

Projections Report



FY 2014

FY 2014 PBGC PROJECTIONS REPORT

SUMMARY

The Pension Benefit Guaranty Corporation (PBGC) guarantees single-employer and multiemployer defined benefit pension plans in separate insurance programs. Although both programs insure pension participants against loss when a pension plan fails, the amount of benefits guaranteed, the point at which the guarantees apply and the funding sources are quite different.

This report looks first at PBGC's multiemployer program, which covers roughly one-quarter of private sector defined benefit pension participants, but has deficits exceeding those of the single-employer program. As shown in this report, recent legislation is expected to postpone the date that PBGC's multiemployer program fund is likely to run out of money and could significantly reduce the magnitude of future program deficits, but it does not fully resolve the issues facing the program and the participants whose benefits it guarantees.

New results for PBGC's single-employer program are broadly consistent with findings of the prior year's report – the financial status of the program is likely to improve but stay in net deficit over the 10-year projection period.

Multiemployer Plans Most multiemployer plans are projected to remain solvent over the next 10 years, but a core group of plans appear unable to raise contributions sufficiently to avoid insolvency. The Multiemployer Pension Reform Act of 2014 (referred to as Kline-Miller or MPRA) was enacted in December 2014, to improve the financial outlook of multiemployer plans and of PBGC's multiemployer program. For some plans facing insolvency within the next twenty years, MPRA allows trustees to permanently reduce benefit promises to participants if, by "suspending benefits," the plan can remain solvent over the long term and preserve benefits at levels above the PBGC guarantee amounts. MPRA also provides additional premiums to fund PBGC's multiemployer program and gives PBGC new ways to help plans remain solvent by providing financial assistance by plan partition or merger.

This report reflects how plan sponsors may utilize MPRA and also reflects changes in our model of the multiemployer system that further improve our estimates of plan benefit outflows, recognize PBGC's establishment of a reserve for small plans on its books, and use updated mortality tables.

After updating the model, and incorporating the premium increases and other provisions under MPRA, but assuming no plans elect suspensions or partitions, PBGC's projected 2024 multiemployer deficit averages \$44.3 billion discounted to today's values.¹ The solvency of the multiemployer program fund is extended by three years; the multiemployer program fund is more likely than not to run out of money in 2025 rather than 2022.

¹ This is the mean present value of the 10-year (2024) projections. "Insolvent", "Deficit", and "Claims are defined and discussed in the section "Financial Obligations" beginning on page 4.

Using best estimate assumptions² as to whether plans and participants will elect to use suspension and partition under MPRA, yields a projected 2024 deficit averaging \$28.0 billion in comparable terms, and would significantly change the future prospects of plans and participants that elect to make changes. Improvements in the near-term solvency of PBGC's multiemployer program are primarily due to MPRA's premium increases; while future suspensions and partitions reduce the amount of long-term liabilities for the program, they do not significantly change the risk of near-term program insolvency. The discussion of the multiemployer simulations begins on page 6; the changes in the model and assumptions are detailed beginning on page 22.

Single-Employer Plans The single-employer simulations continue to show that improvements in the program's net position are likely, but by no means guaranteed, throughout this decade, with a mean present value of the projected 2024 deficit of \$4.9 billion. There is significant variation around this mean outcome. This year's report incorporates a number of improvements to the model, including a more robust model of hybrid plans, market-based recalibration of certain bankruptcy risks, and the use of updated mortality tables. These single-employer results are detailed beginning on page 26.

² PBGC developed assumptions regarding the plans and participants that will elect benefit suspensions and partitions. These assumptions reflect input from various parties, the statutory and regulatory constraints that sponsors must meet, and estimates of the likelihood of participants voting to overturn the suspension. More information on the assumptions can be found in the section "Assumed Utilization of MPRA Suspension and Partition" beginning on p.18.

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Frequently Used Abbreviations

FY	Fiscal Year
ERISA	Employee Retirement Income Security Act of 1974 as amended
ERM	Critical status plans that have determined they have “Exhausted all Reasonable Measures”
HATFA	Highway and Transportation Funding Act of 2014
MAP-21	Moving Ahead for Progress in the 21 st Century Act
ME	Multiemployer
MPRA	Multiemployer Pension Reform Act of 2014
PPA06	Pension Protection Act of 2006 as amended
PBGC	Pension Benefit Guaranty Corporation
PIMS	Pension Insurance Modeling System
PV	Present Value
SE	Single-Employer

About This Report

This report contains estimates and projections for both PBGC's multiemployer and single-employer programs that begin with the values presented in PBGC's most recent Annual Report, as of the end of Fiscal Year 2014, and then project over the following decade and beyond, based on current economic conditions, and current law.³ To make the projections, PBGC uses two stochastic modeling systems: the Multiemployer Pension Insurance Modeling System (ME-PIMS) and the Single-Employer Pension Insurance Modeling System (SE-PIMS). Each relies on running many simulations to derive a range of possible future outcomes. The report uses averages and ranges to summarize the simulations, but there is no single projection that represents the expected results under either program.

This report is an actuarial evaluation. The standard for such evaluations is that the estimates be reasonable and based on the use of reasonable methods and assumptions. In the professional opinions of the signers, this report meets those standards.

The values shown are estimates, not predictions. They reflect a range of values that might result based on the assumptions and behavioral relationships that underlie the projection Models. The values are highly dependent on the stochastic projection of many, highly variable factors, such as future interest rates, future equity returns, and future decisions by plan sponsors. **The actual results that ultimately occur in future years can, and likely will, vary materially from the projections in this report.**

The Wide Range of Possible Outcomes

To illustrate the uncertainty inherent in projecting even the near future, this report shows a wide range of possible outcomes associated with a given set of assumptions. These include mean (average) values and "high," median and "low" values projected for key outcomes for fiscal years 2015 to 2024. To demonstrate potential variation, the "high" value is set at the eighty-fifth percentile (i.e., 85 percent of the outcomes are lower), the median value at the fiftieth percentile, and the "low" value at the fifteenth percentile. While the "high" to "low" range represents the bulk of projected outcomes,⁴ almost a third of projected results lie above or below the "high" to "low" range. Because these "tail" results may be important, the report also presents discussions of the full distributions of projected financial positions for both programs.

Financial Obligations

The report presents two types of financial obligation measures: (1) liabilities (and assets) stated on a present value basis and (2) year by year cash flows.

³ This Projections Report generally uses data and assumptions as of September 30, 2014 (the end of FY2014), but includes legislated changes to premiums enacted through December 2014 and other changes due to MPRA as noted.

⁴ Some outcomes are year-by-year results, such as investment income in each year; they show a fairly constant amount of yearly variation. For other categories, such as the net position of the single-employer program, each year affects the next. This produces a cumulative effect, yielding more uncertain results with each passing year. (This cumulative effect is muted in the multiemployer program's position, where the program's few assets are a fraction of the value of net new claims.)

PBGC's liabilities reflect the discounted present value of the retirement benefits PBGC pays for the lifetime of participants and their beneficiaries; these retirement benefits are generally guaranteed benefits with adjustments as set forth in ERISA and regulations. "Claims" are newly recorded (lifetime) liabilities less any associated assets and recoveries; they are generally recorded on PBGC's books when the payment of guarantee amounts is probable. The amount that PBGC "books" is the present value of benefits payable to participants and their beneficiaries for their lifetimes plus associated expenses that PBGC would provide under the rules governing the guarantee program, less the present value of any assets or other recoveries. Discussions of PBGC's deficit, net position, financial position and net financial position all reflect the discounted present value of lifetime total liabilities in excess of total assets as of a certain date.

The report also looks at year-by-year cash flows. Discussions of plan or PBGC insolvency focus primarily on the sufficiency of plan assets, investment returns, contributions or premiums, and other income to meet benefit payments and expenses for a particular year; i.e., the report uses the term "insolvent" to mean lacking the funds to pay current benefits and expenses for a year.

About the PIMS Models

The PIMS Models are the best available tools for this analysis; but like most models, they are subject to limitations. The Models are continually revised in light of changing law, plan sponsor behavior, and PBGC's understanding of that behavior. Major modeling changes for this 2014 Projections Report include explicit modeling of cash balance plans in SE-PIMS, rewriting of ME-PIMS to better reflect benefit cash outflows for individual plans, changes to ME-PIMS due to MPRA, and the adoption of updated mortality tables for calculating underfunding.

In addition, PBGC carefully considers comments from users and peer reviews of PIMS and uses them to identify additional areas for improvement.⁵ The improvement of PBGC's Models and their documentation is an ongoing and continuing process. While both ME-PIMS and SE-PIMS can simulate demographic and economic factors up to 20 years into the future, they do not model all longer-term sources of uncertainty affecting the pension system.

Estimated multiemployer program deficits and financial assistance shown in this report assume that PBGC will provide benefits in accordance with the current level of guarantees rather than reducing guarantee levels to those affordable by premiums.⁶ This evaluation assumes no changes to the current law for both multiemployer and single-employer plans (as amended by the Highway and Transportation Funding Act of 2014 (HATFA) and MPRA).

⁵ For more information on PIMS including links to user publications and peer review papers see the [PIMS Web Page: http://www.pbgc.gov/about/projections-report/pension-insurance-modeling-system.html](http://www.pbgc.gov/about/projections-report/pension-insurance-modeling-system.html)

⁶ This enables the measurement of the size of the promised benefits from the PBGC program and the resources PBGC has to meet those payments. Under current law [ERISA §4022A(f)(2)(C)], if premiums and PBGC fund assets are insufficient to pay guaranteed benefits, and Congress does not act on a formal PBGC submission of alternative actions, guarantees are reduced to the level affordable by premiums.

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Multiemployer Program Overview

The current multiemployer system, covering more than 10 million participants in about 1,400 plans, remains under severe stress. Multiemployer plans are collectively bargained plans that are maintained by one or more unions and multiple companies, generally in the same industry or as members of an association.

By law, PBGC’s insurance program for multiemployer plans operates differently than its single-employer program. The insured event is plan insolvency (i.e., insufficient funds to pay anticipated benefits and expenses for a year). Even after a plan becomes insolvent, PBGC does not take over the administration of an insolvent multiemployer plan, but rather provides financial assistance to cover the plan’s guaranteed benefits and its expenses.⁷ Multiemployer plans’ premium rates for PBGC coverage are lower than those for single-employer plans and are based solely on participant count.

Last year’s report compared the guarantee amounts available to participants under the single-employer and multiemployer systems. It noted that the multiemployer guarantee amounts were structurally lower, were generally only partial, and varied by years of service. But given that benefit amounts in multiemployer programs are generally more modest than in single-employer programs⁸ it left open the question as to how well the guarantees worked for actual multiemployer participants. PBGC subsequently studied this issue and found that, to date, PBGC’s multiemployer guarantee has provided coverage for the full pension amount to most participants in insolvent plans.⁹ But

⁷ Technically this financial help is in the form of loans. However, with one exception over PBGC’s history, the loans have never been repaid.

⁸ As a measure of benefit generosity, PBGC examined the median target normal cost for single-employer plans for plan years beginning in 2012 and found a value exceeding \$5,500 per active worker, net of administrative expenses. Multiemployer plans report a similar number on a somewhat more conservative set of assumptions (i.e., on a basis which would tend to show higher numbers) for the median cost of annual benefits accruing of approximately \$4,600 per active worker.

⁹ In the past year, PBGC completed a study of the benefits in its multiemployer program. According to the results of this study, 79 percent of participants in multiemployer plans that were receiving PBGC financial assistance for

looking ahead, many more participants are likely to experience significant benefit reductions if their plans become insolvent.

Furthermore, even that reduced level of benefits is at risk because PBGC's multiemployer program faces a high likelihood of long-term insolvency, even after taking into account the increase in multiemployer premiums under MPRA.¹⁰ If and when the program becomes insolvent, the only funds available to support benefits would be the premiums that continue to be paid by remaining plans; this would result in benefits being cut much more deeply, to a small fraction of current guarantees.

MPRA gives plans additional options to address the risk of insolvency,¹¹ but requires difficult choices of plan sponsors and participants. Under MPRA, a "critical status"¹² plan that is projected to be insolvent within 20 years (15 years in some cases), is determined to be in "critical and declining" status. "Critical and declining" plans are allowed but not required to apply to the Department of the Treasury to "suspend"¹³ benefits if they have undertaken all other reasonable measures and if doing so would allow the plan to remain solvent over the long term and continue to provide benefits at least 10 percent higher than the level of the PBGC guarantee, with further protections for the aged and disabled. Thus plan sponsors and participants in plans likely to become insolvent face a difficult choice; whether to act early to make near-term benefit cuts that are anticipated to keep benefits above PBGC's guarantee levels and preserve the plan over the long term, or not to take early action and risk deeper cuts upon insolvency.

MPRA further changes PBGC's ability to provide financial assistance through a plan partition. In a partition, the trustees of a "critical and declining" plan request that PBGC take on responsibility for paying a portion of the plan's benefit liabilities. This is done by creating a new "successor" plan, which covers guarantee amounts for some participants and is supported by PBGC financial assistance. In order to receive partition assistance, the plan must take all reasonable measures to avoid insolvency including the maximum benefit suspensions, if applicable. In addition, PBGC must certify that a partition does not impair PBGC's ability to meet its obligations to certain other plans.

In light of PBGC's limited financial resources, the impairment test will constrain the number of plans to which PBGC will be able to provide partition assistance. To enable review of the impact of those constraints, this report generally presents two sets of results: (1) assuming no (additional) plans will elect to use suspensions or partitions under

FY 2013 received the full amount of their monthly benefit. But only 49 percent of participants in plans that were already terminated and expected to need such assistance in the future will receive their full monthly benefit amounts. The study can be found at <http://www.pbgc.gov/documents/2015-ME-Guarantee-Study-Final.pdf>.

¹⁰ Based on the increased PBGC premium level under MPRA, but no projection of the use of MPRA suspensions and partitions, it is more likely than not that PBGC's multiemployer program will deplete its assets in 2025; that likelihood increases to 91 percent by 2032.

¹¹ Independent of these changes, MPRA doubled PBGC premiums from what they would have otherwise been in plan years beginning in 2015 and going forward. Unless explicitly stated otherwise, these higher premiums are recognized in PBGC's multiemployer projections.

¹² Under the Pension Protection Act of 2006 (PPA06), a plan is considered to be in "critical status" if it is projected to run out of money to pay benefits or expenses or fail to meet minimum funding standards over the relatively near term. A series of tests are set forth in Internal Revenue Code §432(b)(2).

¹³ The suspension of benefits may include permanent and/or temporary reductions of current and future benefit payments.

MPRA and (2) using estimates of the percentage of “critical and declining” plans that will make use of the suspension and partition provisions, using best assumptions as to how the process will operate. The latter results should be interpreted in the light of the challenges and uncertainties outlined later in this report beginning on page 18.

This Projections Report also reflects three other major changes to ME-PIMS, aside from those related to MPRA. These changes (1) improve the modeling of benefit outflows by plans, and in particular the estimate of service-related guarantee amounts, (2) update estimates of longevity by applying a new mortality table and (3) increase the number of sample plans in the Model. These changes are discussed beginning on page 22.

The estimate of the average projected deficit has been reduced from last year’s projected 2023 mean present value deficit of \$49.6 billion to this year’s \$44.3 billion in 2024, assuming no future suspensions and partitions under MPRA. Using the stated assumptions about suspensions and partitions under MPRA reduces the deficit significantly, to \$28.0 billion.

The date when PBGC’s multiemployer program is estimated to have a greater than 50 percent likelihood of insolvency is deferred by three years, from 2022 to 2025. This result holds whether or not we assume plans and participants will elect to make use of suspensions and partitions. The risk of insolvency rises rapidly after the 10-year period, reaching over 90 percent by the end of the first 20 years.

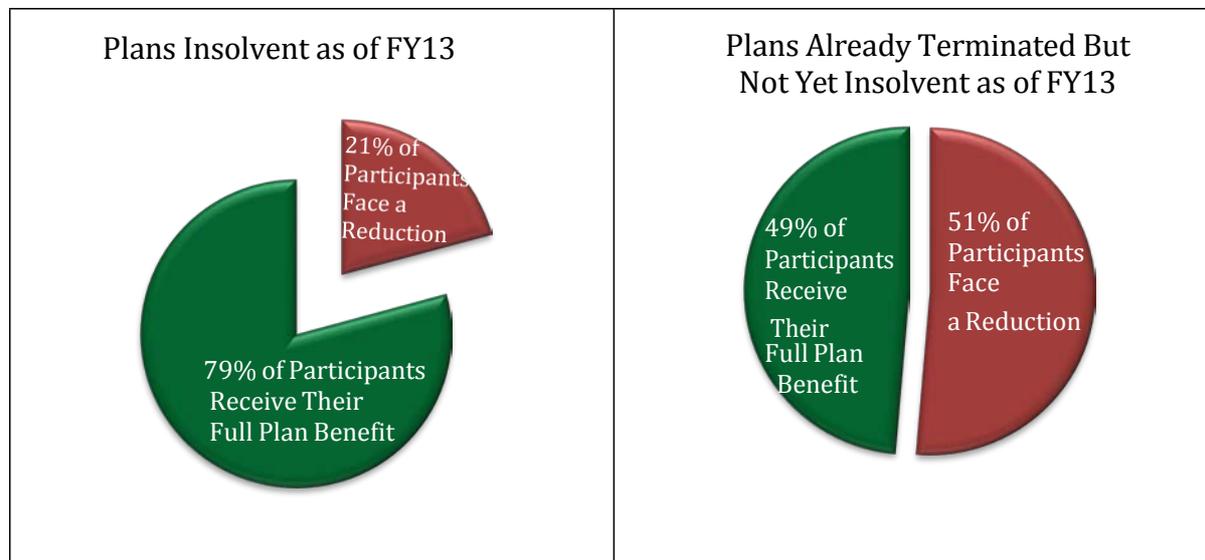
The Model runs 500 simulations of the economy and how plans react to changes. While these results are highly variable, none of the simulations show PBGC’s program in surplus. Instead, the Model shows PBGC’s multiemployer program will have a net deficit in 100 percent of our 10-year projection scenarios.

