

FY 2015 PBGC

PROJECTIONS REPORT

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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 reviews both programs.

PBGC's multiemployer program remains likely to use up all of its assets by the end of 2025. The program, which covers roughly one-quarter of private sector defined benefit pension participants, continues to have deficits (i.e., negative net positions¹) much larger than those of the single-employer program. Different estimates of the number of plans that will undertake benefit suspensions or request financial assistance through partition or facilitated merger affect the projected program deficits, but have only a small effect on the date of program insolvency.

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, potentially reaching net surplus over the 10-year projection period.

MULTIEMPLOYER PLANS Multiemployer plans are, as a group, less well funded than single-employer plans. While the majority of multiemployer plans are projected to remain solvent over the next 20 years, a core group of plans appears unable to raise contributions sufficiently to avoid insolvency within that period. Under the Multiemployer Pension Reform Act of 2014 (MPRA) some plans facing insolvency within the next 20 years may take additional steps to improve long term solvency, including permanently reducing benefit promises to participants via benefit suspensions.² In order to suspend benefits, plans must meet a number of conditions. MPRA also gives PBGC new ways to help plans remain solvent by providing financial assistance for plan partitions (undertaken in conjunction with permanent benefit reductions) or for mergers.

The degree to which plans will attempt to extend solvency through benefit reductions and financial assistance requests remains somewhat unknown at the date of this report. This report contains projections starting with September 30, 2015. As of that date only the largest troubled plan, which represents a sizeable (minority) share of PBGC's program deficit, had made an application for suspension. That application was denied on May 6, 2015 for failure to comply with the requirements of the statute and the plan has indicated it will not reapply. As of the date of the report a few additional plans have applied for suspension, including one application in conjunction with a partition. To date no applications for suspension or partition have been approved.

To assist in evaluating the status of the program, this report illustrates the effect of several scenarios regarding the number of plans that will apply for and successfully meet the statutory and regulatory requirements for benefit

¹ Deficit and negative net position are used in this report to mean the excess of the present value of the liabilities for future payments under the guarantee program over the program assets. "Insolvent," "Deficit" and "Claims" are further defined and discussed in the section "Financial Obligations" beginning on Page 5.

² While MPRA allows plans to potentially define benefit suspensions as extending only for a limited period, and benefit suspensions must be removed if the plan no longer requires them in order to maintain solvency, they are generally anticipated to be permanent reductions in benefit amounts in applications for suspension received to date.

suspensions and financial assistance. The results show that the insolvency of PBGC's program is likely by the end of 2025 under each scenario. In contrast, the projected 10-year deficit is dependent on the scenario illustrated.

Assuming no plans elect suspensions or partitions (or financial assistance through facilitated merger), PBGC's mean projected 2025 multiemployer deficit averages \$55.5 billion discounted to today's values, an increase of \$11.2 billion from the comparable number in our prior Projections Report. The increase largely mirrors changes seen in PBGC's most recent Annual Report,³ which reported a \$9.9 billion increase in the multiemployer program deficit from \$42.4 billion as of the end of FY 2014 to \$52.3 billion as of the end of FY 2015.

We also show two additional alternate sets of assumptions as to whether plans and participants will elect to use suspension and partition⁴ under MPRA: the assumptions used in our prior (FY 2014) Projections Report and a new set of assumptions adopted for this (FY 2015) Projections Report that reflect emerging experience. The new assumptions include: that the largest troubled plan will not apply for benefit suspensions, rates of future suspensions and partitions for other plans will be half the level of our prior assumptions, and the average date that suspensions will go into effect will be 2017. Under this set of assumptions, the present value mean projected 2025 deficit is \$53.4 billion, approximately 96% of the projected deficit without future suspensions or partitions. Using the same assumptions as were primarily shown in our prior Projections Report (but updating the assumed average effective date of suspensions to 2017) yields a mean projected 2025 deficit averaging \$37.7 billion in present value, an increase of \$9.7 billion from our prior report. The difference in results under the FY 2014 and FY 2015 assumptions is primarily due to the change in assumption for the largest troubled plan.

The report includes modest updates to the programming of the system, including changes to assumed mortality rates. Discussion of the multiemployer simulations begins on Page 7; the changes in the model and assumptions are detailed beginning on Page 24.

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 the coming decade. This year's report shows a mean projected present value surplus of \$2.6 billion for 2025, an increase of \$7.5 billion from the prior report. This continues the trend seen in the past several reports. There is significant variation around this mean outcome.

This report incorporates a number of improvements to the model, the most notable being use of updated mortality tables. It also reflects changes in pension law under the Bipartisan Budget Act of 2015 (BBA 15) that provide for larger premiums and reduce minimum funding requirements for plan sponsors. These single-employer results are detailed beginning on Page 26.

³ PBGC's FY 2015 Annual Report may be accessed at <http://www.pbgc.gov/Documents/2015-annual-report.pdf>.

⁴ PBGC's ability to provide financial assistance to plans for both facilitated mergers and for partitions are constrained by non-impairment and net long-run loss tests. The facilitated merger authority is not separately modeled in ME-PIMS, but is incorporated within the modeling of the constrained financial assistance available under partition. For additional information on the assumptions, see the section "Assumed Utilization of MPRA Suspension, Partition and Facilitated Merger" beginning on Page 19.

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FREQUENTLY USED ABBREVIATIONS

BBA 15	Bipartisan Budget Act of 2015
ERISA	Employee Retirement Income Security Act of 1974 as amended
ERM	Critical status plans that have determined they have “Exhausted all Reasonable Measures”
FY	Fiscal Year
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
SE	Single-Employer
PV	Present Value

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 2015, and then project for the following decade and beyond, based on current economic conditions, and current law.⁵ 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.

