188 actual plans (including previously booked plans), which represent more than half of PBGC's insurance exposure in the multiemployer defined benefit system measured from the latest Form 5500 filings available. The database includes:

- plan demographics,
- plan benefit structure,
- asset values,
- liabilities, and
- actuarial assumptions.

In addition, ME-PIMS incorporates historical data of employer contribution levels and demographic trends (over the 10 prior years) to assist in modeling plan trends.

The ME-PIMS database contains pension plan information from Schedule MB of the Form 5500 (Annual Return/Report of Employee Benefit Plan) generally from the 2010 plan year. In addition, more recent data from any available reporting of plan status (endangered, seriously endangered, and critical), plus any multiemployer plans' reports regarding funding improvement plans (for endangered status plans) or rehabilitation plans (for critical status plans) have been incorporated into the modeling system.

[12] For example, assume the mass withdrawal probability for a plan is 5% and that the random numbers are drawn from an urn of balls numbered from 1 to 100, if the ball drawn is numbered 5 or less then the plan experiences a mass withdrawal. If the random number is greater than 5, the plan does not experience a mass withdrawal.

Methodology

PIMS simulates contributions, premiums, and underfunding for these plans using the minimum-funding and premium rules as required by ERISA (including legislative changes in PPA through MAP-21) and then extrapolates the results to the universe of multiemployer plans. Changes to funding rules following PPA (e.g., the Pension Relief Act of 2010) are reflected in the modeling.

ME-PIMS starts with PBGC's multiemployer net position (a $5.2 billion deficit in the case of FY 2012) and data on the funded status of 161 plans that are weighted to represent the universe of PBGC-covered plans that are not current or probable claims for PBGC. The model produces results under 500 different simulations. The probability of any particular outcome is determined by dividing the number of simulations with that outcome by 500.

The nature of the multiemployer program and PBGC's established method for recognizing claims against the program require a long time horizon for examining potential claims. The near-term financial condition of one employer (or even several employers) usually does not determine the risk presented by a given multiemployer plan. Rather, projected claims result from underfunding in a plan that shows several characteristics of future deterioration. In ME-PIMS, those characteristics can worsen or improve in different scenarios under stochastic modeling.

ME-PIMS' projection of exposure to a multiemployer plan depends largely on the plan's financial status rather than that of the sponsoring companies. The amount of underfunding for each plan is based on the best available data, including annual Form 5500 filings and reports that multiemployer plans provide regarding their status under the funding rules (healthy, endangered, seriously endangered, or critical) and the associated filings that detail their respective plans to work out of an adverse status.

In the multiemployer program, PBGC recognizes probable liabilities for plans with the potential to present claims over a limited time horizon. Generally, claims are recognized when their financial condition is likely to deteriorate substantially within 10 years. ME-PIMS models these claims in future years by projecting, for each future year, a potential claim within the 10 years following that future year.

In the multiemployer program, there is little distinction between claims due to insolvency and probable liabilities, unlike under the single-employer program. In the single-employer program, a probable liability is generated when the condition of the sponsoring employer justifies such a claim. In the multiemployer program, a probable liability is generated when certain plan metrics are sufficiently problematic. Given a sufficiently problematic collection of plan metrics, and a cash-flow projection of insolvency, a plan is classified as probable, and is thus recognized as a PBGC liability.

PBGC's classification of claims against the multiemployer program depends both on the funded status of the plan and on several measures of the plan's health. These factors are then used in modeling cash flow requirements of the plan, to anticipate insolvency. Plan funding data (asset and liability amounts) for estimates were collected from Form 5500 filings for 2009, and 2010 (the most recent available for each plan). The Corporation adjusted this plan data from such sources as additional reporting from individual plans, and from data provided by plans or their service providers.

ME-PIMS projects PBGC's potential financial position by combining simulated claims with simulated paths for premiums, expenses, PBGC's investment returns, and changes in PBGC liability, that is, the present value of benefits and expenses payable pursuant to claims recognized by the PBGC.