PBGC’s Guarantee in Future Plan Insolvencies

The 2013 Projections Report compared the structure of the PBGC multiemployer guarantee to that of the single-employer guarantee. That analysis showed that the multiemployer guarantee generally provided smaller amounts than the single-employer guarantee did and that the multiemployer guarantee provided only partial coverage above relatively small levels. However, multiemployer plans also tend to have lower benefit levels. Thus the impact of the different guarantee structure on participants was still unclear.

Participants who will come to rely on PBGC’s multiemployer guarantee are covered by plans in three categories: (1) plans that are already insolvent, (2) plans that have already terminated but have not yet run out of money, and (3) ongoing plans. For the 2015 Multiemployer Guarantee Study, PBGC was able to collect representative data on participants in the first two categories to assess how the guarantee operated for actual individual participants. That study shows that the multiemployer guarantee structure generally provided for payment of full accrued plan benefit levels to almost 80 percent of participants in plans that became insolvent in the past. However, the level of coverage declines significantly in plans that have already terminated but not yet become insolvent. This is due to the higher level of benefits in these plans.

Figure 1 – PBGC’s Safety Net is Less Effective for Future Insolvencies



Data of comparable quality were not available for participants in ongoing plans that are likely to become insolvent. However, the study did show that benefit levels for those plans were generally higher than in terminated plans and the percentage of benefits guaranteed would likely be even less than in terminated plans.¹⁴

Will PBGC Have Funds to Pay Multiemployer Guarantees?

Participants in insolvent plans also face the risk that PBGC’s guarantee fund itself will run out of money to provide financial assistance, so that it will be unable to pay even the current level of guarantees. This and following sections examine that risk.

The multiemployer guarantee program remains at risk of running out of money.

This year’s projections show it is more likely than not that the program will run out of money in 2025. At the end of the 10-year projection period ending in 2024, its assets are depleted in approximately 43 percent of the scenarios. Program risk continues to rise over time, reaching 90 percent by 2031 and 93 percent by 2034.

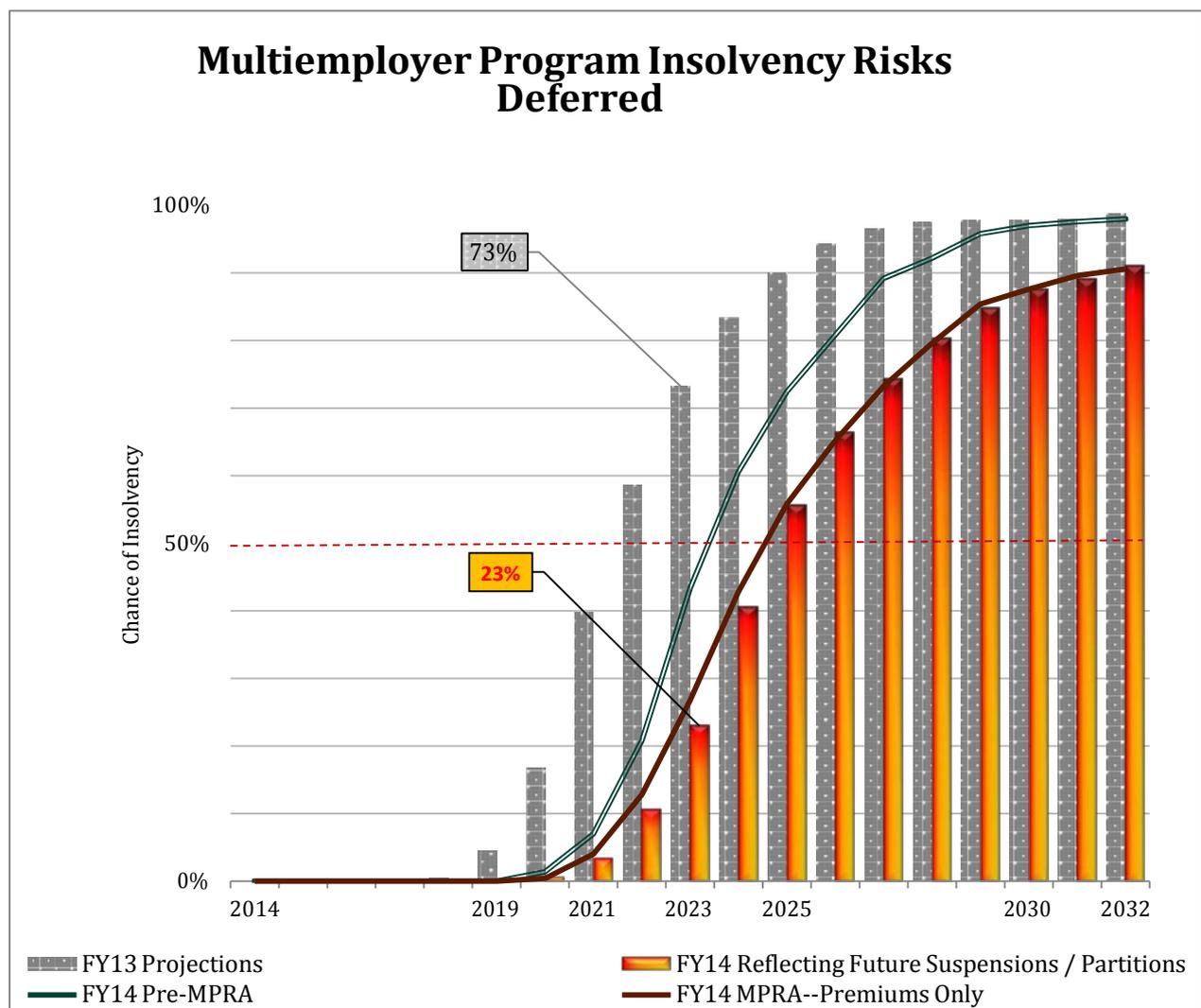
The near-term risk of running out of money has decreased. The risk that the multiemployer fund will become insolvent has decreased, particularly over the short term, when compared to the prior (FY2013) report.

The 2013 Projections Report showed the multiemployer program becoming insolvent in 73 percent of simulations by 2023 (a 10-year projection period). As shown in the following Figure 2, this year, the projected risk of insolvency by 2023 has decreased to 23 percent. However, this represents primarily a deferral of the risk -- the longer term risk of insolvency remains above 90 percent at the end of the 20-year projection period.

¹⁴ ME study (<http://www.pbgc.gov/documents/2015-ME-Guarantee-Study-Final.pdf>) – Figure 4.

The columns in the following chart compare the final results for the prior (FY13) and current (FY14) insolvency risk projections; the lines show results at interim stages. Comparing the column for the FY13 projections with the upper line in the chart shows that the reduction in near-term risk is due primarily to better modeling of plan benefit outflows as well as to changes in data and the economy. Comparing that line to the line below it shows that the larger reduction in medium-term risk is due to the additional premiums assessed under MPRA. Finally, comparing the second line to the FY14 results shows that the assumed suspensions and partitions have a very small effect on insolvency risk.

Figure 2 – Multiemployer Program Insolvency Risks Deferred



Because PBGC’s ability to offer assistance to plans is constrained by its resources, and it must certify to Congress that offering partition or merger assistance will not impair its ability to provide assistance to certain other plans, this report reflects an assumption that the number and format of partitions will be limited so as to not significantly change PBGC’s insolvency risk. Thus the insolvency risk after reflecting future suspensions and partitions is very similar to that shown when reflecting only the premium increases under MPRA, without any assumption as to future suspensions and partitions.

Summary Projections

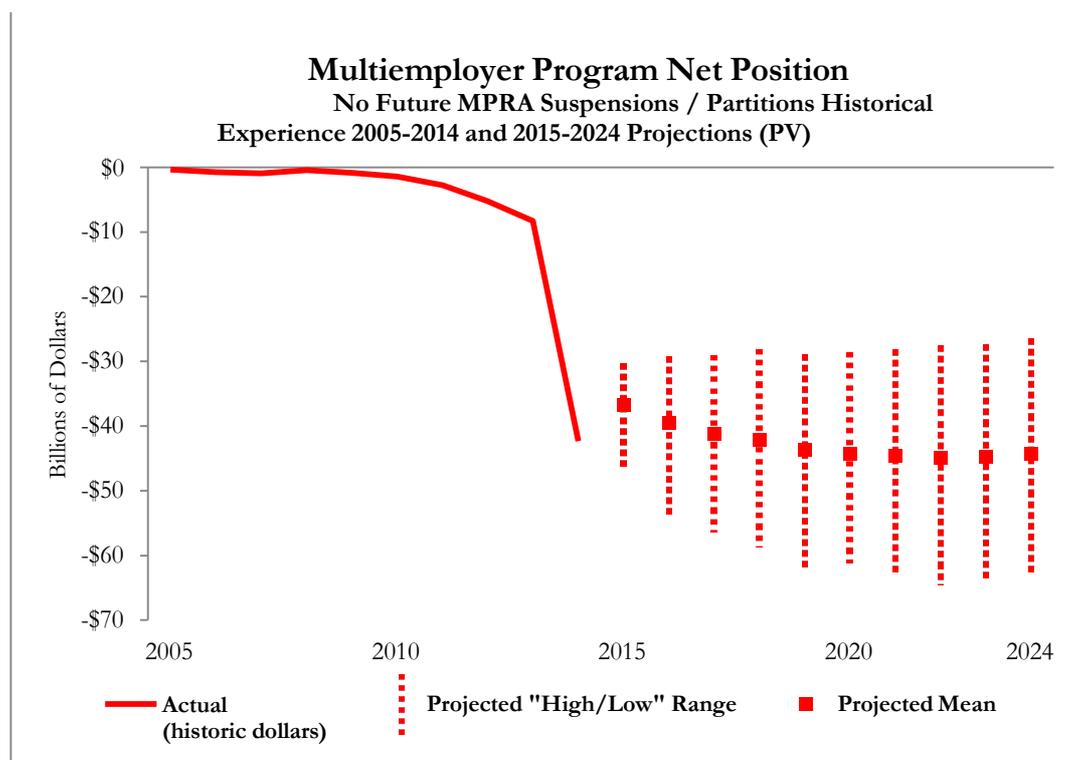
Projected Net Position

The 10-year projections show the multiemployer program's net position as somewhat improved from last year's projections, even before considering any future election of benefit suspensions and partitions by plans under MPRA. The net position is projected to further improve significantly should plans utilize suspensions and partitions. ME- PIMS projects that PBGC's 2024 multiemployer obligations, will be lower than last year's projections (a mean deficit of \$44.3 billion in 2024 compared to the previous projection of a mean deficit of \$49.6 billion), prior to the usage of MPRA suspensions and partitions. This projected mean deficit (after discounting to present value) is somewhat higher than the current deficit of \$42.4 billion shown in the September 30, 2014 financial statements. Incorporating best estimates of how plans will use suspension and partition, the 10-year mean projected deficit is significantly lower, falling to a mean present value of \$28.0 billion in 2024.

The following chart (Figure 3) shows the FY 2015 through 2024 present values of the projected multiemployer net position (the squares and dotted lines) in contrast to the actual historical net positions (the solid line ending in fiscal year 2014). It assumes no future benefit suspensions or partitions under MPRA. It also illustrates the large change in the historical net position from 2013 to 2014, as discussed in PBGC's 2014 Annual Report.

For each future year, the chart shows the mean outcome for each year as a large square, as well as the range between the fifteenth percentile (15 percent of the outcomes are worse in that year) and the eighty-fifth percentile (15 percent of the outcomes are better). These are the present values of PBGC's deficit (i.e. negative net position), assuming that PBGC had been able to borrow any amounts needed in previous years to meet its financial assistance obligations at current guarantee levels if assets and premiums are insufficient to provide the guarantees. The resulting deficit is the amount of present value of future financial assistance as of that year, less projected assets, plus any amounts borrowed (with interest) in order to continue to provide the current schedule of guarantees and financial assistance in years prior to the projection date.

Figure 3 – Multiemployer Net Position Deficit Likely to Remain High Absent Future Benefit Suspensions



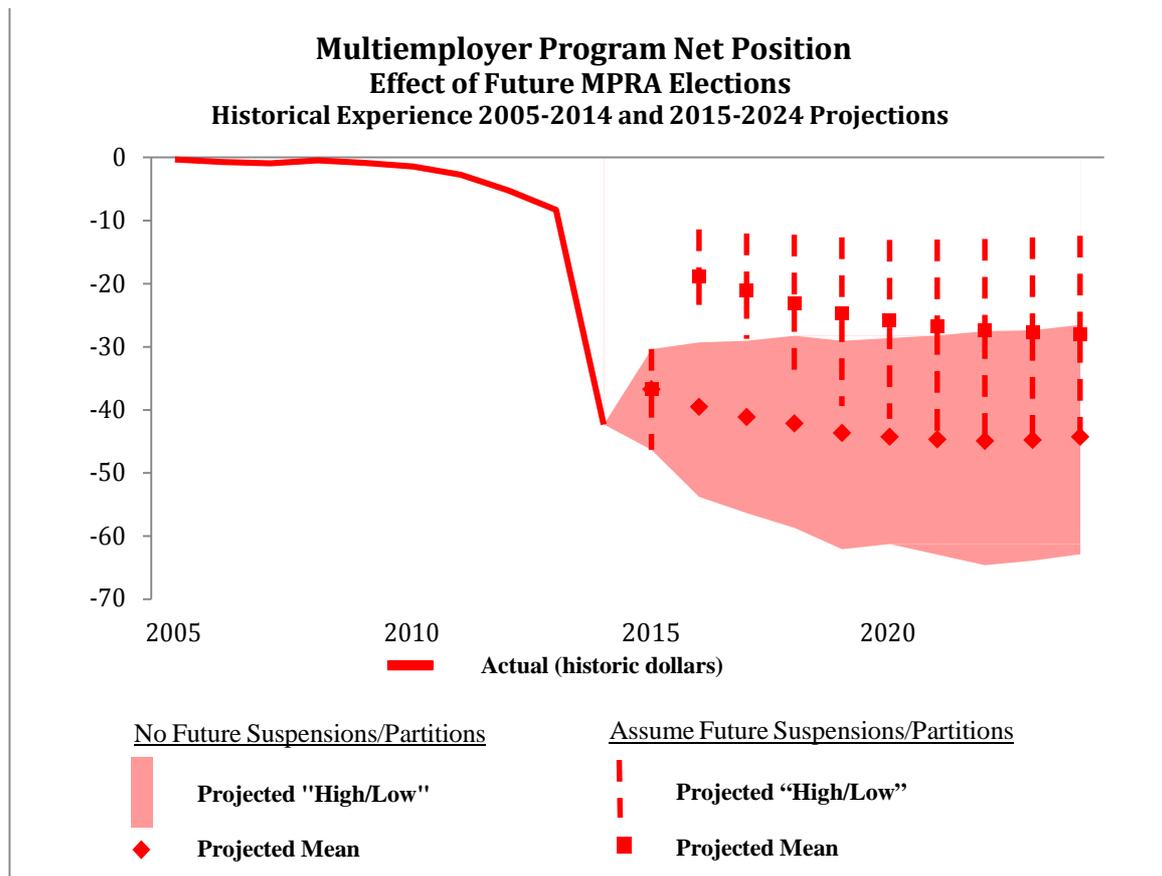
In Figure 3 above, the **mean** future **net** position is projected to remain relatively close to the multiemployer program’s current net position in present value terms. This occurs because the current net position (i.e., PBGC’s financial statement deficit of \$42.4 billion in fiscal year 2014) already reflects significant financial deterioration in some plans, including several large plans. The FY2015 projected net new claims are considerably lower than the FY2014 net new claims because a large portion of the “potential” new claims are now already included in the current net position.

Figure 4 compares the projected net positions for 2015 through 2024, assuming “best estimate” future MPRA suspensions and partitions, with the projected net positions without the MPRA elections. This enables a direct comparison of the effects of the assumed election of suspensions and partitions on the projected mean and range of future deficits. To facilitate the comparison, the high/low range shown in Figure 3 is shown as a band, and the “best estimate” values are shown with the prior format.