The purpose of the report is to provide an actuarial evaluation of the expected operation and status of PBGC's multiemployer and single-employer programs over the near term. It does so by illustrating the projected solvency and net position (accounting balance sheet) for the two programs over time under a variety of simulated future conditions. The standard for actuarial 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 reasonable 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 2016 to 2025. To demonstrate potential variation, the "high" value is set at the 85th percentile (i.e., 85 percent of the outcomes are lower), the median value at the 50th percentile, and the "low" value at the 15th percentile.

While the "high" to "low" range represents the bulk of projected outcomes,⁶ almost a third of projected results lie above or below the "high" to "low" range. Over a 10-year period it is likely that results will fall outside the "high" to "low" range several times. Because these "tail" results are also important, the report also presents discussions of the full distributions of projected financial positions for both programs.

⁵ This report generally uses data and assumptions as of September 30, 2015 (the end of FY 2015), but includes legislated changes to premiums and other changes due to BBA 15 enacted through December 2015. Assumptions regarding applications for suspension and partition reflect emerging experience through May 2016.

⁶ 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.)

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.

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. PIMS generally models anticipated amounts shown as liabilities or assets on PBGC's books at future points in time along alternate economic paths; it does not model footnote disclosures, such as amounts that represent reasonably possible contingencies.⁷

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. Furthermore, as discussed above, the term "deficit" is used in this report solely to refer to the difference between liabilities for a lifetime of payments and assets, not to year-by-year cash flow amounts.

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 (2015) report include changes to SE-PIMS to reflect the provisions of BBA 15. We also explicitly recognize expense assumption in the Target Normal Cost, and modify cash balance interest crediting assumptions. Changes to ME-PIMS add more modeling flexibility for reflecting suspensions and partitions under MPRA.

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.⁸

Significant changes have been made to assumptions used in ME-PIMS regarding the number of multiemployer plans that will apply for suspension and partition. These assumptions reflect emerging experience under the program through May 2016. In both systems we adopt updated mortality table projections for calculating underfunding.

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

⁷ Reasonably possible contingencies are discussed in Note 9 of PBGC's Annual Report. As of the end of FY 2015 they were \$218 Billion for the single-employer program and \$20 Billion for the Multiemployer program.

⁸ 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>.

affordable by premiums.⁹ This evaluation assumes no changes to the current law after December, 2015 for both multiemployer and single-employer plans (as amended by BBA 15).

⁹ 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.

MULTIEMPLOYER PROGRAM

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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., a year in which the plan is anticipated to have insufficient funds to pay benefits and expenses). 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.¹⁰

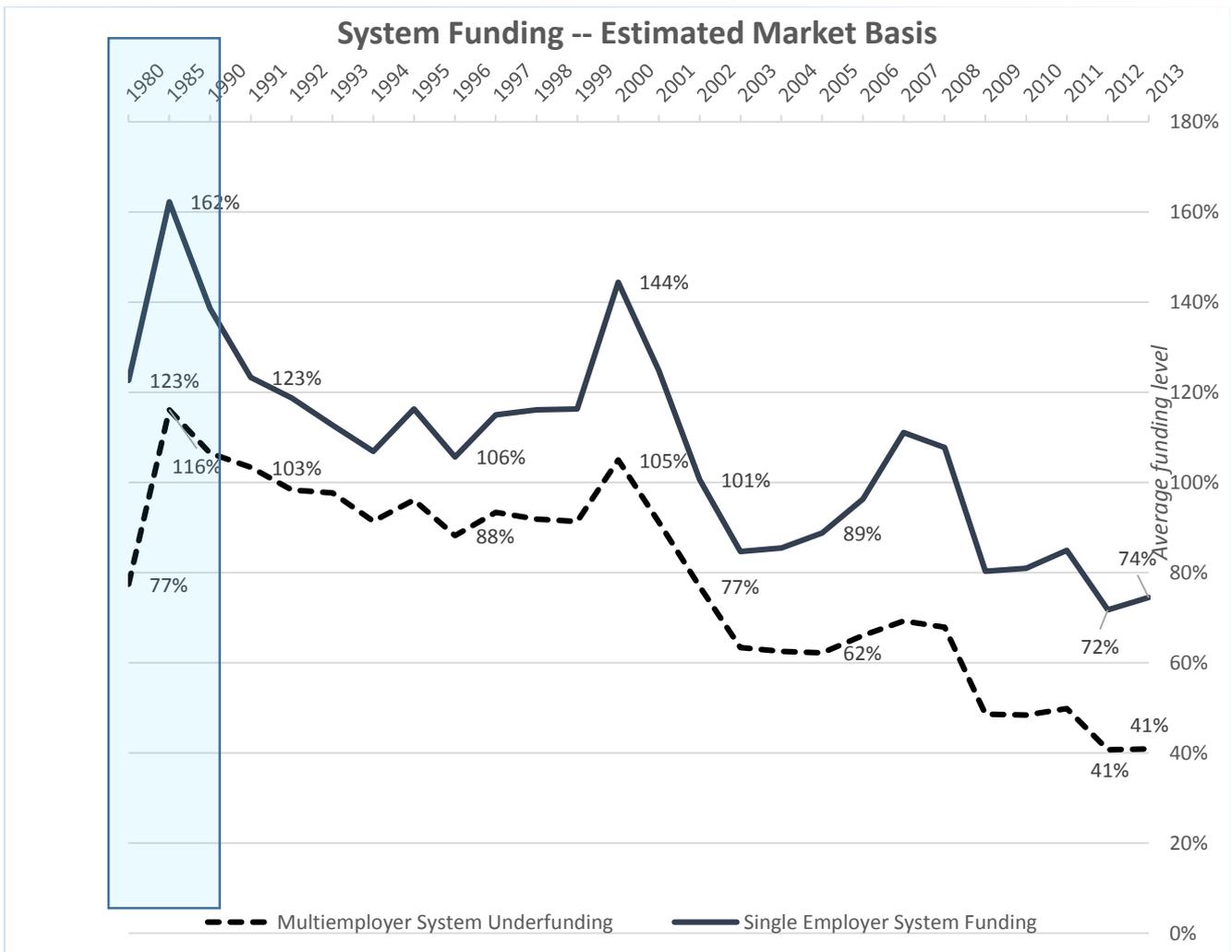
Multiemployer plans' premium rates for PBGC coverage are lower than those for single-employer plans and are based solely on participant count. The amount and structure of the benefit guarantees provided under the program also differ significantly. Assets of PBGC's multiemployer program are separate from those of the PBGC single-employer program by statute; assets from one program cannot be used to fund obligations of the other program.