Because multiemployer liabilities are usually recognized by PBGC several years before a plan becomes insolvent, a plan's financial condition can improve after it is first recognized, reducing PBGC's liability for that plan (i.e., the value of its claim) by delaying its projected date of insolvency and/or reducing the flow of assistance anticipated after insolvency. In some cases, insolvency is delayed beyond the 10-year threshold required for recognition, causing the plan to become unbooked reducing its claim value to zero. Conversely, a plan's condition can deteriorate further following the initial recognition.

ME-PIMS reflects any un-bookings as negative claims, which are taken into account in the mean and median claim amounts (i.e., the above amounts represent the value of booked minus un-booked future claims). However, financial improvements that are insufficient to cause claims to be un-booked are not reflected in the ME-PIMS claims values. As a result, the change in net position over the projection period may fall short of the present values of simulated premiums, expenses, and investment returns over the period.

The ME-PIMS model is not predictive. As is the case with all PIMS-based reporting (single-employer or multiemployer), our analysis is not a prediction or a forecast but rather provides a range of possible outcomes generated by 500 random economic scenarios. It is important to analyze any PIMS results beyond the mean and median values. Careful attention should also be given to so-called tail results, as the recent financial turmoil has compelled policy makers to do.

Projections of claims against the insurance program are made stochastically. Claims against the pension insurance program are modeled by simulating the occurrence of insolvency, or mass withdrawal with insolvency anticipated within 10 years, for any given plan. To anticipate insolvency, the model projects future cash flows that would be experienced by a plan under various scenarios. For mass withdrawal, the model reflects the relationship among various factors (the ratio of active to inactive participants, the ratio of assets to benefit payments, and the period of time over which the funding standard account is available to ameliorate contribution requirements). For each period, the model assigns a random change in each of these variables to each plan, correlated with changes in the economy. The simulated financial health variables determine the probability either of insolvency or of mass withdrawal for that year.

In ME-PIMS, a sample of actual plans represents the universe of multiemployer plans. The ME-PIMS sample is divided into five tiers, grouped by plan size (based on vested liabilities). In each tier of the sample plans, the individual plans are weighted by the factor for that tier, where the factor is the total vested liability for *all* multiemployer plans in that tier divided by the total vested liability for the *sample* plans in that tier. If a plan is projected to present a claim in ME-PIMS, the claim against the multiemployer program is the claim for that plan multiplied by the factor for that plans' tier. In the tier for the largest multiemployer plans, ten out of the eleven largest plans are in the ME-PIMS sample. In lower tiers, a progressively smaller proportion of multiemployer plans are in the sample. The factors for the tiers range from 1.06 for the tier of largest plans, to 18.09 for the plans in the tier of smallest plans.

The model assumes that plan contributions follow plan-specific 10-year historical patterns of contribution increases, within parameters established to restrain unlikely patterns of increase or decrease. The model runs 500 economic scenarios (varying interest rates and equity returns). ME-PIMS then extrapolates the results of these simulations to the universe of insured multiemployer plans.

Assumptions

All of the following variables are stochastically projected:

- Interest rates, stock returns, and related variables (e.g., inflation, wage growth, and multiplier increases in flat-dollar plans). These variables are determined by interest rates in ME-PIMS.
- Asset returns. Plan asset returns are based on a study of historic asset returns among large plans. Using the financial rates directly modeled in PIMS (stock market returns, long-term Treasury bond returns and yields), the study estimated mixtures of those rates to best fit the historic returns of each plan in the study. PIMS projects annual plan returns using the following weighting based on the average of the estimated rate mixtures, 48 percent stock market returns, 23 percent long-term Treasury bond returns, 30 percent long-term Treasury bond yield and a -2.5 basis points additive adjustment. Future plans for PIMS include modeling of additional asset class returns allowing PIMS to use the investment allocation information sponsors now report as part of the annual Form 5500 filings.
- Plan demographics. Starting with plans' population data from the Form 5500, the number of active participants for each plan varies according to that plan's actuarial assumptions regarding retirement, disability, and termination of employment. Age and service also vary over time due to hiring assumptions that are determined separately in each scenario of the projection. Hiring patterns vary with stochastic projections, the general assumption is that a plan's historical trend continues, and hiring occurs (or not) to bring the active population up to the continued trend as needed after plan decrements (retirement, termination of employment, disability) take place. ME-PIMS does not currently assume industry-specific or collective-bargaining employment trends. The numbers, ages, and benefits of retired and terminated vested participants vary depending on mortality, separation, and retirement assumptions.
- Benefit-level and employer-contribution increases. These vary annually during the projection period with some correlation to modeled economic conditions in each future year.
- Probability of mass withdrawal. This probability is generated using each plan's:
  - ratio of active to inactive populations,
  - ratio of assets to benefit payments and expenses,
  - ratio of the funding standard account to the decrease in that funding standard account, and
  - plan size.