Reflecting the election of suspensions and partitions under MPRA, using our best estimate assumptions, significantly decreases the projected net deficit, as shown in Figure 4. This is in contrast with the effect on near-term solvency shown in Figure 2 above. The decrease in the projected net deficit reflects that, over the long-term, suspension (and financial assistance through partition) may allow plans to continue to operate and provide benefits at levels lower than current levels, but without running out of money and seeing benefits fall to PBGC guarantee levels. This affects PBGC’s deficit (which looks at benefits paid over the lifetime of participants) but not shorter-term solvency, indicating that this is a long-term effect.

Given the period required to apply and to determine whether an application for suspension or partition meets the requirements of MPRA, PBGC does not anticipate that any suspensions will be in effect as of the release of PBGC’s FY2015 Annual Report. While it is likely that decisions to proceed to a suspension will be spread over the next several years, for simplicity, our model of elections assumes that “critical and declining” plans will make an election that is effective in 2016.¹⁵ PBGC will review the assumptions around election timing as experience under MPRA evolves.

Figure 4 – Future Benefit Suspensions Likely to Reduce Deficit



Sources of Uncertainty: Multiemployer Program

Post-MPRA, there are three major sources of uncertainty in the multiemployer system: (1) Probability of new claims. These new claims will arise primarily, but not solely, from plans that are currently in poor financial condition. Uncertainty as to the probability and timing of future financial assistance reflects both the volatility of plan investment returns and the timing of potential mass withdrawal from the plan by contributing employers. This variability in fund earnings, contributions and benefit accruals makes the date of insolvency and the amount of financial assistance uncertain. (2) Variability in the timing and amount of financial assistance payments. (3) Extent to which plans will use

¹⁵ For modeling purposes, assumptions regarding election of suspension and partition incorporate the likelihood that sponsors will apply, will comply with statutory requirements, and that the suspensions will not be overturned by participant vote. For additional information see the discussion on p. 18.

suspensions and partitions under MPRA. These sources of uncertainty are discussed in detail in the following sections.

Projected Net New Claims

The following tables show the mean present value of net new claims and the mean present value of the financial position of PBGC’s multiemployer program in 2024 (discounted to 2014 present values), both before and after utilizing MPRA suspensions and partitions. Alongside those values, the tables display the “low” and “high” values at the fifteenth and eighty-fifth percentiles. For each of these tables, because higher new claims mean greater financial losses to PBGC, the order of the columns has been reversed for the second row of projections to better show the relationship between high new claims and a deterioration of PBGC’s financial position. In addition to the present value of the liabilities less assets for FY 2024, which comprise the financial position, the chart also notes when the fund is insolvent as of that date (see Figure 2 for the range of solvency outcomes in other years).

No MPRA Suspensions/Partitions			
2014 Present Value (PV) <i>(Dollars in billions at year end)</i>	“Low” (15th percentile)	Mean	“High” (85th percentile)
PV PBGC ME Net New Claims FY 2015 -2024	\$1	\$13	\$26
	“High” (85th percentile)		“Low” (15th percentile)
PV FY 2024 PBGC ME Financial Position <i>(Deficit)/ Surplus</i>	\$(27)	\$(44)¹⁶	\$(63) Insolvent

The Net New Claims essentially reflect liabilities recorded when a plan is booked on PBGC’s financial statements offset by the value removed from the books in a subsequent year, should a plan’s financial condition materially improve.¹⁷ The PV FY2024 Financial Position measures future obligations as of 2024, including net new claims as well as final adjustments for benefit payments, asset earnings, and projected 2024 assumptions, and then discounts to a 2014 present value. The number shown includes as part of the deficit

¹⁶ The mean present value discounted to 2014 is a \$44 billion deficit. The mean discounted present value is the average across all simulation paths; discount rates vary among different simulation paths. The mean projected 2024 value is a \$61 billion deficit in nominal terms.

¹⁷ This is the present value of net PBGC obligations for plans projected to be booked during the next 10 years, offset by the reversal of liabilities for plans “unbooked” over the 10-year projection period. The liability “unbooked” is the value in the year of removal; it reflects how the liability has evolved over time along a particular economic path and is not the same liability at which the plan was initially booked.

any shortage of funds due to providing financial assistance at the currently guaranteed level even after the multiemployer fund runs out of money.

The median present value of net new claims totaled over the next 10 years (assuming no use of MPRA suspensions and partitions) is about \$13 billion; that is, half of the simulations show a 10-year total of claims above \$13 billion and half below. The mean present value of claims (that is, the average level of claims) is also about \$13 billion over the next 10 years. In past projections, future claims under the Model reached very high levels in a greater number of simulations than in the current projections, such that the projected mean exceeded the projected median. The number of very high claims is smaller in this year’s projections and the projected mean and median are more closely aligned. (For a comparison of the distribution of claims see Figure 8 on page 21.)

The middle 70 percent of the outcomes, shown in the table above, for the present value of the multiemployer program’s projected financial position is a range of \$36 billion. The model finds a 50 percent likelihood that the multiemployer program will experience a projected improvement over the current deficit of \$42.4 billion (expressed in present value terms).

After assumed election of suspension and partition under MPRA, the projected mean deficit declines significantly, reflecting the likelihood that these plans will remain solvent for the long term and not need PBGC financial assistance, resulting in the removal of liabilities from the books, net of any additional partition assistance provided. Under these assumptions, the model finds an 80 percent likelihood that the program will experience a projected improvement in the deficit over the ten year projection period.

Assuming MPRA Election Rates			
2014 Present Value (PV) <i>(Dollars in billions at year end)</i>	“Low” (15th percentile)	Mean	“High” (85th percentile)
PV PBGC ME Net New Claims FY 2015 -2024	\$(12)	\$3	\$21
	“High” (85th percentile)		“Low” (15th percentile)
PV FY 2024 PBGC ME Financial Position <i>(Deficit)/ Surplus</i>	\$(12)	\$(28)¹⁸	\$(47) Insolvent

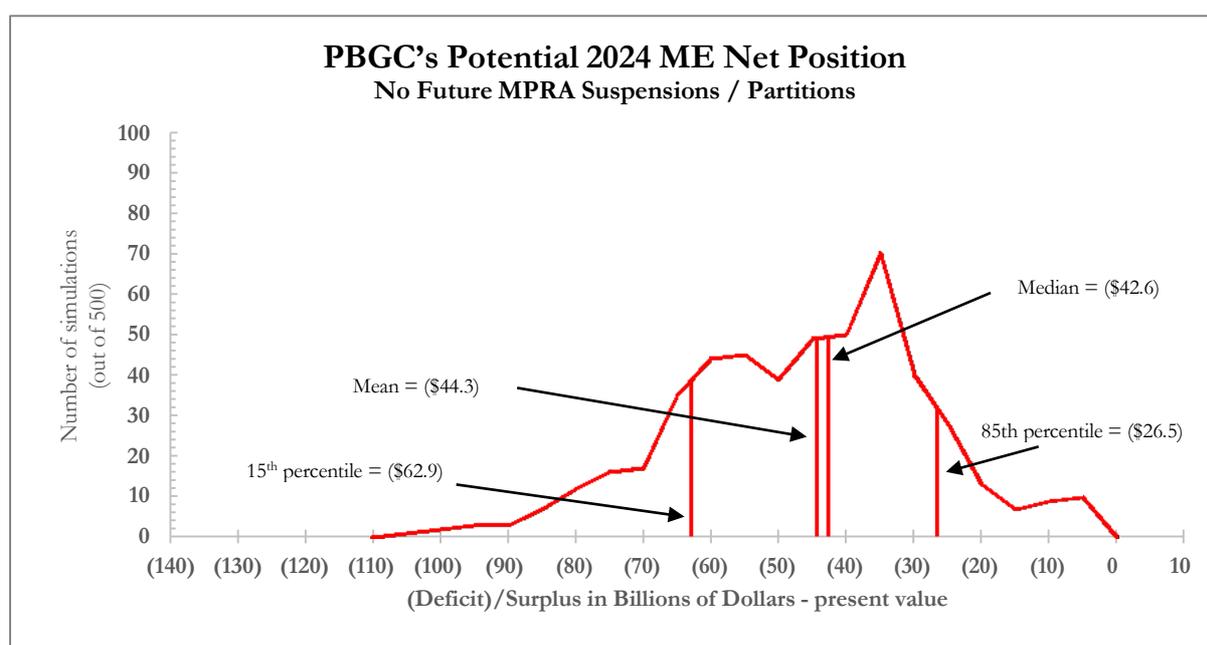
The following graphs illustrate the range of projected outcomes for the financial position of PBGC’s multiemployer program 10 years from now, both before and after the use of the MPRA suspensions and partitions. For each value of PBGC’s projected net position

¹⁸ The mean present value discounted to 2014 is a \$28 billion deficit. The mean discounted present value is the average across all simulation paths; discount rates vary among different simulation paths. The mean projected 2024 value is a \$39 billion deficit in nominal terms.

along the horizontal axis, the height of the line shows the frequency of that net position (out of the 500 simulations).

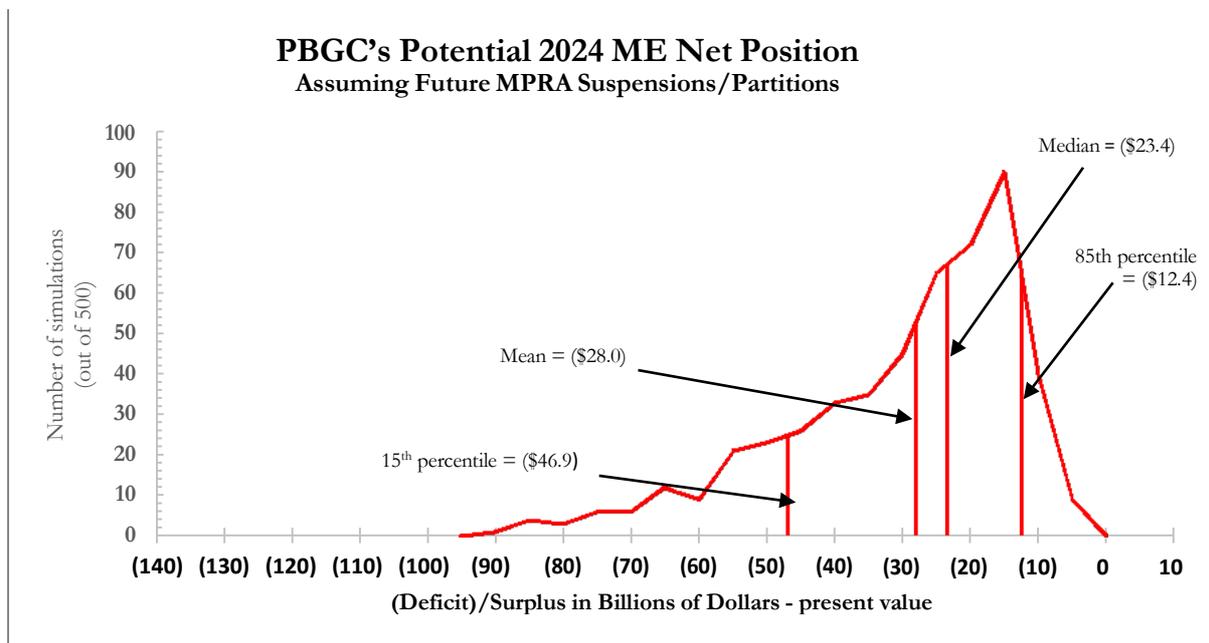
Vertical lines on the graph show the present value of PBGC’s projected 2024 net position at the fifteenth and eighty-fifth percentiles and the mean and median values of projected net positions. The median result is a deficit with a present value of \$43 billion in fiscal year 2024 prior to MPRA use. None of the 500 projections shows a surplus. The most optimistic projection shows a deficit of \$1.7 billion in present value. Many projections show very severe deficits, with the largest projected at a present value of \$102 billion.

Figure 5 – ME Net Position, Absent Future Suspensions and Partitions, Shows Wide Range of Potential Outcomes, None Positive



As depicted in the following graph, revisiting this distribution under the best estimate assumption about election of benefit suspension and partition under MPRA (i.e., assuming plans choose suspension and partition in the future), produces a significant shift in the distribution of potential future deficits under the program, with a large range of potential outcomes. Despite this shift, still none of the 500 projections show a surplus.

Figure 6 – Assumed Future Suspensions Reshape the Risks to the Insurance Program



PV Financial Assistance Payments

In addition to new claims, ME-PIMS simulates financial assistance payments from PBGC to insolvent multiemployer plans to pay retiree benefits and maintain the plans. PBGC generally provides financial assistance only *after* a plan becomes insolvent. Thus, financial assistance payments projected over the next 10 years are generally due to previous claims (i.e., plans already booked as losses).

Over the period from 2015 to 2024, after recognizing the doubling of PBGC premiums from calendar 2015 forward under MPRA, financial assistance payments are projected to just about match PBGC's resources, prior to the use of MPRA suspension and partition. Assets in the multiemployer program in 2014 are about \$1.8 billion while the present value of projected premiums over the 10-year period is about \$2.7 billion (post MPRA), totaling about \$4.5 billion. This is about equal to the mean present value of financial assistance of \$4.6 billion in the chart below, which shows the mean, and high and low values for the present value of projected financial assistance payments. Even within the high/low range, financial assistance payments vary by a factor of more than three.

No MPRA Suspension/Partitions			
2014 Present Value <i>(Dollars in billions at year end)</i>	“Low” (15th percentile)	Mean	“High” (85th percentile)
PV PBGC ME Financial Assistance Payments FY 2015-2024	\$2.3	\$4.6	\$7.5

If plans use the MPRA suspension and partition options, the pattern of financial assistance will change. Plans whose partitions are underwritten by PBGC will receive

financial assistance sooner in anticipation that they will need less total assistance and be able to survive. Financial assistance payments assuming MPRA election rates are shown in the following chart and discussed below in the section “Assumed Utilization of MPRA Suspension and Partition.”

Assuming MPRA Election Rates			
2014 Present Value <i>(Dollars in billions at year end)</i>	“Low” (15th percentile)	Mean	“High” (85th percentile)
PV PBGC ME Financial Assistance Payments FY 2015-2024	\$2.9	\$4.2	\$5.2

Since the projected financial position reflects money still owed even after providing financial assistance for the next 10 years, it emphasizes the increased demands on PBGC’s resources beyond the projected 10-year “financial assistance” flows shown above.

Assumed Utilization of MPRA Suspension and Partition

As discussed above, MPRA gives critical and declining plans additional options to address the risk of insolvency, but the use of these options presents difficult choices for plan sponsors and participants. Regulations covering important parts of the process are not yet final. Thus, there is no experience available to help estimate the number of plans that will apply to Treasury, be approved to suspend benefits and meet the participant voting requirements of the law. Similar issues apply in estimating partition by PBGC, with the added complication that the impairment test will constrain the number of plans to which PBGC will be able to provide partition assistance and the structure of the partition payments.

The ME-PIMS Model addresses these issues by a combination of explicit modeling and assumptions. It explicitly estimates a plan census and benefit distribution for each plan in the sample and uses that information to determine, at each point along each economic path, (1) whether the plan is in critical status, (2) if the plan is projected to become insolvent within the ensuing 20-year period (15 years in some cases) and meets the criteria to be critical and declining, (3) benefits protected under MPRA, and (4) whether the plan would project long term solvency, either through benefit suspensions alone, or with partition assistance. For critical and declining plans, ME-PIMS then applies assumptions as to whether Boards of Trustees will undertake and successfully complete the requirements of benefit suspension.

Our assumptions for these plans reflect two primary factors: whether Boards of Trustees will voluntarily undertake to apply for a suspension that complies with the requirements of the law and, to the extent that a plan is not “systemically important,” whether participants will vote to override the suspension. For “systemically important” plans, the law requires that Treasury override any “no” vote, after reviewing and potentially adjusting the proposed suspensions.

Information on the composition of plans that intend to apply, by size and funded status, is limited and informal. PBGC has gathered information from the plans most likely to use these options and from multiemployer practitioners and has derived assumptions as to the potential utilization rates. Estimates were further adjusted to reflect the impact of estimated voting results, weighted to reflect the provisions of MPRA that affect voting in systemically important plans. As a result, ME-PIMS assumes (in its “best estimate” assumptions) that there is a 100 percent likelihood that the largest critical and declining plan will elect to apply and will complete regulatory requirements. It further assumes a 60 percent likelihood for other plans that can extend solvency by benefit suspension alone (i.e., that are able to preserve solvency while keeping benefits at levels equal to or higher than the minimum benefit protections in MPRA).

When a plan would need to reduce benefits below the minimum protections set forth in MPRA in order to preserve solvency, it has the option of applying to PBGC for financial assistance in the form of a partition. In a partition, the plan is relieved of the obligation to pay for a portion of its benefit liabilities by spinning off the guarantee obligations for some participants to a separate plan which is financed by PBGC. MPRA also requires a plan to make maximum benefit suspensions in conjunction with a partition. Thus, the factors that affect suspension generally continue to apply. In addition, Congress required that PBGC authorize a partition only if it can certify that the provision of financial assistance to a particular plan will not impair PBGC’s ability to help participants in certain other plans.