The average funded status of plans in the multiemployer system is generally lower than that of plans in the single-employer system, when measured using common assumptions. Figure 1 graphs the relative funded status of the systems over time, using numbers reported on the Form 5500 and then adjusted by PBGC to reflect an estimated common basis using discount rates and mortality assumptions reflective of annuity purchase rates at each point in time.¹¹ As demonstrated in the chart, funding levels generally decreased over recent periods for both systems, but the multiemployer system is significantly less well funded than the single-employer system, and the gap is growing.

¹⁰ Technically this financial help is in the form of loans. However, with one exception over PBGC's history, the loans have never been repaid.

¹¹ See Tables S-44 and M-9 from PBGC's 2014 Databook tables <http://www.pbgc.gov/documents/2014-data-tables-final.pdf>.

Figure 1 – Aggregate Funding Status of Multiemployer and Single-Employer Plan Systems



The level of guarantee provided under the multiemployer program is typically significantly smaller than under the single-employer program. Even so, that level of guarantee is at risk because PBGC’s multiemployer program faces a high likelihood of long-term insolvency. 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,¹² but requires difficult choices of plan sponsors and participants. Under MPRA, a “critical status”¹³ plan that is projected to be insolvent within 20 years (or potentially 15 years in rare 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”¹⁴ benefits if they have undertaken all other reasonable measures and if doing so would allow the plan to remain solvent over the

¹² MPRA also doubled PBGC premiums from what they would have otherwise been in plan years beginning in 2015 and going forward. These higher premiums are recognized in PBGC’s multiemployer projections.

¹³ Under the Pension Protection Act of 2006 (PPA06) as amended by MPRA, 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).

¹⁴ MPRA defines a suspension of benefits to include either permanent or temporary reductions of current and future benefit payments.

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.

Under MPRA, 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 wait and risk deeper cuts upon insolvency.

MPRA further changes PBGC's ability to provide financial assistance, either through a plan partition or by providing facilitated merger assistance. 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, and the partition must reduce PBGC's long-term loss. In addition, PBGC must certify that a partition does not impair PBGC's ability to meet its obligations to certain other plans. Most of these constraints also apply to the provision of facilitated merger assistance (but the requirement to take all reasonable measures to avoid insolvency is replaced with a requirement that the assistance be necessary for the merged plan to remain solvent).

As of September 30, 2015, Treasury had not yet issued final regulations on the requirements plans must satisfy in order to receive approval of a benefit suspension¹⁵ and only one plan, the largest of the troubled plans, had applied for approval to undertake benefit suspensions. That application was denied for failure to conform to the requirements of the statute and regulations and the plan has indicated it will not reapply. PBGC regulations on financial assistance were also not final as of September 30, 2015¹⁶ and no plans had applied for financial assistance as of that date.

Given the lack of experience of plans successfully applying for suspensions and/or partitions, this report continues to present results: (1) assuming no future suspensions or partitions under MPRA will be effective (since, as of September 30, 2015, no plan had yet completed a suspension or partition, the assumption of no future suspensions or partitions effectively assumes no use of suspensions or partitions) and (2) using estimates of the percentage of "critical and declining" plans that will make use of the suspension and partition provisions, using assumptions as to how the process will operate. The latter results should be interpreted in the light of the uncertainties outlined later in this report in the section "Assumed Utilization of MPRA Suspension, Partition and Facilitated Merger" beginning on Page 19. We primarily show results on the basis of a set of assumptions revised to reflect emerging experience. The revisions include assumptions that the largest troubled plan will not reapply for benefit suspensions, rates of future suspensions and partitions for other plans will be half the level of our prior (FY 2014 Projections Report) assumptions, and the assumed average date of commencement of benefits suspensions is 2017 rather than 2016. We also show results using the same assumptions as were primarily shown in our prior Projections Report (FY 2014), which included an assumption that the largest troubled plan would successfully implement benefit suspensions in 2016.

¹⁵ Final regulations were published as of April 28, 2016 <https://www.gpo.gov/fdsys/pkg/FR-2016-04-28/pdf/2016-09888.pdf>. As of May, five plans had applied for approval of benefit suspensions – one of those suspensions was in conjunction with a partition. One application was denied, one plan withdrew its initial application and reapplied. None had yet been approved.