Two of the most important variables in the stochastic simulations are stock returns and interest rates. Stock returns are independent from one period to the next. To determine a simulated sequence of stock returns, the model randomly draws returns from a distribution that reflects historical experience going back to 1926. Unlike stock returns, interest rates are correlated over time. With the model, the Treasury yield for a given period is expected to be equal to the yield for the prior period, plus or minus some random amount. The random draws affecting the bond yields and stock returns are correlated according to an estimate derived from the period 1973-2007.

The following assumptions are also used in ME-PIMS projections:

- Mortality. For purposes of determining plans' mortality experience during each year of the projection period: the RP2000 mortality table set back one year, projected with Scale AA to that year. For purposes of projecting plan population in valuing projected liabilities: the RP2000 mortality table set back one year, projected with scale AA to the year of valuation plus 10 years.

- Contribution Level/Credit Balances. The credit balance is increased each year by the valuation interest rate and decreased by the amount by which modeled contributions are below the minimum required. ME-PIMS modeling of employer contributions reflects that most employers make contributions at a level above the minimum required, though this is not always true. There is some interaction between the classic minimum required contribution and the contributions required in light of Recovery Schedules.
- Benefit Improvements. For flat-dollar plans, benefit multipliers are assumed to increase annually by the rate at which they have increased over the 10 years previous to the year for which the Form 5500 provides data. Most multiemployer plans have flat-dollar formulas, though there is a trend towards formulas that are based on a percentage of total contributions attributable to each participant. ME-PIMS models both flat-dollar and percent-of-contributions benefit formulas. In plans where the benefit formula is not a flat-dollar or percent-of-contributions schedule, a translation to such a formula is made and the plan is modeled as a flat-dollar plan.
- Benefit improvement restriction. ME-PIMS assumes that due to restrictions on benefit increases (they cannot take place in bargaining agreements unless contributions will immediately fund such an increase under PPA) plans will not increase benefits.
- Benefit accrual restriction. ME-PIMS models benefit reductions that arise in recovery schedules under endangered and critical plan statuses. These restrictions are modeled in ME-PIMS for endangered and critical plans as appropriate under the respective rules for such plans. For plans that include benefit freezes in their recovery schedules, those freezes are modeled as continuing indefinitely.
- PBGC Premiums. ME-PIMS models premiums based on the rate under current law with projected rates increasing under the indexing provisions in current law. There is no allowance in premium projections for write-offs of interest penalties and premiums.
- PBGC's Assets. All assets in the multiemployer program are, by law, placed in revolving funds that are invested in US Treasury securities. Asset returns in ME-PIMS are bound by the modeling of US Treasury returns in future years. This modeling incorporates random fluctuations within certain bounds to simulate variation over time.
- Discounting Future Contributions/Claims. When ME-PIMS discounts future amounts, the discount factor is a single interest factor derived from the "select" and "ultimate" factors described in the 2012 financial statements. Those factors are based on a survey of prices that the private-sector annuity market would charge at present, to pay a given amount in the future.

Sample Statistics from FY 2012 Runs in ME-PIMS

The following tables show some output statistics from runs of the ME-PIMS model for the FY 2012 Exposure Report. These statistics are specific to the model runs for this report, but show general examples from running the FY 2012 Exposure Report economic assumptions and plans' data through the stochastic process.