In light of PBGC’s limited financial resources, the impairment test will constrain the plans to which PBGC will be able to provide partition assistance. As a result, ME-PIMS assumes that only 20 percent (rather than 60 percent) of plans that require both suspension and partition to avoid insolvency, and otherwise meet the requirements of the law will complete the regulatory requirements, receive PBGC approval, and implement the suspension and partition.

To present the effects of uncertainty as to whether Trustees and participants will elect to suspend benefits and to successfully apply for partition, this report generally shows results under two alternate sets of assumptions assuming no future suspensions and partitions and on the basis of the assumptions described above (“best estimate” assumptions). It further illustrates uncertainty over time related to each of those assumption sets, along 500 future economic paths. As an additional test of the sensitivity of the MPRA election assumptions, PBGC has determined the effects of halving these assumptions.¹⁹ In that case, the estimated effects on solvency would be small – changing the likelihood of insolvency by less than 5% in any year. The mean present value of the projected 2024 deficit under the alternative assumptions would be \$36.1 billion.

¹⁹ In other words, the likelihoods for the one large plan, other suspensions, and additional partitions would be 50 percent, 30 percent, and 10 percent, respectively.

Figure 7 – Sensitivity of Assumptions Regarding Election of Suspension / Partition

Mean PV FY 2024 PBGC ME Financial Position			
2014 Present Value (PV) <i>(Dollars in billions at year end)</i>	No Future Suspensions / Partitions	Alternate Assumptions	Best Estimate Assumptions
<i>(Deficit)/ Surplus</i>	\$(44)	\$(36)	\$(28)

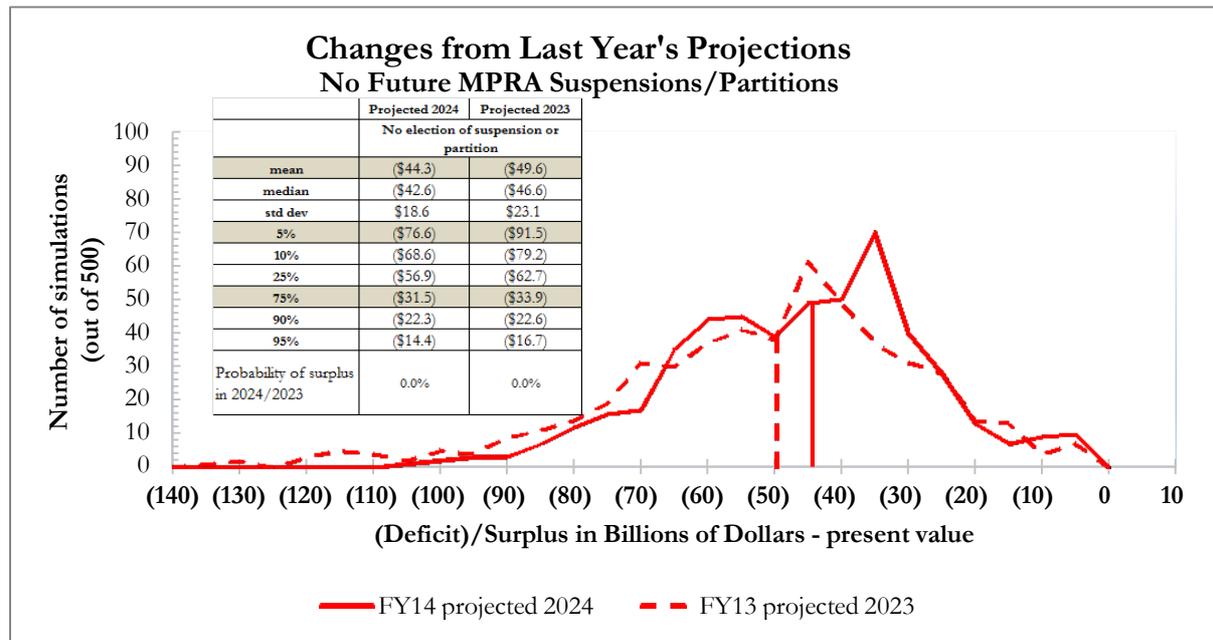
These assumptions are developed for modeling purposes only; they should not be interpreted as preempting statutory and regulatory requirements regarding the approval process for benefit suspensions and partitions. The suspension and partition assumptions are discussed in greater detail in the Appendices to this report. As noted earlier, the report shows some results assuming both no use of MPRA suspension and partition and a “best estimate” utilization assumption.

Variability in Projected Financial Position, Multiemployer Program

About half of projections, absent use of MPRA provisions, show a slight improvement in PBGC’s financial position over the next 10 years. As of September 30, 2014, the multiemployer program had a deficit of \$42.4 billion. The mean projected result for 2024 (discounted to a 2014 present value) is a \$44.3 billion deficit, and the median outcome in fiscal year 2024 (discounted to a 2014 present value) is a \$42.6 billion deficit.

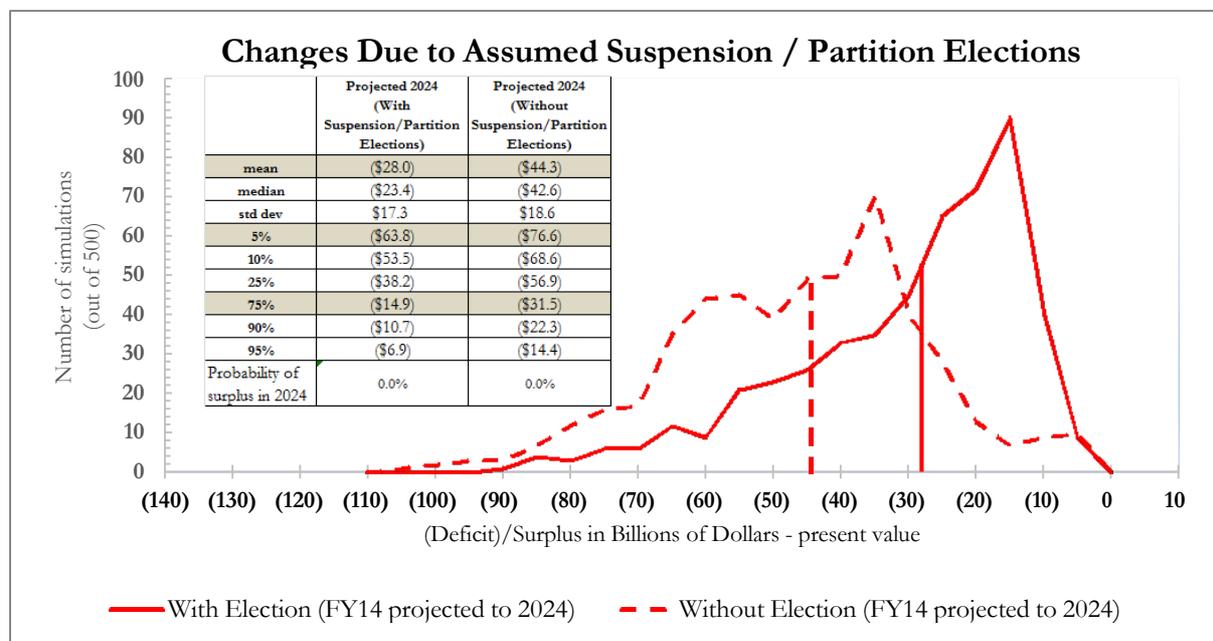
The graph below illustrates the shift in the distribution of outcomes for the program compared to the prior report.

Figure 8 – ME Changes from Last Year's Projections



If plans are assumed to take advantage of MPRA suspensions and partitions, the graph changes. As previously noted, the mean present value of the 2024 deficit decreases from \$44 to \$28 billion, with more outcomes to the right of the graph. Again, there are no projected positive net position outcomes in either scenario.

Figure 9 – ME Changes due to Assumed Use of MPRA Suspension/Partition



MPRA doubled the premium rate to \$26, effective in 2015. Even after the increase in per-participant premiums, the present value of projected multiemployer premiums during the fiscal years 2015 to 2024 ranges only between \$2.5 billion and \$2.9 billion. Last year’s 10-year projected premiums were much lower (ranging from \$1.1 billion to \$1.3 billion). The increase in this year’s projected premiums is largely the result of the passage of MPRA. Since the multiemployer program’s premiums are still relatively low and the program has few assets at the end of the 10 year projection period, the increase in premium has an insignificant impact on the projected net position.

Reconciling ME-PIMS Results from 2013 to 2014

The following table displays a detailed reconciliation (in dollars, as well as percentages) of the changes from 2013 to 2014. A discussion of each item follows the table. Decreases in the projected deficit amounts are shown in parentheses on the chart.

The magnitude of the dollar amounts shown in the table change significantly based on the order in which they are calculated, but they would still add up to the final value of \$28.0 billion under any order. Because the projected assets are small compared to the liabilities, the percentages displayed would not change significantly, regardless of the order of measurement.

Figure 10 – Reconciliation of Changes in ME-PIMS Results

Reconciliation of Changes in ME-PIMS Results, 2013 to 2014 Results			
Description of Change	Value of Change (\$ billions)	Net Deficit (\$ billions)	% Change
Initial Position for Mean PV of 10-Year Projected Net Deficit from 2013 Projections Report		\$49.6	
1. Changes due to new plan data and passage of time from fiscal year 2013 to fiscal year 2014	5.4	55.0	+10.9%
2. Changes in economy and economic assumptions from fiscal year 2013 to fiscal year 2014	0.8	55.8	+1.5%
3. Changes to ME-PIMS Model	(13.7)	42.1	-24.6%
4. Change in mortality assumption	3.6	45.7	+8.6%
5. MPRA premiums and other changes (No plan election of suspension or partition)	(1.4)	44.3	-3.1%
6. MPRA (Reflecting assumed plan election rates for suspension and partition)	(16.3)	28.0	-36.8%
Year 2024 Mean PV of Projected Net Deficit based on 2014 ME-PIMS Model		\$28.0	

Data changes: Changes in the starting data between fiscal year 2013 and fiscal year 2014 include an increase in the number of plans in the sample in ME-PIMS, both to get a sufficient sample of “critical and declining” plans to better model MPRA actions and to

accommodate the small plan reserve methodology²⁰ of PBGC's financial statements. The Model is also updated to incorporate new plan data. Finally, this category incorporates any changes due to the fact that the 2014 Projections Report extends the projection period one year, from 2023 to 2024. In combination, these changes increase the present value of the deficit by \$5.4 billion.

Economy and economic assumptions: Between fiscal years 2013 and 2014, there were modest changes in the assumptions regarding the underlying economy (e.g., source of imputed asset earnings for the years immediately before the valuation for which actual data are not yet available), upon which all the ME-PIMS projections are based. ME-PIMS also reflects changes in the underlying economy. Reflecting these changes increases the present value of the projected deficit by \$0.8 billion.

Changes to the Model: PIMS generally operates on the basis of plan data, using aggregate information as reported on the Form 5500;²¹ it imputes individual participant census information in order to estimate changes in plan liabilities over time. In prior years, the methods used to impute inactive participant censuses were the same across both SE-PIMS and ME-PIMS, generating a census varying by age and amount of benefit.

However, as discussed in the 2013 Projections Report, significant differences between the single-employer and multiemployer programs in factors that affect the guarantee (e.g., service), as well as differences in the point at which the guarantee applies, suggested a focus on the increased sensitivity of modeling plan benefit outflows (cash flows) in ME-PIMS. The 2014 version of ME-PIMS incorporates significant improvements to enable the imputation of a retiree census that explicitly varies by age, service, form of benefit (modeling life annuities and joint-and-survivor annuities), gender, and benefit amount. It produces benefit outflow estimates much more closely aligned to those reported by the actuaries of the plans. The new version of the Model also incorporates the ability to input plan specific census information where available.

The report reflects other small modifications to the coding (1) to allow the use of multiple processors, (2) to change the way the program generates random numbers within a scenario, and (3) to reflect the changes incorporated into PBGC's accounting policy last year (the establishment of liability booking procedures by size of plan). However, the main change to the Model is the change to the benefit cash flow model. In combination, the changes reduce the present value of the deficit by \$13.7 billion.

Change in mortality assumption: The PIMS Model generally assumes certain relationships between long-term interest rates and the interest factors generated as an estimate of annuity prices. PBGC sets interest factors that approximate annuity prices using a specific mortality table. New information about longevity is reflected almost immediately in annuity prices (i.e., in developing interest factors); this can distort the relationship between interest factors and other long term rates. Last year's report examined this potential by adding a sensitivity test on the interest factors used in pricing. This year's report utilizes updated mortality tables, incorporating a projected static

²⁰ See Footnote 33.

²¹ Information about Form 5500 and its attachments is available at <http://www.dol.gov/ebsa/5500main.html>.

version of the new tables issued by the Society of Actuaries.²² This change increases liabilities by \$3.6 billion.

MPRA premiums and other changes (No plan election of suspension or partition):

MPRA doubled the level of the per-participant premium effective in 2015. It also made a variety of other changes to the law including removal of prior law reorganization provisions that required a separate minimum contribution calculation under certain circumstances. While certain changes (such as reflecting that PPA06 would not sunset) were already incorporated into prior projections, reflecting the new items decreases liabilities by \$1.4 billion, primarily due to the increase in the premium.²³

MPRA (Reflecting assumed plan election rates for suspension and partition):

PBGC developed a “best estimate” set of assumptions for the utilization of MPRA suspensions and partitions. The development of these assumptions is outlined in the section entitled “Assumed Utilization of MPRA Suspension and Partition.” ME-PIMS reflects the likelihood that a plan will attempt to and succeed in suspending benefits through assumed election rates, which are modeled stochastically. Plans that will need partition as well as suspension are modeled as a separate class, with election rates limited by MPRA’s requirement that PBGC’s provision of financial assistance through partition not impair its ability to assist certain other troubled plans. MPRA also gave PBGC authority to support plans by providing financial assistance to help troubled plans merge. This facilitated merger authority is subject to similar impairment constraints and is not separately modeled in ME-PIMS, but is incorporated within the modeling of the constrained financial assistance available under partition.

The additional set of assumptions required to support this segment of the Model are outlined in the Appendices to this report. Reflecting the assumed rates of suspension and partition decreases the present value of the 2024 multiemployer program net deficit by \$16.3 billion.

In total, reflecting MPRA assumptions and all other Model and data updates since last year’s report, the present value of the multiemployer program mean projected net deficit (projected ten years from the report date) decreases from \$49.6 billion to \$28.0 billion.

Sensitivity of Changes to the Model and Discount Rate

PIMS benefits from comments of readers, other users, and a peer review of the program. One suggestion made in prior peer reviews was to enhance the disclosure of the sensitivity of results to changes in assumptions and other aspects of the Model. PBGC

²² Information about the RP-2014 Mortality Tables is available at <https://www.soa.org/Research/Experience-Study/pension/research-2014-rp.aspx>

²³ MPRA also made permanent many of the multiemployer changes legislated by PPA06. Since ME-PIMS already assumed that these changes would be permanent, there are no effects to discuss due to this provision of MPRA. Further, MPRA stipulated that certain specific amounts of PBGC premiums collected from multiemployer plans for the years 2016 to 2020 would be placed in non-interest-bearing accounts. ME-PIMS does not currently reflect this provision. Had it been included in the Model, PBGC would run out of funds approximately one month sooner, and the present value of premiums would be approximately \$50 million less.

has begun to do this, focusing first on the modeled discount rate. Over time, PBGC plans to expand this analysis to other significant areas of PIMS.

As discussed above, PBGC has added tests of the sensitivity to increases and decreases in the PIMS discount rate for valuing PBGC obligations. With the “no future MPRA utilization” assumption, if market prices for annuities were based on discount rates 50 basis points higher than in the base projection, the mean present value of the 2014 multiemployer net position would decrease (improve) by \$2.9 billion; discount rates 50 basis points lower would increase (worsen) the mean present value of the deficit by \$3.2 billion. Using the “MPRA suspension and partition election” assumptions, discount rates 50 basis points higher than in the base projection would improve the mean present value of the 2014 multiemployer net position by \$2 billion and discount rates 50 basis points lower would worsen the mean present value of the deficit by \$2.3 billion. All four scenarios show no chance of a surplus in 2024.

SINGLE-EMPLOYER PROGRAM

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Single-Employer Program Overview

PBGC’s simulations show that significant improvement in the single-employer program’s projected net position is likely over the 10-year time horizon. This is a similar pattern to that reported last year, even after adjusting for some refinements to SE-PIMS. Among the changes made to the modeling system were explicit recognition of hybrid plans, adjustments to bankruptcy probabilities for certain plan sponsors, modifications to the variable rate premium projections, reflection of more up-to-date mortality, and recognition of the effects of HATFA. In 2014, PBGC’s single-employer program covered over 30 million participants in over 22,000 plans.

Last year PBGC reported a mean present value of \$7.6 billion for its projected 2023 deficit. The 2014 Projections Report shows a reasonably comparable deficit of \$4.9 billion for 2024, also with a large range of variability in the potential outcomes. However, none of the simulations project that the program will run out of money within the next 10 years.