¹⁶ PBGC's final regulation on partition was issued December 23, 2015 and is available at <https://www.gpo.gov/fdsys/pkg/FR-2015-12-23/html/2015-32309.htm>. PBGC's proposed regulation on mergers was issued on June 6, 2016 (see <https://www.gpo.gov/fdsys/pkg/FR-2016-06-06/pdf/2016-13083.pdf>).

The estimate of the average projected deficit increased from last year's projected 2024 mean present value deficit of \$44.3 billion to this year's \$55.5 billion 2025 projected mean present value, assuming no future suspensions and partitions under MPRA. Using the FY 2015 assumptions about suspensions and partitions under MPRA reduces the deficit to \$53.4 billion. Using the same assumptions as were primarily shown in our FY 2014 Projections Report yields a mean projected 2025 deficit averaging \$37.7 billion in present value, an increase of \$9.7 billion from our prior report.

The year when PBGC's multiemployer program is estimated to have a greater than 50 percent likelihood of insolvency remains 2025, regardless of scenario. While the likelihood is slightly lower if plans are assumed to use suspension and partitions under MPRA, whether or not suspensions are adopted, PBGC's multiemployer program remains more than 50 percent likely to run out of assets by the end of 2025. The risk of insolvency rises rapidly after the 10-year period, reaching 98 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, under any of the alternate scenarios, 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.

WILL PBGC HAVE FUNDS TO PAY MULTIEMPLOYER GUARANTEES?

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

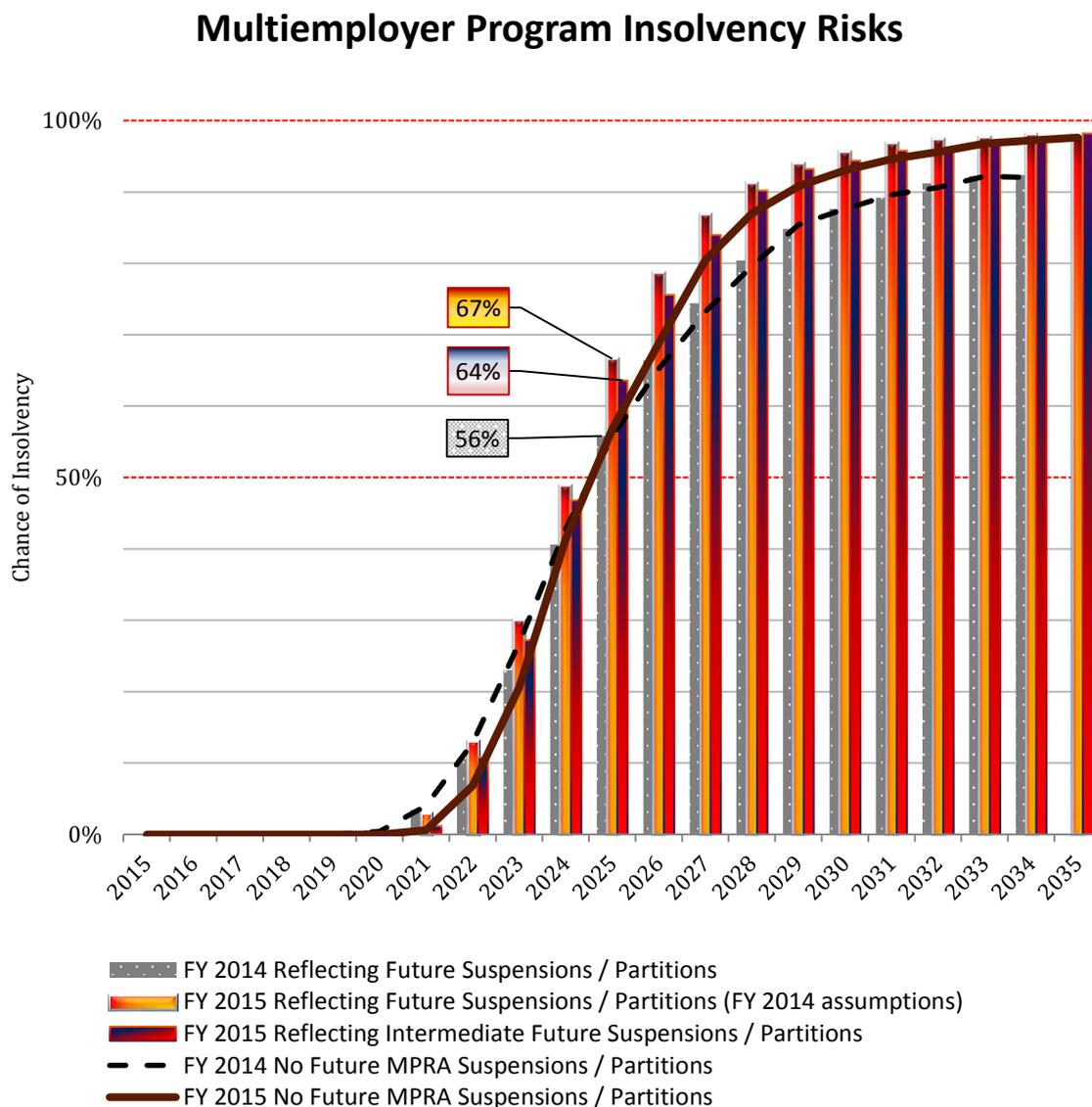
The multiemployer guarantee program remains at risk of running out of money. This year's projections continue to show it is more likely than not that the program will run out of money by the end of 2025. At the end of the 10-year projection period ending in 2025, PBGC's multiemployer fund assets are depleted in approximately 57 percent of the scenarios. Program risk continues to rise over time, reaching 95 percent by 2031 and 98 percent by 2035.