Table 1

Arithmetic Means, Standard Deviations and Correlations of Key Financial Market Values

FY 2012 Multiemployer Model Runs
(across 2013-2022 for 500 economic scenarios)

	Long-Term Treasury Yield	Return on 30-year Treasury Bonds	Stock Market Return
Mean	3.0%	3.0%	8.2%
Standard Deviation	0.9%	6.8%	20.6%
Correlations:			
• Long-Term Treasury Yield	1.00	-0.29	-0.11
• Return on 30-year Treasury Bonds		1.00	0.23
• Stock Market Return			1.00

Table 2

Arithmetic Means and Standard Deviations of Market Rates Derived From Projected Long-Term Treasury Yields in FY 2012 Multiemployer Model Runs

	Long-Term Corporate Rate	Inflation Rate	Wage, Salary and Flat Benefit Growth Rate
Mean	4.1%	2.6%	4.4%
Standard Deviation	0.9%	0.9%	0.9%

Table 3

Miscellaneous Data from FY 2012 Multiemployer Model Runs

	Mean	Standard Deviation
Projected Plan Returns	5.4%	10.3%
Annual Probability of Plans' Projected Mass Withdrawal	2.2%	7.4%
Annual Probability of Plans' Projected Insolvency	0.1%	0.1%

Possible Future Refinements to the ME-PIMS Model

As noted in the disclaimer at the beginning of this Report, we expect to continue to modify and improve ME-PIMS in the future. For example, we plan to incorporate into ME-PIMS information on plans' actual responses to PPA, to replace some of our early assumptions that accompanied the passage of PPA. This will affect the projection of employer contribution and

employment levels, the hierarchy of steps taken in funding improvement and rehabilitation plans, and the occurrence of projected mass withdrawals in multiemployer plans. In addition, we plan to make necessary refinements in the modeling of cash flows and the sampling of plans currently "booked" as PBGC liabilities.

Expected claims under the multiemployer program depend on two things. One is the amount of underfunding in the pension plans that PBGC insures (i.e., exposure). The other is the likelihood that a plan will fail, or become insolvent, either in the course of ongoing operations or following a mass withdrawal.

A plan becomes insolvent when it does not have enough assets to pay PBGC guaranteed benefits as they become due. A single-employer plan has one sponsor for which financial information is often available and whose financial condition can be assessed and modeled. By contrast, among multiemployer plans, even the identity of *any* individual employers that participate in particular multiemployer plans has only recently become available. Others remain unknown. So at present, ME-PIMS does not model the financial conditions of individual employers (or industries) in multiemployer plans. As we analyze the newly available information on individual employers, we will consider whether to incorporate this information into the model.

Limitations in Modeling Future Uncertain Events

Readers should interpret the results from this modeling with caution and with an understanding of the model's limitations. Results are sensitive to model design decisions such as equation specifications, degrees of interdependence among variables, and historical periods used for the estimates. The modeling depends on historic estimates of the behaviors (volatilities, correlations, central tendencies, etc.) of the model's variables and does not reflect uncertainties about the future that might not be evident from historic data. The real range of future outcomes can be more uncertain if different modeling assumptions are applied.

Statement of Actuarial Opinion

This actuarial evaluation has been prepared in accordance with generally accepted actuarial principles and practices and, subject to the disclaimer on page two of this report, to the best of my knowledge, fairly reflects the possible distribution of projected outcomes relative to the operations and status of the Corporation's single-employer and multiemployer plan insurance programs as of September 30, 2012.

In preparing this evaluation, I have relied upon information provided to me regarding plan and participant data, plan sponsor financial information, historic asset yield and bankruptcy information and other matters. I have checked this information for reasonableness as appropriate based on the purpose of the evaluation; the responsibility for the information rests with the preparers of the original source data.

Subject to the disclaimer on page two of this report, in my opinion, (1) The techniques and methodology used are generally acceptable within the actuarial profession; (2) The assumptions used are appropriate for the purposes of this report; and (3) The resulting evaluation represents a reasonable estimate of the possible distribution of projected outcomes relative to the operations and status of the these programs.

I, C. David Gustafson, am the Chief Policy Actuary of PBGC. I am a Member of the American Academy of Actuaries, a Fellow of the Conference of Actuaries and an Enrolled Actuary. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.

C. David Gustafson

Chief Policy Actuary, PBGC

Member, American Academy of Actuaries