Summary Projections

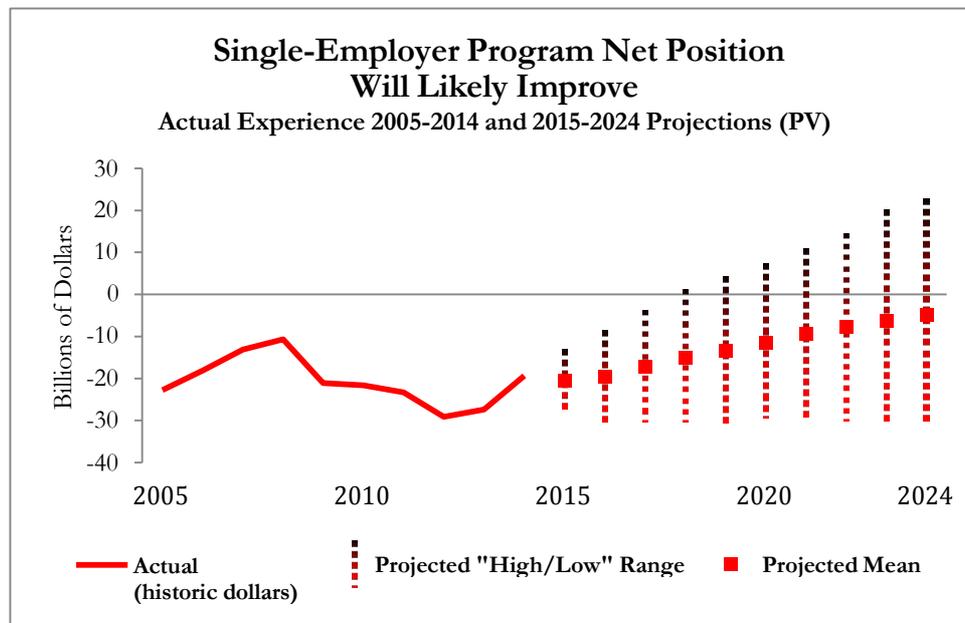
Net Position

The FY 2014 single-employer program financial statement assets of \$88.0 billion and liabilities of \$107.4 billion result in a net deficit of \$19.3 billion.²⁴ The following chart shows PBGC’s actual net financial position from fiscal years 2005 to 2014, and the present value of the range of projections for the next 10 years. The mean projected net position for each future year is shown as a large square. The dotted vertical bars for each future year show the range of results between the fifteenth and eighty-fifth percentiles for that future year. Since each year’s position affects the following year’s position, the

²⁴ Individual figures may not sum or subtract due to rounding.

uncertainty of PBGC’s financial position grows every year through fiscal 2024, as reflected in the progressively longer vertical bars:

Figure 11 – Single-Employer Net Position Will Likely Improve



Because PBGC’s obligations are paid out over the remaining lifetimes of people receiving pensions, a deficit means PBGC will have less money than it will need over a period of decades. Without changes, at some point there is a risk that a program in a deficit position will run out of money (i.e., it will have paid out all its assets and still owe benefits). That point still appears to be many years in the future for PBGC’s single-employer program. Out of 5,000 simulations, none project that PBGC’s single-employer program will run out of money within the next 10 years. A majority of simulations project decreases in PBGC’s deficit.

The improvements to PBGC’s net position over the 10-year period are due to a general trend of improving plan solvency and projected PBGC premiums exceeding projected claims.

Sources of Uncertainty: Single-Employer Program

The uncertainty in the future of PBGC’s single-employer program arises from questions we cannot now answer. These include not knowing which plans will fail, how much PBGC will owe participants as a result of these failures, how much PBGC will still owe people by FY 2024 (in outstanding benefits that remain beyond the 10-year projection period), what returns PBGC will realize on its assets, and how much PBGC will receive in premiums.

Which Plans Will Fail?

The primary drivers of PBGC’s projections are the financial health of the companies that sponsor pension plans and the amount of underfunding in those plans. If many companies with large, underfunded pension plans enter bankruptcy and are permitted to terminate their underfunded plans, new claims are created against PBGC, increasing

future PBGC obligations. These new claims will also be reflected in PBGC's projected net position.

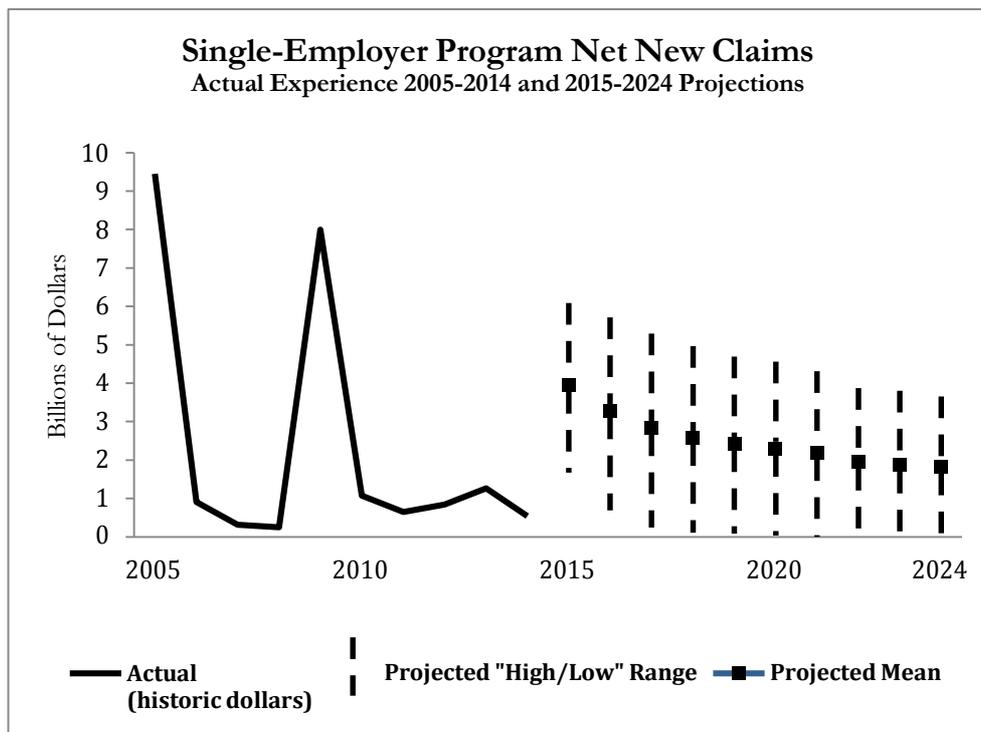
How Much Will PBGC Owe Participants?

Benefit payments and new claims. "Benefit payments" for a given year means the amount PBGC is projected to pay to retirees during that year (discounted to a 2014 present value), regardless of when their plans failed. "New claims," on the other hand, represents the total present value of the projected costs over time to PBGC of plans that fail during the projection period. A new claim is the difference between the present value of all the money PBGC will have to pay for a plan that is projected to fail and the assets of that plan, including any recovery from plan sponsors. Note that the valuation reflects the benefits payable beyond the 10-year projection period for all failed plans; payments continue until all participants covered by the plan no longer receive benefits.

The present value of projected net new claims (illustrated in the chart below) represents the amount of money PBGC owes for participant's benefits because their plans fail during the 10-year projection period, less the assets recovered from failed plans and the companies that sponsor them. In this chart, as in similar charts above, the solid line represents historical values, while the dotted lines represent the range of outcomes in future years. The outcomes are between the fifteenth and eighty-fifth percentiles. Since PBGC trustees the assets of failed plans, new claims bring in both new assets and new liabilities. Because PBGC would generally not take over a plan that could pay all benefits due, each plan adds liabilities to PBGC that are larger than the assets that PBGC inherits from it.

Like investment income projections, the projections displayed for net new claims are for each year's results, so there is no cumulative effect in the amount of variability.

Figure 12 – Single-Employer Net New Claims



The table below shows a range of projections for present value of the new claims and benefit payments for the next 10 years. The table shows the mean and the “high” and “low” values covering 70 percent of outcomes.²⁵ The projection of benefit payment amounts are present values of the benefit payments projected to occur over the next 10 years, while the projected new claims amounts are the present values of all new claims that are booked in the next 10 years.

2014 Present Value (PV) <i>(Dollars in billions at year end)</i>	“Low” (15th percentile)	Mean	“High” (85th percentile)
PV PBGC SE Benefit Payments FY 2015-24	\$64	\$74	\$84
PV PBGC SE Net New Claims FY 2015-24	\$8	\$25	\$43

More uncertainty exists about future new claims than about future benefit payments. Since benefit payments include continuing payments to people whose plans already have failed, PBGC already knows how much it expects to pay those people over the next 10 years. Furthermore, while projected benefit payments in this table are only for the 10-year

²⁵ In the tables, “high” and “low” projections for different measurements — such as “Benefit Payments” or “New Claims” — simply order all results through that lens. So, amounts within a single column cannot be combined. Where there are relationships among the values presented, they are noted in the text that accompanies the tables.

projection period, projected new claims include obligations for benefit payments far into the future. Under the Model, the median present value of new claims over the next 10 years is about \$21.9 billion. The mean present value of claims is higher, about \$25.3 billion over the next 10 years. The mean is higher than the median because there is a chance under some simulations that claims could reach very high levels.

How Much Will PBGC Still Owe in Fiscal Year 2024?

Interest rates affect the present values associated with PBGC’s benefit obligations. The single-employer program’s obligations are mainly benefit payments to the retirees who depend on PBGC. At any given point in time, PBGC uses an interest rate to determine the market value of those obligations in the future. Changes in this interest rate have a big effect on the calculations. Variation in the rate accounts for a great deal of the variation in the value associated with the benefits owed. Within the 70 percent of outcomes presented, the single-employer program’s present value of projected liabilities in FY 2024 varies by \$84 billion (discounted to a 2014 present value), as shown in the following chart.

2014 Present Value <i>(Dollars in billions at year end)</i>	“High” (85th percentile)	Mean	“Low” (15th percentile)
PV PBGC SE Liabilities in FY 2024	\$151	\$109²⁶	\$67

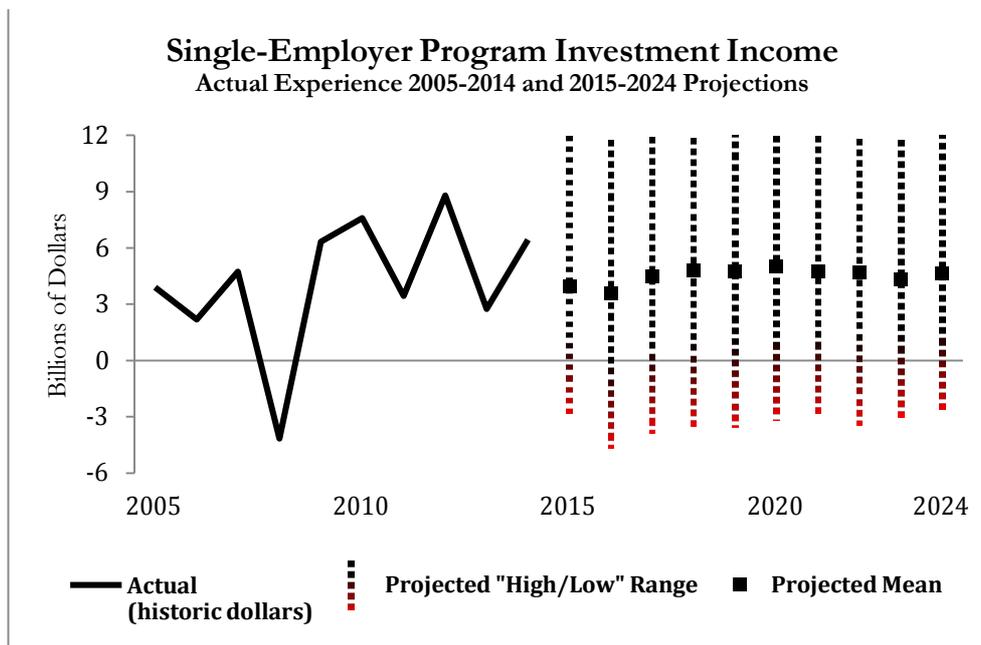
What Investment Returns Will PBGC Realize?

In contrast to its role with multiemployer plans, PBGC becomes the statutory trustee of the assets of terminated single-employer plans. Because PBGC assumes the assets of these plans when they fail, the single-employer program has a significant pool of assets. The rate of return on these assets is an important source of uncertainty for the single-employer program.

As shown in the chart below, investment income varies a great deal by year. However, the amount of variation does not grow cumulatively, because each year’s projection is only for that year’s investment income, not the accumulated total of all investment gains and losses. The dotted vertical bars represent the range of outcomes in each year that lie between the fifteenth and the eighty-fifth percentiles. The vertical bars in the chart remain similar in size. For FY 2015 (the first year of the projection) that pool of projected results ranges from an \$11.9 billion gain to a \$3.0 billion loss, expressed as present values discounted to 2014.

²⁶ The mean present value discounted to 2014 is \$109 billion. The mean projected 2024 value is \$151 billion in nominal terms.

Figure 13 – Single-Employer Program Investment Income



For these projections, PIMS assumed PBGC would invest 70 percent of assets in fixed income investments such as treasuries and corporate bonds and 30 percent of assets in equities, consistent with PBGC’s investment policy.

The table below summarizes projections for the total base of assets in the single-employer program by 2024, as well as for the amount PBGC will earn in investment income through FY 2024.

2014 Present Value <i>(Dollars in billions at year end)</i>	“Low” <i>(15th percentile)</i>	Mean	“High” <i>(85th percentile)</i>
PV PBGC SE Assets in FY 2024	\$74	\$104²⁷	\$135
PV PBGC SE Investment Income FY 2015-24	\$19	\$45	\$73

Within the results shown in the table (fifteenth percentile to eighty-fifth percentile), there is a range of \$54 billion projected in the investment returns that PBGC will realize and a \$61 billion range in the total amount of PBGC’s projected assets.

New claims also produce increased assets because when plans fail, PBGC inherits their assets as well as their future responsibilities. Thus a plan termination adds to the money PBGC has on hand, and adds even more to the amount PBGC owes. In many scenarios with rising assets, new claims also increase.

²⁷ The mean present value discounted to 2014 is \$104 billion. The mean projected 2024 value is \$143 billion in nominal terms.

How Much Premium Income Will PBGC Receive?

One other factor that helps reduce PBGC’s deficit is premiums. The projected amount of premiums that PBGC will receive under current law is shown in the table below:

2014 Present Value <i>(Dollars in billions at year end)</i>	“Low” (15 th percentile)	Mean	“High” (85 th percentile)
PV PBGC SE Premiums FY 2015-24	\$23	\$34	\$47

The present value of premiums figures shown above are higher than the corresponding values last year. The increase can be attributed to higher projections of variable premium income due to lower projected interest rates (resulting in increases in projected plan liabilities), increases in underfunding from HATFA changes to funding requirements, and updates to premium modeling made after observing higher-than-expected premium receipts in the most recent year.

Variability in Projected Financial Position, Single-Employer Program

SE-PIMS projects PBGC’s potential financial position by combining simulated claims (including amounts PBGC recovers from failed plans and their sponsors) with simulated premiums, investment returns, and other factors, recognizing PBGC’s 2014 financial position as the starting point.

The financial position of the single-employer program as of September 30, 2014, was a deficit of \$19.3 billion. In a majority of simulations, the fiscal year 2014 projections show an improvement; the median present value of the projected position in 2024 is a \$4.1 billion deficit. The mean present value of the projected position in 2024 is a slightly higher \$4.9 billion deficit. The table below shows the mean position, along with the values at the fifteenth and eighty-fifth percentiles.