The year by year risks of running out of money have shifted. The risks of insolvency have compressed -- decreasing slightly prior to 2024 and increasing for 2025 and later years when compared to the FY 2014 report.

The 2014 Projections Report showed the multiemployer program becoming insolvent in 43 percent of simulations by 2024 (a 10-year projection period). As shown in Figure 2, this year, the projected risk of insolvency by 2024 has slightly decreased to 41 percent. The longer term risk of insolvency increased by 6 percent to 98 percent at the end of the 20-year projection period. The compression of risk reflects a reduction in uncertainty as the date of insolvency grows nearer and a change in the pattern of risk. The change in the pattern reflects that plan experience in 2015 was worse than the average of our prior simulations leading to higher longer term risks. However, since actual plan experience was not as bad as some of the least favorable potential simulations we modeled for that year, some of the possibilities we previously projected for near term risk in our prior projection are eliminated, thereby reducing the likelihood of near term insolvency.

Figure 2 compares the final results for the prior (FY 2014) and current (FY 2015) insolvency risk projections. The lines in the chart show results assuming no future MPRA suspensions and partitions while the columns show results assuming future suspensions and partitions; black and grey elements represent results from our prior (FY 2014) Projections Report. Generally, PBGC multiemployer program insolvency risk decreased slightly from FY 2014 to FY 2015 within the first decade and increased slightly in the second decade.

Figure 2 – Multiemployer Program Risks Compress – 2025 Insolvency Likely



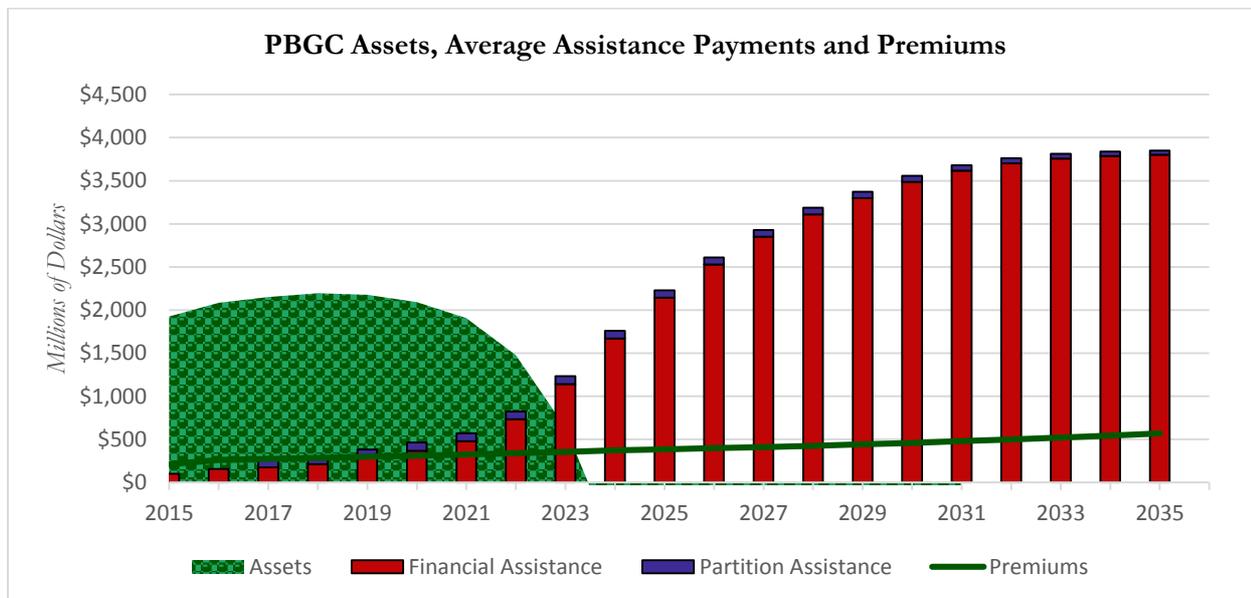
Because PBGC’s ability to offer assistance to plans is constrained by the resources of its multiemployer program, and it must certify to Congress that offering partition or merger assistance will not impair its ability to provide assistance to certain other plans, this report reflects an assumption that 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 no future suspensions and partitions.

HOW QUICKLY WILL THE MULTIEMPLOYER FUND BE EXHAUSTED?

As shown above, our models estimate that the risk of insolvency rises over time, exceeding 50 percent within FY 2025. To derive the 50 percent level we simulate PBGC premiums paid and the potential financial assistance to plans under 500 economic scenarios. In more than half of the scenarios, PBGC’s multiemployer fund is depleted on or before the end of FY 2025. This form of presentation allows the reader to understand the potential timing of plan insolvency, but may not provide insight into the drivers of insolvency.

To provide additional insight into the drivers of fund insolvency we have also prepared an illustration of PBGC's multiemployer fund balance using the average projected premiums and financial assistance derived from our simulations.

Figure 3 -- PBGC Multiemployer Fund Projected to Be Drained



As shown above, financial assistance is projected to rise dramatically over the extended term. Most of the increase in financial assistance is not driven by additional assistance provided through partition, but reflects the rising needs of plans that enter insolvency in the near future. Annual financial assistance rises much more rapidly than premiums, in the second decade attaining levels comparable with the current level of assets in the multiemployer fund.

The above projection uses the average (mean) level of financial assistance across all of our simulations in each year. Since the average level of financial assistance includes simulations of economic paths where plans become insolvent at relatively earlier dates, the average financial assistance level is larger than the median. Thus, PBGC's assets are drawn down relatively more quickly, based on average financial assistance and premium levels. This leads to a finding that, at average expected financial assistance levels, PBGC's fund is depleted one year earlier than the median projection (in 2024 rather than 2025).¹⁷

¹⁷ Additional deterministic projections of the multiemployer program are presented in the FY 2015 MPRA Report <http://www.pbgc.gov/documents/MPRA-Report.pdf>.