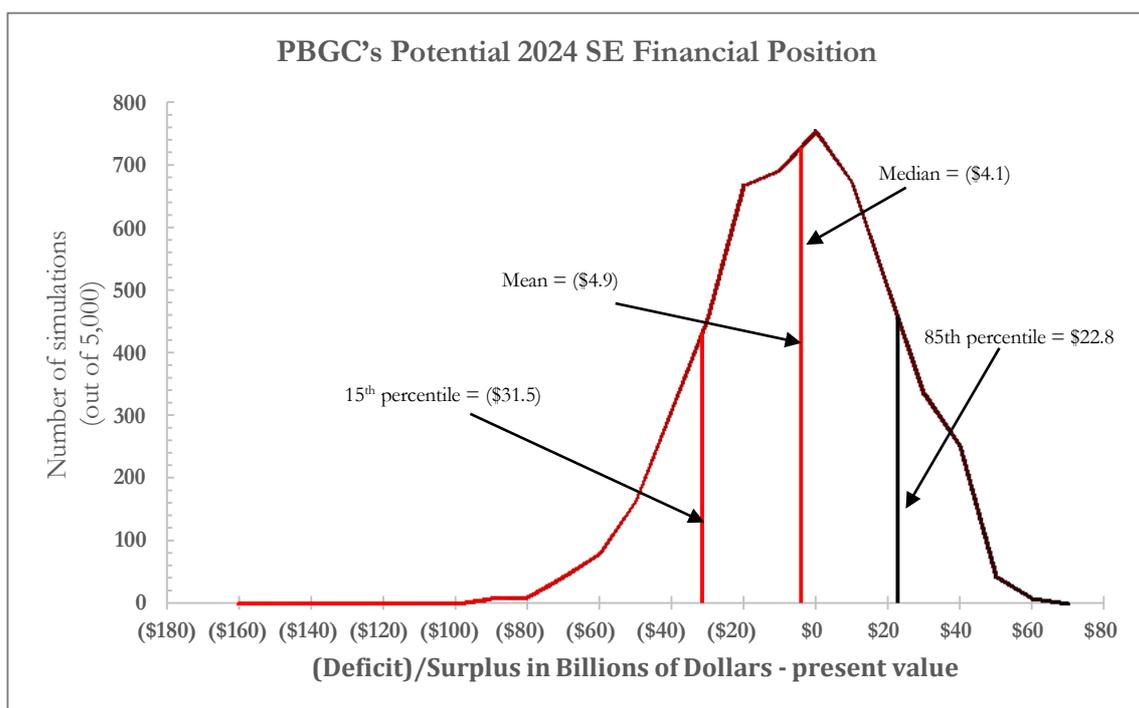
2014 Present Value <i>(Dollars in billions at year end)</i>	“Low” (15 th percentile)	Mean	“High” (85 th percentile)
PV FY 2024 PBGC SE Financial Position <i>(deficit)/ surplus</i>	\$(31)	\$(5)²⁸	\$23

Full distribution of results by financial position. The following graph shows the full range of outcomes that SE-PIMS projects for PBGC’s single-employer financial position over the next 10 years. For each value of PBGC’s projected net position along the horizontal axis, the height of the line shows how many scenarios (out of 5,000) have that

²⁸ The mean present value discounted to 2014 is a \$5 billion deficit. The mean projected 2024 value is a \$7 billion deficit in nominal terms.

net position as a result. The higher the curve, the more simulations fall at that point in the distribution. The further to the right any point on the curve is, the better the financial position associated with that point. The further to the right the graph’s “hump”, the more scenarios have positive outcomes, and the less spread-out the graph is side-to-side, the more the simulations agree on outcomes.

Figure 14 – PBGC’s Potential 2024 SE Financial Position

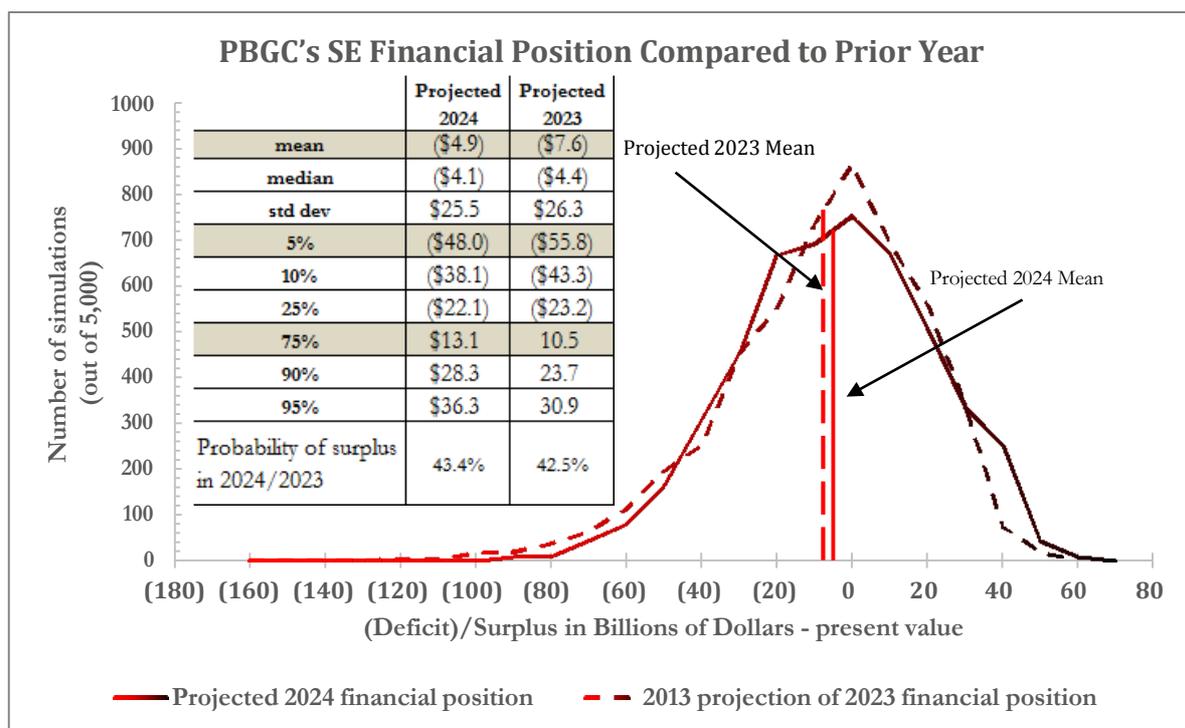


Vertical lines on the graph show the present value of PBGC’s projected 2024 net position at the fifteenth and eighty-fifth percentiles, and the mean and median values of projected net positions. The median (as mentioned above) is a \$4.1 billion deficit in FY 2024, while the mean is a \$4.9 billion deficit.

Reconciling SE-PIMS Results from 2013 to 2014

Comparison of financial position with last year’s results. The graph below compares the 2013 projections of PBGC’s 2023 financial position with this year’s projections of the 2024 financial position. The hump has not moved much (the changes to the mean and median between the projections are relatively small), but the curve is flatter in the middle in 2024. This means that the average results are about the same, but there is somewhat more variance around these averages, at least in the middle of the distribution. The mean projected position has improved slightly, by about \$2.7 billion, from a deficit of \$7.6 billion to a deficit of \$4.9 billion. The median projected position has remained about the same.

Figure 15 – SE Financial Position: Comparison to Prior Year



Potential for exhaustion of PBGC funds. As discussed in the section “Financial Obligations” beginning on page 4, PBGC’s financial statements in its Annual Report present liabilities that extend for the lifetime of pension plan participants and their beneficiaries. These liabilities primarily represent obligations for plans that have already terminated plus probable future claims. PBGC’s liabilities are then compared with the assets currently held to determine the net position. In general, the Annual Report does not look ahead to see how liabilities and assets will change as new claims arise, new premiums are earned, asset returns are realized, etc.

The scenarios simulated in SE-PIMS, by contrast, start with PBGC’s existing assets and obligations (liabilities) as of Fiscal Year 2014 and then also project:

- Future premium income assuming the premium rates enacted in the December 2013 Budget Act,
- Future PBGC claims, which increase PBGC’s benefit obligations but also include assets recovered from terminated plans and from their sponsors, and
- Future investment income or losses on PBGC assets, based on PBGC’s investment policy and asset allocations.

In the 5,000 scenarios simulated in SE-PIMS, there are none in which PBGC assets are completely exhausted within the 10-year projection period.

The following table explores the effects of each of the changes on the projected 2024 net deficit. It is important to note that the order of the changes affects the values. If the impact of the changes were measured in a different order, it is likely that the values for each of the changes would be different, although the final deficit number would remain the same. While the magnitude of changes appears large in relationship to the projected

2024 deficit, this is largely because the projected deficit is coming closer to zero, and thus relatively small changes in modeled liability appear to have very large effects. These changes are small, however, in comparison with either projected liabilities or the range of potential deficits.

Figure 16 – Reconciliation of Changes in SE-PIMS Results

Reconciliation of Changes in SE-PIMS Results, 2013 to 2014 Results		
Description of Change	Value of Change (\$ billions)	Net Deficit (\$ billions)
Initial Position for Mean PV of 10-Year Projected Net Deficit from 2013 Projections Report		\$7.6
1. Changes in economy and economic assumptions from fiscal year 2013 to fiscal year 2014	0.2	7.8
2. Changes due to new plan data, modeling updates, other assumption updates, and passage of time from fiscal year 2013 to fiscal year 2014	(7.3)	0.5
3. Change in mortality assumption	6.5	7.0
4. Effects of HATFA changes to funding requirements	(2.1)	4.9
Year 2024 Mean PV of Projected Net Deficit based on 2014 SE-PIMS Model		\$4.9

Economy and Economic Assumptions: Between fiscal year 2013 and fiscal year 2014, there were changes in the underlying economy, upon which all the SE-PIMS projections are based. For instance, earnings on pension plan assets in 2013 were higher than assumed and the Model reflected a new source for imputed earnings for the period immediately before the valuation for which there are no available data. That change was offset by lower projected market rates of return in the coming years.²⁹ Reflecting these changes increased the present value of the projected deficit by \$0.2 billion.

Changes to data, Model, other assumption updates, and passage of time: Since the 2013 Projections Report, PBGC has made a number of changes to the SE-PIMS Model, as well as updates to the data. Each individual change had a relatively modest effect, and some of the effects offset one another. The underlying financial situation improved over the year for plans, sponsors and PBGC. SE-PIMS changed the way it projects premiums to reflect higher than expected variable premium collections over the last year. SE-PIMS now explicitly models cash balance plans and reflects refined modeling of sponsor bankruptcies to better reflect historic default rates. In the aggregate, these changes decreased the present value of the net deficit by \$7.3 billion.

Change in mortality assumption: The PIMS Model generally assumes certain relationships between long-term interest rates and the interest factors generated as an

²⁹ Across all simulations, PIMS projects a mean arithmetic rate of return on plan assets of 6.1 percent, corresponding to a mean geometric rate of return of 5.6 percent.

estimate of annuity prices. PBGC sets interest factors that approximate annuity prices using a specific mortality table. New information about longevity is reflected almost immediately in annuity prices (i.e., in developing the relationship between interest factors and other long term rates). Last year's report examined this potential by adding a sensitivity test on the interest factors used in pricing. This year's report utilizes updated mortality tables, using a projected static version of the new tables issued by the Society of Actuaries. This change increased liabilities by \$6.5 billion.

Changes to funding requirements from HATFA: Changes to funding requirements under HATFA³⁰ resulted in increases to projected claims but also offsetting increases to projected variable premiums. The present value of these changes decreased the mean present value of the projected deficit by \$2.1 billion.

In total, the present value of the single-employer program mean projected net deficit decreased from \$7.6 billion to \$4.9 billion.

Recent Single-Employer Plan Trends

Our projections do not assume that plans are terminated voluntarily by healthy companies, only by companies in distress. However, some healthy companies do close their pension plans by purchasing annuities and undertaking a standard termination. In these cases, PBGC's current obligations are not affected, but those companies cease paying premiums altogether. PBGC is analyzing the effect of these actions and will attempt to incorporate them in future reports.

Similarly, PIMS does not model the potential for plans to discharge any significant part of their obligations by purchasing annuities through insurance companies and/or paying lump sums. The use of annuity buyouts and lump sums by companies seeking to transfer risk for significant portions of their liabilities has recently become a more common practice; PIMS does not currently model this as a continuing or expanding trend in the future. In addition to reducing premium receipts, these transactions might affect future exposure to claims in some circumstances. PBGC intends to investigate this trend in the future as well.

Sensitivity of Changes to the Model's Discount Rate

PIMS benefits from comments of readers, other users and a peer review of the program. One suggestion made in prior peer reviews was to enhance the disclosure of the sensitivity of results to changes in assumptions and other aspects of the Model. PBGC has begun to do this, focusing first on the modeled discount rate. Over time, PBGC plans to expand this analysis to other significant areas of PIMS.

As discussed above, PBGC has added tests of the sensitivity to increase and decrease in the PIMS discount rate for valuing PBGC obligations. If market prices for annuities were based on discount rates 50 basis points higher than in the base projection, this would

³⁰ Among other provisions, HATFA extends the period during which the narrowest range around the 25-year average segment rates applies for funding purposes. For plan years beginning in 2012 through 2017, each segment rate is adjusted so that it is not less than 90 percent nor more than 110 percent of the corresponding 25-year average segment rate.

improve the mean present value of the 2014 single-employer net position by \$6.4 billion and improve the likelihood of a surplus in 2024 from 43.4 percent to 54.2 percent. Discount rates 50 basis points lower would increase the mean present value of the deficit by \$7.3 billion, and reduce the likelihood of a surplus in 2024 to 33.9 percent.

APPENDICES

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Overview of PIMS

The analysis contained in this report utilizes ME-PIMS and SE-PIMS. PIMS Models are primarily models of pension plans, rather than of plan participants. They use data reported by a sample of pension plans to model the future funded status of the universe of private sector multiemployer and single-employer pension plans. Both Models project long-term financial outcomes by running many simulations, each modeling year-by-year changes over 20 years into the future. Each simulation starts with known facts about the economy, the universe of PBGC-insured plans, and PBGC’s financial position. The program then introduces random year-by-year changes (within certain bounds) to simulate economic fluctuations, producing 500 scenarios for alternate economic paths through time. Within a scenario, each plan’s outcomes from one year form the following year’s starting-point for that plan, and so on. The Models recognize that all single-employer plan sponsors have some chance of bankruptcy, that all multiemployer plans have some chance of insolvency, and that these probabilities change over time depending on a variety of factors.

Neither SE-PIMS nor ME-PIMS is a predictive model. 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 withdrawal by individual employers. It does, however, reflect anticipated employer behavior in limiting contributions to multiemployer plans. SE-PIMS does not attempt to anticipate companies’ more general behavioral responses to changed circumstances, such as, whether or not to continue to sponsor defined benefit plans.

Future Outcomes Are Expressed in Present Value Terms

This report expresses future outcomes in present value terms (i.e., discounted back to the end of 2014). 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, corporate bonds, or U.S. Treasury bonds.

In the projections of net position, one important factor is the determination of the amount of money PBGC owes to provide benefits or assistance in today's present values. Changes in interest rates have a large effect on this calculation — the higher the interest rate used to calculate future obligations (liabilities), the lower the present value of the obligations reported. ME-PIMS and SE-PIMS model uncertainty in future changes to these interest rates.

How Projections Compare to Financial Statement Liabilities

The long-term projections, presented here, are different from the exposure reported in PBGC's financial statements. There, PBGC classifies some plans as "probable for financial assistance" (multiemployer) or "probable to terminate" (single-employer) and records them as losses on its financial statements. PBGC describes others as "reasonably possible" losses and discloses the estimated exposure due to these plans in Section VI of the PBGC Financial Statements, "Single-Employer and Multiemployer Program Exposure," but does not book them as losses. These estimates are based on plans that PBGC insures and considers reasonably possible to require financial assistance or to terminate, compared with all the plans that PBGC insures (the universe modeled in ME-PIMS and SE-PIMS).

PIMS treats the financial statement liabilities as initial inputs to the Model, estimating how they may vary in the future and adding in the effects of projected new claims, benefit payments and asset returns.

ME-PIMS

ME-PIMS – Overview

Each year in the course of preparing its financial statements, PBGC analyzes insured large (over 35,000 participants) and medium (between 2,500 and 35,000 participants) multiemployer plans to identify those ongoing plans that might become claims against the insurance program.³¹ In determining whether a plan should be classified as a probable risk of requiring financial assistance in the future and recorded in PBGC's financial statements as a balance sheet liability, PBGC evaluates whether the plan can be expected to become insolvent within the following 10 years, often taking into account detailed available plan, industry, and employer data. Each plan is determined to either be "booked" as a liability for the financial statements for a given year or not to be included in the accrued liabilities at all.

To project future claims against the multiemployer program that are not already booked in the current financial statements, ME-PIMS models a similar process for each plan in each future year of each scenario. In each projection year and for the particular economic scenario being simulated, ME-PIMS projects a plan's funded status, cash flow, asset base,

³¹ Generally, all multiemployer plans currently receiving financial assistance from PBGC as well as those that have terminated are included in PBGC's financial statements, along with ongoing probable insolvencies. Beginning with FY2014, the liabilities of the small plans that have not yet terminated are represented in the aggregate in the financial statements by a small plan bulk reserve.

and growth or decline in the contribution base, to determine whether that plan is projected to become insolvent within a specified time horizon (generally the next ten years). In each projection year, the plans that are projected as future insolvencies within that time horizon become ME-PIMS liabilities that year for the particular scenario. Thus a plan may be “booked” in ME-PIMS in some years and some scenarios and not in others.

There is often a long time lag between PBGC’s booking of a multiemployer plan and the start of PBGC’s financial assistance payments. Payments begin only after the plan has depleted its assets. In ME-PIMS’ simulation of the multiemployer program, a plan can be booked as a probable claim in one year of a projection, and then, if economic conditions are projected to improve sufficiently, it can become un-booked (in the Model) in a later year. Because PBGC’s accounting procedures for financial statements reflect considerations not included in the ME-PIMS modeling analysis, and because the financial condition of plans can vary from year to year, the ME-PIMS projections of PBGC’s net position may deviate from PBGC’s financial statements in subsequent years.

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

ME-PIMS portrays future underfunding, under current law funding rules, 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 based on the factors listed in the “Assumptions” section. When determining whether a multiemployer plan undergoes a mass withdrawal in a given year/scenario, a random number is drawn and compared with the plan’s probability threshold for mass withdrawal — the result determines whether or not a mass withdrawal is included in that year of the simulation.³²

³² For example, assume the mass withdrawal probability for a plan is 5 percent 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.

ME-PIMS — Data

ME-PIMS has a detailed database of actual plans (including previously booked plans). These plans represent more than half of PBGC's insurance exposure in the multiemployer defined benefit system, measured from the latest Form 5500 filings available as of the preceding spring (generally 2012 plan year information). The database includes:

- summary statistics on plan demographics,
- plan benefit structure,
- asset values,
- liabilities,
- actuarial assumptions, and
- historical contribution levels and demographic trends (over the 10 prior years) to assist in modeling plan trends.

The ME-PIMS database also contains other pension plan information obtained from Schedules MB of Form 5500. For booked plans and two large troubled plans PBGC collected additional data beyond the general information available on the Form 5500 and used it in the Model. The additional data is subject to confidential treatment requests under 29 CFR 4901.24.

ME-PIMS — General Methodology

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. The probability of any particular outcome is estimated by dividing the number of simulations with that outcome by 500, the number of multiemployer simulations.

Because multiemployer liabilities are booked by PBGC several years before a plan becomes insolvent, a plan's financial condition can improve after it is first booked, 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 "un-booked" and reducing its claim value to zero. Conversely, a plan's condition can deteriorate further following the initial recognition.

ME-PIMS reflects 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 during the projection period that are insufficient to cause claims to be un-booked are not reflected in the un-booked ME-PIMS claims values. As a result, the change in net position over the projection period may fall short of the amount that would actually be determined when reflecting the present values of simulated premiums, financial assistance, expenses, and investment returns over that period.

ME-PIMS' primarily models the plan's financial status rather than that of the plan's contributing employers.

In the multiemployer program, there is little distinction between claims due to insolvency and probable liabilities, unlike the single-employer program. In the single-employer program, a probable liability is generated on PBGC's books when the condition of the sponsoring employer justifies such a classification. In the multiemployer program, a probable liability is generated when certain plan metrics are sufficiently problematic, a mass withdrawal is triggered, or cash-flow insolvency is projected within 10 years.

ME-PIMS — Sampling

In ME-PIMS, a sample of actual plans (both booked and non-booked) represents the universe of multiemployer plans. ME-PIMS simulates contributions and underfunding for the sample plans chosen for the ME-PIMS analysis. It extrapolates or scales the results generated by this sample of plans to the universe of all multiemployer plans by multiplying each sampled plan by a weighting factor. To avoid the risk that a particular sampled plan is anomalous and will materially distort the overall results, PIMS includes almost all the largest plans in its sample, and decreasing proportions of smaller plans, where sampling anomalies would have a smaller impact. Thus, the largest plans typically have the smallest weighting factors.

ME-PIMS starts with PBGC's multiemployer net position from the financial statements (a \$42.4 billion deficit in the case of fiscal year 2014) for currently insolvent and probable plans. The starting net position is modeled using a sample of 27 insolvent plans, 29 terminated probable plans, and 44 ongoing probable plans. This is a change from 24, 32, and 43 plans, respectively, used in FY2013. In addition, ME-PIMS starts with data on the funded status of 184 non-booked plans (compared to 166 in 2013) that are weighted to represent the universe of PBGC-covered plans that are not current or probable claims for PBGC.

The ongoing non-booked PIMS sample is divided into tiers, by plan size (based on vested current 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 to the multiemployer program is the claim for that plan multiplied by the factor for that plan's tier.

The size of the sample was increased in FY2014 to accommodate 1) the change in procedures to determine which plans are to be included in the financial statements (i.e., which plans are to be booked), as implemented by the Multiemployer Working Group (MWG) for the fiscal year ended September 30, 2014, and 2) the passage of MPRA, which makes available suspension and partition options for certain "critical and declining" plans. To accommodate the new booking procedures, the PIMS sample of ongoing non-booked plans was divided into three categories: small (under 2,500 participants), medium (between 2,500 and 35,000 participants) and large (over 35,000 participants) plans. To accommodate the modeling of MPRA, each of these groups was further divided in "MPRA" and "others" yielding a total of six categories.

The list of plans in the MPRA group for each size category is derived by sampling from a list of plans which are potentially in “critical and declining” status as determined by an external model. Generally, ME-PIMS attempts to individually model almost all the large and medium plans the external model determines may be “critical and declining.” Thus there are 28 sample plans total in the three MPRA groups; the weights are 1.00, 1.03 and 7.75 for the large, medium and small size plans, respectively. There are 11 tiers of plans in the “others” groups, 2 for the large plans, 5 for the medium plans and 4 for the small plans. The weights for the tiers range from 1 for the tier of largest plans to 15.54 for the tier representing the smallest plans.

Under the new booking procedures for the financial statements, ongoing small plans are no longer included explicitly in the financial statement calculations, but are replaced by a bulk “small plan reserve.”³³ ME-PIMS does not precisely duplicate the bulk reserve methodology but further divides the “other” small plans into two groups. The first group consists of the small plans that are assumed to be booked in the first valuation year (year 0), as determined by an initial ME-PIMS run. The weight for these plans, 1.584 in FY2014, is determined by the ratio of the total ME-PIMS PV of assistance to the bulk reserve. The plans that are not booked in year 0 are weighted according to the process used for the medium and large tiers.

ME-PIMS — Plan Sponsor Behavior

Changes to funding rules following PPA06 (e.g., the Pension Relief Act of 2010) are reflected in the modeling. Generally the Model assumes that plans in critical status will increase contributions and make other plan changes. These assumptions differ for critical status plans that have “exhausted all reasonable measures” (ERM).

The 2014 version of ME-PIMS includes significant new modeling around “critical and declining” status plans. Each plan is evaluated separately to determine when it first becomes “critical and declining” along each of 500 economic paths. The Model then examines all “critical and declining” plans to see if cutting back the benefits to the maximum extent (110 percent of the PBGC’s guarantee) is sufficient to maintain plan solvency over the long term. If so, it applies a random draw to determine whether the plan will suspend benefits in a given year.³⁴ ME-PIMS solves for the amount of benefit cutback by determining the smallest feasible cutback using an approximation to the regulatory solvency test. This approximation requires the plan to be projected to remain solvent throughout the next 50 years and have at least a 20 percent funded ratio at the end of the 50-year period, using the actuary’s investment return assumption. The test and the random draw for implementing a suspension are determined initially for any economic scenario where the plan is deemed to be in “critical and declining” status in 2015 or thereafter. If a plan was not deemed to be “critical and declining” in any previous year along a particular economic path, ME-PIMS continues to test the plan in each subsequent projection year to determine whether it has become “critical and declining.”

³³ The revised methodology is discussed on page 83 of PBGC’s 2014 Annual Report, available at <http://www.pbgc.gov/about/reports/ar2014.html>

³⁴ Assumed probabilities of suspension are 100 percent for the largest applicable plan and 60 percent for other plans.

If suspension to the maximum extent allowable is not sufficient for the plan to become solvent, ME-PIMS then considers whether a partition on top of the maximum suspension would assure the plan's solvency. ME-PIMS assumes all inactive participants will be eligible to be partitioned to the new (spinoff) plan and tests for (1) whether or not supporting the partition would reduce the long term cost to the multiemployer insurance program (at least 10 percent of the present value of projected assistance) and (2) whether suspension/partition would ensure the plan's solvency. If these conditions are met, ME-PIMS applies a random draw such that 20 percent of such eligible plans will partition in the first possible year.

The numerical effects of these changes on the mean results are detailed in the section of this report headed "Reconciling ME-PIMS Results from 2013 to 2014"

ME-PIMS — Imputing the Inactive Census

ME-PIMS generally operates on the basis of plan data, using aggregate information as reported on the Form 5500; it imputes individual participant census information in order to estimate changes in plan liabilities due to demographic changes over time. The active participant census is readily developed from the active age/service scatter attachment to the plan's Form 5500. The inactive census is more problematic. Because the development of ME-PIMS used SE-PIMS as a starting point, in prior years it focused on plan liabilities, imputing an inactive distribution by age, service, and amount of benefit, derived from an extended projection of the current active census.

The multiemployer program works differently from the single-employer program with insolvency as the PBGC-triggering event. Furthermore, the structure of the multiemployer guarantee differs from that in the single-employer program; the multiemployer guarantee applies to the monthly accrual rate per year of service, rather than the total accrued benefit. Thus, the current version of ME-PIMS incorporates significant improvements to enable the imputation of a retiree census that explicitly varies by age, service, form of benefit (modeling life annuities and joint and survivor annuities), gender, and benefit amount. It produces benefit outflow estimates much more closely aligned to those reported by the actuaries of the plans.

The imputed inactive census is based on actual inactive data received from several plans. The actual inactive data provide a master template for the assumed distributions by age, service, gender and form of payment for each plan's inactive census (at least initially). ME-PIMS then applies the individual plan's current accrual rate (with adjustment for inflation) to this initial inactive census, which is then further calibrated to the Form 5500 in-pay benefits and the starting current liabilities of the plan.

The new version of the Model also incorporates the ability to input plan specific census information where available.

ME-PIMS — Assumptions

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 the underlying means, standard deviations, and correlation matrix established for the ME-PIMS projection.

- Stock returns are modeled as 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.
 - Interest rates are modeled as 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 to 2007. Stock returns are more likely to be high when the Treasury yield is falling and vice versa. Credit spreads on investment-grade corporate bonds are modeled to regress toward their historic mean values.
- **Asset returns.** Plan asset returns are based on an internal 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 plans 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, and 30 percent long-term Treasury bond yield, with a -2.5 basis points additive return adjustment (percentages are rounded). Future plans for PIMS may include modeling of additional asset class returns allowing PIMS to use the investment allocation information trustees now report as part of the annual Form 5500 filings.
 - **Plan demographics.** Starting with the plan's active employee population data from the Form 5500 (grouped by age and service bands), the distribution of active participants for each plan in the future 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 hiring distribution continues and hiring occurs (or not) to bring the size of the active population up to the size indicated by the continued trend as needed after plan decrements (retirement, termination of employment, disability) take place. ME-PIMS does not currently assume industry-specific employment trends. ME-PIMS models net annual changes in employment levels reflecting the path of economic variables in a particular scenario over time, resulting in a mean net decrease in the active multiemployer population of 1.3 percent per year across all scenarios.
 - **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:
 - plan size,
 - ratio of active to inactive population,
 - ratio of assets to benefit payments and expenses,
 - ratio of the accumulated credit balance in the funding standard account to employer contributions,
 - ratio of market value of assets to vested actuarial liabilities, and
 - ratio of current year to previous year contribution amount.

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 Combined Healthy mortality tables, projected with Scale AA to the specified projection year on a static basis. For purposes of determining the present value of PBGC assistance: the RP2014 Combined Healthy male and female mortality tables with a static projection of 13 years beyond the applicable valuation year using the MP2014 scale.

- **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.
- **Benefit Improvements.** For flat-dollar plans that are not in critical or endangered³⁵ status, benefit multipliers are assumed to increase annually by the rate of increase in average wages. The majority of 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, especially for plans in critical or endangered status. 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 critical status plans and most endangered status plans will not adopt future benefit improvements.
- **PBGC Premiums.** ME-PIMS models premiums based on the rate under current law (reflecting doubling in 2015 under MPRA) with projected rates increasing under the indexing provisions in current law. There is no allowance in premium projections for write-offs of uncollectable premiums and for the fact that a portion of the premium collected is not credited with interest under MPRA.
- **PBGC's Assets.** All assets in the multiemployer program are, by law, placed in revolving funds. PBGC's policy is to invest revolving fund assets in United States Treasury securities. Asset returns in ME-PIMS are bound by the modeling of Treasury returns in future years.
- **Discounting Future Claims.** When ME-PIMS discounts future claims, the discount factor is a single interest factor which models the "select" and "ultimate" factors described in the 2014 financial statements with an assumed reversion to the relationship of market interest rate and annuity pricing factors observed prior to the 2008 financial crisis. Those factors are based on a survey of private-sector annuity market prices.
- **Determining Discounted Future Present Values Shown in Report Tables.** For calculations involving discounting future amounts, the discount rate used is the simulated 30-year Treasury rate generated for the particular year and economic scenario.
- **Behavior of Critical Status Plan Sponsors.** The per-capita contribution in critical status plans increases at a multiple of the prior observed rate, but the annual rate of increase in per-capita contribution is limited to 12 percent per year (7 percent for those critical plans assumed to declare ERM). The plan aggregate contribution amount (indexed for wage inflation) is capped by a multiple of the 2008 contribution. The cap assumes that aggregate contributions in non-ERM plans will not more than double in the first six years, not more than triple in the next six years or exceed 3.5 times the base year amount thereafter. The limit is 1.5 times the pre-PPA06 base year contribution in ERM plans. A floor is set such that the aggregate dollar limit never falls below the prior year's contribution. These increases in contributions are treated as "supplemental" and do not affect the benefit accrual rate in plans where the benefit is based on a percentage of employer contributions. Non-ERM critical status plans are assumed to eliminate early retirement subsidies and temporary supplements for active participants.
- **Assumptions to Facilitate Suspension and Partition.** This 2014 Projections Report reflects additional assumptions to model the effects of MPRA:

³⁵ A plan is generally considered to be in "endangered status" if it is not in "critical status" and it (1) is less than 80 percent funded or (2) has an accumulated funding deficiency in the current plan year or is projected to have an accumulated funding deficiency in any of the six subsequent plan years. A plan is in "seriously endangered status" if the plan is not in "critical status" and both (1) and (2) apply. (Internal Revenue Code §432(b)(1))

- Suspension only: For plans that can suspend benefits and remain solvent without requiring partition assistance, ME-PIMS assumes that one large plan has a 100 percent likelihood of suspending benefits and that the other suspension-only eligible plans will do so 60 percent of the time.
- Partition: For plans which require partition in addition to suspension in order to maintain solvency, ME-PIMS tests to ensure that the partition will reduce PBGC's long run loss by at least 10 percent. For plans that meet that requirement it assumes that there is a 20 percent likelihood that a plan that could be successfully partitioned under the standard would actually be approved for partition.
- **Plan Demographics to Facilitate Cash Flow Modeling.** To determine the cash flows in multiemployer plans, ME-PIMS utilizes a number of assumptions:
 - Proportion of active population assumed to be male: 70%,
 - Proportion of retirees (in ongoing plans) assumed to be male: 80%,
 - Proportion of terminated vested participants (in ongoing plans) assumed to be male: 94%,
 - Age difference: females three years younger than their male spouses,
 - Proportion of active population assumed to elect joint and survivor form: 60%,
 - Proportion of retirees assumed to possess a joint and survivor form: 30%,
 - Proportion of terminated vested assumed to elect joint and survivor form: 35%,
 - Joint & survivor form: joint and 50% survivor benefit,
 - Proportion of participants assumed married for pre-retirement death benefit: 80%, and
 - Conversion factors based on PBGC rates for the joint and 50% survivor benefit: .8730 for male participants; .9135 for female participants.

The 2014 version of ME-PIMS recognizes the following changes in assumptions³⁶ from the assumptions used in the 2013 version of the Model:

- **Mortality Table used to determine the present value of PBGC assistance:** the RP2014 Combined Healthy male and female mortality tables, with a static projection of 13 years beyond the applicable valuation year using the MP 2014 scale, replaces the RP2000 Combined Healthy male mortality table projected with scale AA to the year of valuation plus 10 years and set back one year. Up-to-date mortality tables enable the consistent projection of interest factors and long-term interest rates in the economy in PIMS.
- **Mortality Table used to determine the plans' mortality experience during each year of the projection period:** the RP2000 Combined Healthy male and female mortality tables, projected with Scale AA to the specified projection year on a static basis, replace similar male-only tables to enable ME-PIMS to better model cash flows.
- **Source of Imputed Earnings Immediately Prior to Valuation Date:** Wilshire's TUCS survey of multiemployer plan returns replaces the Ryan Labs pension plan asset/liability survey. This change improves projections by focusing strictly on returns in multiemployer pension plans.
- **Assumptions used to Facilitate Suspension and Partition:** the assumptions shown above are added and used for the first time in 2014 to support the modeling of suspensions and partitions. The basis for the choice is explained in the section "Assumed Utilization of MPRA Suspension and Partition."

³⁶ This list excludes changes that arise merely from changes in economic conditions or from annual updates, for example changes in interest rates and asset returns, one additional year of mortality improvement.

- **Plan Demographic Assumptions used in Cash Flow Modeling:** the assumptions shown above are added and used for the first time in 2014 to support the cash flow modeling. PBGC chose these assumptions because they are representative of the data available to PBGC from multiemployer plans.

Possible Future Refinements to the ME-PIMS Model

PBGC expects to continue to modify and improve ME-PIMS in the future. Areas under study include incorporating additional modeling of plans' actual responses to PPA06, especially in the areas of projected mass withdrawals and employer benefit and funding decisions, and to MPRA in the area of suspension of benefits and partition.