SUMMARY PROJECTIONS

Projected Net Position

The 10-year projections show the multiemployer program's net position deteriorated from last year's projections. If there are no future suspensions and partitions under MPRA, ME-PIMS projects that PBGC's 2025 multiemployer obligations will be higher than last year's projections (a mean deficit of \$55.5 billion for 2025 compared to the previous projection of a mean deficit of \$44.3 billion for 2024, an increase of \$11.2 billion from the comparable number in our prior Projections Report). The change largely mirrors changes seen in PBGC's most recent Annual Report, which reported a \$9.9 billion increase in the multiemployer program deficit from \$42.4 billion as of the end of FY 2014 to \$52.3 billion as of the end of FY 2015. This projected mean deficit (after discounting to present value) is almost the same as the current deficit of \$52.3 billion shown in the September 30, 2015 financial statements.

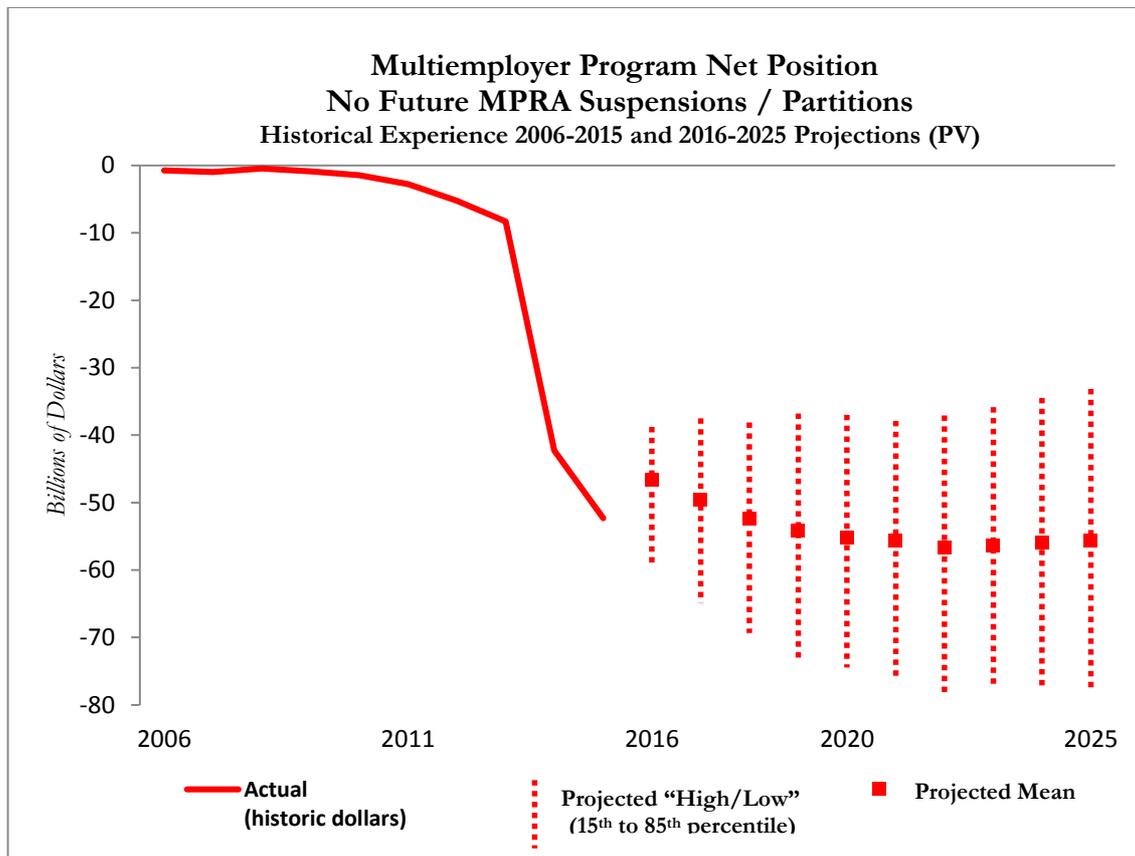
Based on the assumptions regarding plans' use of suspension and partition determined for this FY 2015 report, the 10-year mean projected deficit increased from a mean present value of \$36.1 billion for 2024 to a mean present value of \$53.4 billion for 2025. These assumptions differ from the primary set of assumptions used in our FY 2014 Report by assuming that the largest troubled plan will not implement benefit suspensions, the rate of implementation of suspension and partition will be half the rate previously assumed for other plans and the average effective date of suspensions will be one year later. Using the FY 2014 Report assumptions, the 10-year mean projected deficit also would have increased from a mean present value of \$28.0 billion for 2024 to a mean present value of \$37.7 billion for 2025. Additional information on the effect of different assumptions regarding suspension and partition is set forth in the section "Assumed Utilization of MPRA Suspension, Partition and Facilitated Merger" beginning on Page 19.

Figure 4 shows the FY 2016 through 2025 present values of the projected multiemployer net position (the squares and dotted lines) in contrast to the actual historical net positions as reported in nominal dollar values (the solid line ending in FY 2015). It assumes no future benefit suspensions or partitions under MPRA. It also illustrates worsening of the historical net position from 2014 to 2015, as discussed in PBGC's 2015 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 15th percentile (15 percent of the outcomes are worse in that year) and the 85th 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 maintained its financial assistance obligations at current guarantee levels (even 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 unfunded amounts for prior years carried forward (with interest)¹⁸ in order to continue to provide the current schedule of guarantees and financial assistance in years prior to the projection date.