A plan becomes insolvent when it does not have enough assets to pay 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 some individual employers that participate in particular multiemployer plans has only recently become available. Others remain unknown. At present, ME-PIMS does not model the financial conditions of individual employers (or industries) in multiemployer plans. PBGC will analyze the newly available information on individual employers that provide more than five percent of a plan's contributions, and consider whether to incorporate this information into the Model.

PIMS currently models future mortality improvement using age-varying static mortality projections. Future improvements to the system may incorporate generational mortality tables that include variation by age and cohort.

SE-PIMS

SE-PIMS — Overview

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. Large claims from a small number of terminations characterize the Corporation's claims experience throughout its history and are likely to affect PBGC's potential future claims experience as well.

SE-PIMS starts with data on PBGC's single-employer position and data on the funded status of more than 400 plans that are weighted to represent the universe of PBGC-covered plans. The Model produces results under 5,000 different simulations (500 economic scenarios times 10 bankruptcy simulations). The probability of any particular outcome is estimated by dividing the number of simulations with that outcome by 5,000. The Model uses funding rules as prescribed by current law.

PBGC's expected claims under the single-employer program depend on two factors: the amount of underfunding in the pension plans that PBGC insures (i.e., exposure) and the likelihood that corporate sponsors of these underfunded plans will encounter financial distress that results in bankruptcy and plan termination (i.e., the probability of claims).

SE-PIMS — Data

SE-PIMS has a detailed database of more than 400 actual plans, sponsored by more than 300 firms, which represent about half of PBGC's insurance exposure in the single-employer defined benefit system measured from the 2012 Form 5500 filings (the most recent year of complete Form 5500 filing data available). The plans selected for the sample are those with sponsors that have the largest shares of total plan liabilities in the single-employer defined benefit system and where (1) sufficient publicly accessible data is available on the sponsor to use the SE-PIMS bankruptcy probability model, and (2) plan details can be sufficiently captured in the SE-PIMS Model. The addition of the ability to model cash balance plan structures significantly relaxed the second constraint in this year's Model.

The database includes:

- summary statistics on plan demographics,
- plan benefit structure,
- asset values,
- liabilities,
- actuarial assumptions, and
- key financial information about the employer sponsoring the plan

The SE-PIMS database contains pension plan information from Schedules SB of the Form 5500 generally from the 2012 plan year. SE-PIMS also reflects any available contributions from later years' filings that are available when the initial results are generated.

SE-PIMS — Methodology

The SE-PIMS sample of more than 300 large plan sponsors is weighted to represent the universe of PBGC-insured, single-employer plans. The weighted representation reflects the values of total liabilities and underfunding, and the distribution of funding levels among plans in the insured universe that were available publicly as of the preceding spring (generally 2012 plan year information).

The weights in SE-PIMS scale the sample of plans to be representative of the entire universe of single-employer plans (generally trying to capture the distribution of plans by size). This is done by creating scaled copies (referred to as "partners") of the sponsors in the SE-PIMS sample. Each partner is projected to sponsor scaled copies of the same plans sponsored by its source sponsor. Partners begin each scenario with the financial conditions copied from their source sponsors but are scaled in the sizes of their balance sheet entries and employment and receive individual projections of their financial conditions and bankruptcy experiences. Because the SE-PIMS sample is drawn from larger than average plans and corporations, each partner is scaled (in plan size and sponsor size) to one-fifth the size of its source.

Partners are allocated to sponsors in SE-PIMS to create a weighted sample that approximates the distribution of plan liabilities by funding status in the insured universe.

For example, the weighted sample's total value of plan liabilities among plans between 50 to 60 percent funded is compared to the same total for the insured universe, and similarly for plans 60 to 70 percent funded, 70 to 80 percent funded, etc. Partners are allocated for a best fit to the entire distribution.

SE-PIMS simulates contributions, premiums, and underfunding for these plans using the minimum funding and premium rules as required by the PPA06 and subsequent legislation, and then extrapolates the results to the universe of single-employer plans. Funding rules and PBGC premiums under current law are reflected in the modeling. SE-PIMS also uses the employer's financial information as the starting point for assigning probabilities of bankruptcy, from which it projects losses to the insurance program.

Projections of claims against the insurance program are made stochastically. Claims against the pension insurance program are modeled by simulating the occurrence of bankruptcy for plan sponsors. The Model reflects the relationship that occurred from 1980 to 1998 between the probability of bankruptcy and the firms' contemporaneous financial health variables (equity-to-debt ratio, cash flow, firm equity, and employment), modified as described below. For each period, the Model assigns a random change in each of these variables to each firm, correlated with changes in the economy. The simulated financial health variables determine the probability of bankruptcy for that year.

The Model assumes, with the exception noted below regarding variable-rate premiums, that all plan sponsors contribute the minimum amount each year. The Model runs 500 economic scenarios (varying interest rates and equity returns) with each plan's sponsor being "cycled" through each economic scenario 10 times (with varying financial health experiences, bankruptcy probabilities, etc.) for a total of 5,000 different simulations. SE-PIMS then extrapolates the results of these simulations to the universe of insured single-employer plans.

Beginning in 2014, SE-PIMS explicitly models cash balance plans to determine their values in the Model. This is a change from the prior year to better model the liabilities developing under cash balance plans.

SE-PIMS — Assumptions

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).³⁷ These variables are determined by the underlying means, standard deviations, and correlation matrix established in SE-PIMS.
 - Stock returns are modeled as 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.

³⁷ In a flat-dollar plan, the pension benefit is determined by multiplying a fixed amount by the participant's years of service. In a salary-related plan, the benefit is determined by multiplying a percentage of the participant's salary by the years of service.

- Interest rates are modeled as 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. Stock returns are more likely to be high when the Treasury yield is falling and vice versa. Credit spreads on investment-grade corporate bonds are modeled to regress toward their historic mean values.
- **Sponsor financial health variables** (equity-to-debt ratio, cash flow, firm equity, and employment).
 - **Asset returns.** Plan asset returns are based on an internal 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 plans 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, and 30 percent long-term Treasury bond yield, with a -2.5 basis points additive return adjustment (percentages are rounded). Future plans for PIMS may 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 distribution of active participants for a plan varies throughout the forecast, according to that plan's actuarial assumptions regarding retirement, disability, and termination of employment. Age and service also vary over time due to hiring patterns that are determined separately in each scenario of the projection. Unless the plan is frozen, PIMS assumes a stationary mean active participation level for the plan. The distribution of ages and benefits for retired and terminated vested participants are imputed from a long term projection of the starting active population and normalized to the actual counts furnished by the Schedules SB. All participants are assumed to be male and are assumed to elect straight life annuities.
 - **Probability of bankruptcy.** Sponsors are subjected to an annual stochastic chance of bankruptcy. That probability of bankruptcy is determined by formulas estimated from historical bankruptcies and various measures of companies' financial health over the period 1980 to 1998. Bankruptcy probability formulas generally do not vary by industry.³⁸ A plan presents a loss to participants and/or the pension insurance program if its sponsor is simulated to experience bankruptcy and the plan is less than 80 percent funded for termination liability. For the 2014 Model, PBGC made two changes to improve its estimates of bankruptcy risk.
 - Reflected a new internal data source to better identify who was the plan's sponsor.
 - Compared market indices of bankruptcy risk to those generated by PIMS and recalibrated the outliers in PIMS to equal the mean of the market estimate of bankruptcy risk for that class of bonds.

PBGC plans to update its bankruptcy model to look beyond book values of the firms to their market values in determining bankruptcy risk.

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

- **Mortality.** For purposes of determining plans' mortality experience during each year of the projection period: the RP2000 Combined Healthy male mortality table, projected with Scale AA to the specified projection year on a static basis. For purposes of determining the amount of

³⁸ SE-PIMS makes an exception for the financial and utilities industries, where relatively high degrees of leverage are considered not to signal a risk of bankruptcy. SE-PIMS also increases the bankruptcy probabilities of a few large companies, especially in the retail industry, whose Model probabilities greatly underestimate the risk of bankruptcy as measured by their bond ratings.

underfunding at termination, the RP2014 Combined Healthy male mortality tables with a static projection of 13 years beyond the applicable valuation year using the MP2014 scale.

- **Contribution Level/Credit Balances.** The credit balance is increased each year by the plan's rate of return on assets and decreased by the amount assumed to be used to satisfy the minimum funding requirement. For purposes of modeling future claims, SE-PIMS, assumes that employers will contribute the minimum required amount each year as determined using the further smoothing authority under HATFA (new in 2014) and that any credit balance remaining will be used to the maximum extent permitted until the balance is completely depleted.
- **Benefit Improvements/Benefit Improvement Restriction.** For flat-dollar plans, benefit multipliers are assumed to increase annually by the rate of inflation and productivity growth. For salary-related plans, the benefit formula is assumed to remain constant, but annual salary increases are reflected based on the rate of inflation, productivity growth, and a factor measuring merit and/or seniority. Because SE-PIMS does not model benefit increases that exceed the average wage increase of affected employees, benefit improvement restrictions are not applicable in PIMS.
- **Cash Balance Plans:** ME-PIMS assumes that plans will pay the full accrued benefit (the account balance) as a lump sum to all retiring and terminating active participants in any plan that is at least 80 percent funded.
- **Plan Accrual Benefit Restrictions.** Plans with funded percentages below 60 percent must cease benefit accruals. SE-PIMS reflects this rule, and assumes that once a plan is frozen, it will remain frozen, even if the percentage increases above 60 percent at some future time.
- **Declassification of Credit Balances.** When determining funding percentages for triggering benefit restrictions, SE-PIMS reduces assets by credit balances. Sponsors have the option of declassifying credit balances at any time to raise the funded percentage to the level needed to avoid a benefit restriction. For modeling purposes, SE-PIMS assumes that sponsors will choose to declassify credit balances to the extent necessary to avoid the benefit freeze restriction (60 percent threshold), but assumes that traditional plan sponsors will not declassify balances to attain the 80 percent threshold. Because cash balance plans are assumed to pay the full accrued benefit as a lump sum to departing participants, contingent on sufficient funding, these plans are assumed to declassify credit balances to achieve 80 percent funding.
- **PBGC Premiums.** SE-PIMS models premiums based on the rate under current law with projected rates increasing under the fixed increases and indexing provisions in current law. There is no allowance in premium projections for write-offs of uncollectable premiums.
- **Variable-Rate Premiums.** PBGC's experience has been that many companies make plan contributions in excess of the minimum, in part to avoid or reduce their variable-rate premium payments. Virtually all of these companies have been at a low risk of bankruptcy, and their plans have not accounted for a material portion of PBGC's claims. By contrast, the relatively small number of plans that result in claims are sponsored by companies that have not made contributions above the required minimum for an extended period prior to the claim. Using the general PIMS projection that companies will make the minimum required contributions would overstate the estimate of PBGC's variable rate premium income. Accordingly, for variable-rate premium projections only, the SE-PIMS Model reflects an adjustment to plan assets phased in over five years to offset the assumption that plans generally contribute at the minimum. Variable rate premiums are further scaled to match recent experience. This report reflects an additional one year delay in both the asset increase and the variable rate premium scaling in order to better match PBGC's actual experience in variable-rate premium collection as premium rates rise.
- **PBGC's Assets.** Projected returns are based on analysis of historical returns, return volatilities, and correlations between the different asset class returns.
- **Discounting Future Claims.** When SE-PIMS discounts future amounts, the discount factor is a single interest factor which models the "select" and "ultimate" factors described in the 2014 financial statements with an assumed reversion to the relationship of market interest rate and

annuity pricing factors observed prior to the 2008 financial crisis. Those factors are based on a survey of private-sector annuity market prices.

- **Determining Discounted Future Present Values Shown in Report Tables.** For calculations involving discounting future amounts, the discount rate used is the simulated 30-year Treasury rate generated for the particular year and economic scenario.

(For additional information on SE-PIMS and the assumptions used in running the Model, see PBGC's *Pension Insurance Data Book 1998*, pages 10-17, which also can be viewed on PBGC's website at www.pbgc.gov/publications/databook/databk98.pdf.)

The 2014 version of SE-PIMS recognizes the following changes in assumptions from those used in the 2013 version of the Model.³⁹

- **Mortality Table for determining the amount of underfunding at termination:** the RP2014 Combined Healthy male mortality tables with a static projection of 13 years beyond the applicable valuation year using the MP 2014 scale replaces the RP2000 Combined Healthy male mortality table projected with scale AA to the year of valuation plus 10 years and set back one year. Up-to-date mortality tables enable the consistent projection of interest factors and long-term interest rates in the economy in PIMS.
- **Source of Imputed Earnings Immediately Prior to Valuation Date:** Wilshire's TUCS survey of single-employer plan returns replaces the Ryan Labs pension plan asset/liability model. This change improves projections by focusing strictly on returns in single-employer pension plans.
- **Modeling of Employer Bankruptcies:** The 2014 Model reflects a new internal data source to better identify the plan's sponsor and recalibrates outliers in the SE-PIMS bankruptcy model to equal the mean of the market estimate of bankruptcy risk for plan sponsors with similar bond ratings, by comparing market indices of bankruptcy risk to those generated by the SE-PIMS Model. This change improves our projection of bankruptcy rates for certain large employers.
- **Adjustment to Variable Rate Premiums:** The 2014 Model reflects an additional one year delay in both the asset increase and the variable rate premium scaling in order to better match PBGC's actual experience in variable-rate premium collection as premium rates rise.
- **Cash Balance Plans/Declassification of Credit Balances:** The 2014 Model assumes that plans will pay the full accrued benefit (the account balance) as a lump sum to all retiring and terminating active participants in any cash balance plan that is at least 80 percent funded. It also assumes that cash balance plans will declassify credit balances where possible to achieve the 80 percent threshold to allow them to pay the lump sums. In prior years, the Model assumed that no plans would declassify credit balances to achieve 80 percent funding. These additions/changes enable SE-PIMS to realistically model cash balance plans.

Sample Statistics from FY 2014 Runs in ME-PIMS and SE-PIMS

The following tables show selected output statistics from runs of ME-PIMS and SE-PIMS for this 2014 Projections Report. These statistics are specific to the Model runs for this report.

³⁹ This list excludes changes that arise merely from changes in economic conditions or from annual updates, for example changes in interest rates and asset returns, or one additional year of mortality improvement.

Table 1

**Arithmetic Means, Standard Deviations and Correlations of Key Financial Market Values
FY 2014 Single-Employer and Multiemployer Model Runs
(across 2015-2024 for 500 economic scenarios)**

	Long-Term Treasury Yield	Return on 30-year Treasury Bonds	Stock Market Return
Mean	3.4%	3.4%	9.2%
Standard Deviation	1.2%	8.8%	20.3%
Correlations:			
• Long-Term Treasury Yield	1.00	-0.27	-0.05
• Return on 30-year Treasury		1.00	0.22
• Stock Market Return			1.00

Table 2

**Arithmetic Means and Standard Deviations of Market Rates Derived From Projected Long-Term
Treasury Yields in FY2014 Single-Employer and Multiemployer Model Runs**

	Long-Term Corporate Rate	Inflation Rate	Wage, Salary and Flat Benefit Growth Rate
Mean	4.5%	2.8%	4.5%
Standard Deviation	1.2%	1.2%	1.2%

Table 3

**Projected Plan Returns⁴⁰
FY 2014 Single-Employer and Multiemployer Model Runs**

Arithmetic Mean	6.1%
Geometric Mean	5.6%
Standard Deviation	10.3%

Table 4

**Projected Annual Bankruptcy Probabilities⁴¹
FY 2014 Single-Employer Model Runs**

Arithmetic Mean	0.6%
Standard Deviation	1.9%

⁴⁰ The geometric rate of return reflects that negative asset returns set plans back more than positive returns help them, by reducing the base of assets. This is particularly important for plans whose benefit payments exceed contributions.

⁴¹ The bankruptcy probability modeling methods and results are more fully described in Boyce, S. and Ippolito, R. A. (2002), The Cost of Pension Insurance. Journal of Risk and Insurance, 69: 121–170. doi: 10.1111/1539-6975.00012.

Table 5a

**Annual Probability of Plans' Projected Mass Withdrawal
FY 2014 Multiemployer Model Runs
No Future MPRA Suspensions/Partitions**

Arithmetic Mean	3.1%
Standard Deviation	7.9%

Table 5b

**Annual Probability of Plans' Projected Mass Withdrawal
FY 2014 Multiemployer Model Runs
Assuming MPRA Election Rates**

Arithmetic Mean	2.6%
Standard Deviation	7.2%

Table 6a

**Annual Rate of Plans' Projected Insolvency
FY 2014 Multiemployer Model Runs
No Future MPRA Suspensions/Partitions**

Arithmetic Mean	1.30%
Standard Deviation	0.60%

Table 6b

**Annual Rate of Plans' Projected Insolvency
FY 2014 Multiemployer Model Runs
Assuming MPRA Election Rates**

Arithmetic Mean	1.10%
Standard Deviation	0.50%