¹⁸ Unfunded amounts carried forward with interest are effectively treated as if PBGC could borrow them. This enables the completion of the present value calculation so that the total liability can be displayed, but is not intended to imply that PBGC has borrowing authority.

Figure 4 – Absent Suspensions and Partitions Deficit Likely to Remain Near Current Levels



In Figure 4 above, the mean future net position is projected to remain relatively close to the multiemployer program’s current net position in present value terms (although in nominal dollar terms it is expected to increase with the passage of time).¹⁹ This occurs because the current net position (i.e., PBGC’s financial statement deficit of \$52.3 billion in FY 2015) already reflects significant financial deterioration for many plans expected to become insolvent over the next 20 years, including several large plans.

Figure 5 compares the projected net positions for 2016 through 2025, using (FY 2015 Projections Report) assumptions of future MPRA suspensions and partitions, to the projected net positions without future MPRA suspensions or partitions. 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 in Figure 4 is shown as a band in Figure 5.

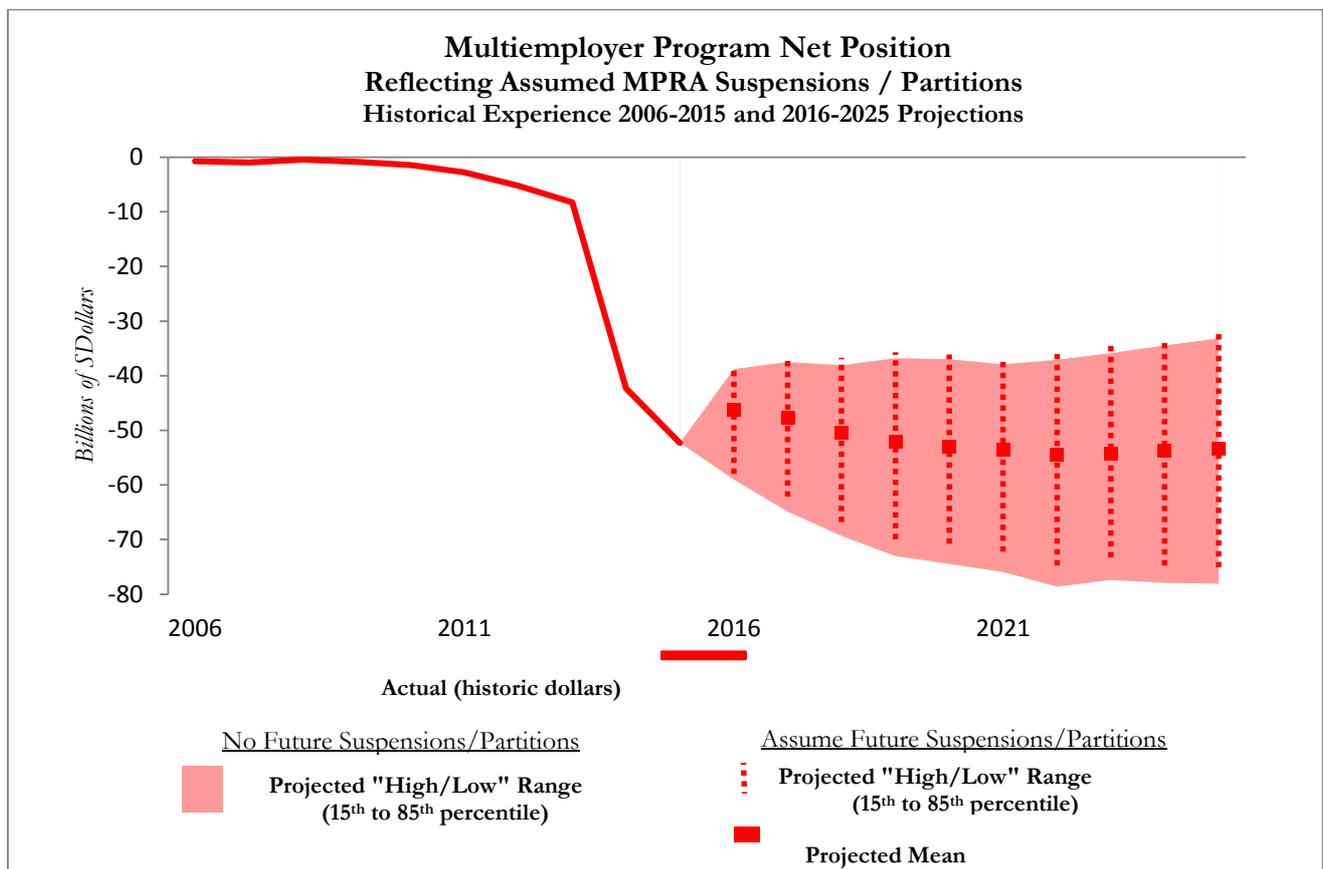
Reflecting the election of suspensions and partitions under MPRA decreases the projected net deficit, as shown in Figure 5. This is in contrast with the effect on near-term solvency shown in Figure 2 above. The decrease in the projected net deficit reflects that, over the long term, suspension (and financial 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

¹⁹ See Footnote 21.

effect. Changes are relatively modest however, reflecting the assumption that the largest troubled plan will not implement benefit suspensions.

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 fully in effect as of the release of PBGC's FY 2016 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 2017.²⁰ PBGC will continue to review the assumptions around election timing and percentage of plans electing as experience under MPRA emerges.

Figure 5 -- Future Suspensions and Partitions Likely to Partially 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. (2) Variability in the timing and amount of financial assistance payments. (3) Extent to which plans will use suspensions and partitions under MPRA. These sources of uncertainty are discussed in detail in the following sections.

²⁰For modeling purposes, assumptions regarding election of suspension and partition incorporate the likelihood that sponsors will apply, will comply with statutory and regulatory requirements, and that the suspensions will not be overturned by participant vote. For additional information see the discussion beginning on p. 19.

Projected Net New Claims

New claims 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.

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 2025 (discounted to 2015 present values), whether or not plans utilize future MPRA suspensions and partitions. Alongside those values, the tables display the “low” and “high” values at the 15th and 85th 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 2025, 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 Future Suspensions/Partitions Under MPRA			
2015 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 2016 -2025	\$5	\$20	\$35
	“High” (85th percentile)		“Low” (15th percentile)
PV FY 2025 PBGC ME Financial Position <i>(Deficit)/ Surplus</i>	\$(33)	\$(56)²¹ Insolvent	\$(78) 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.²² The PV FY 2025 Financial Position measures future obligations as of 2025, including net new claims as well as final adjustments for benefit payments, asset earnings, and projected 2025 assumptions, and then discounts to a 2015 present value. The number shown includes as part of the deficit 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 future MPRA suspensions and partitions) is about \$18 billion; that is, half of the simulations show a 10-year total of claims above \$18 billion and half below. The mean present value of net new claims (that is, the average level of claims) is also about \$20 billion over the next 10 years. This is approximately one-half higher than last year’s projections.

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 \$45 billion.

²¹ The mean present value discounted to 2015 is a \$56 billion deficit. The mean discounted present value is the average across all simulation paths; discount rates vary among different simulation paths. The mean projected 2025 value is a \$74 billion deficit in nominal terms.

²² 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.

After assumed election of suspension and partition under MPRA, the projected mean deficit declines somewhat, 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.

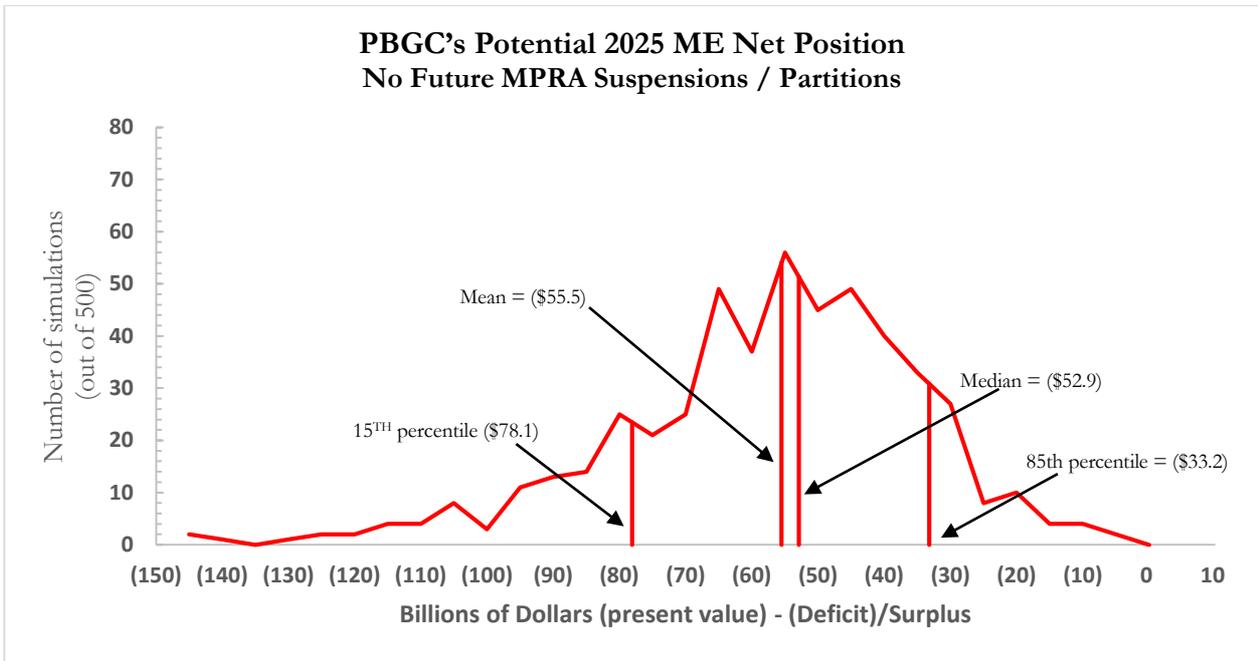
Reflecting Assumed MPRA Suspensions / Partitions			
2015 Present Value (PV) <i>(Dollars in billions at year end)</i>	“Low” (15th percentile)	Mean	“High” (85th percentile)
PV PBGC ME Net New Claims FY 2016 -2025	\$4	\$18	\$32
	“High” (85th percentile)		“Low” (15th percentile)
PV FY 2025 PBGC ME Financial Position <i>(Deficit)/ Surplus</i>	\$(32)	\$(53)²³ Insolvent	\$(75) 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 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 2025 net position at the 15th and 85th percentiles and the mean and median values of projected net positions. The median result is a deficit with a present value of \$52.9 billion in FY 2025 assuming no future suspensions or partitions under MPRA. None of the 500 projections shows a surplus. The most optimistic projection shows a deficit of \$2 billion in present value. Many projections show very severe deficits, with the largest projected at a present value of \$144 billion.

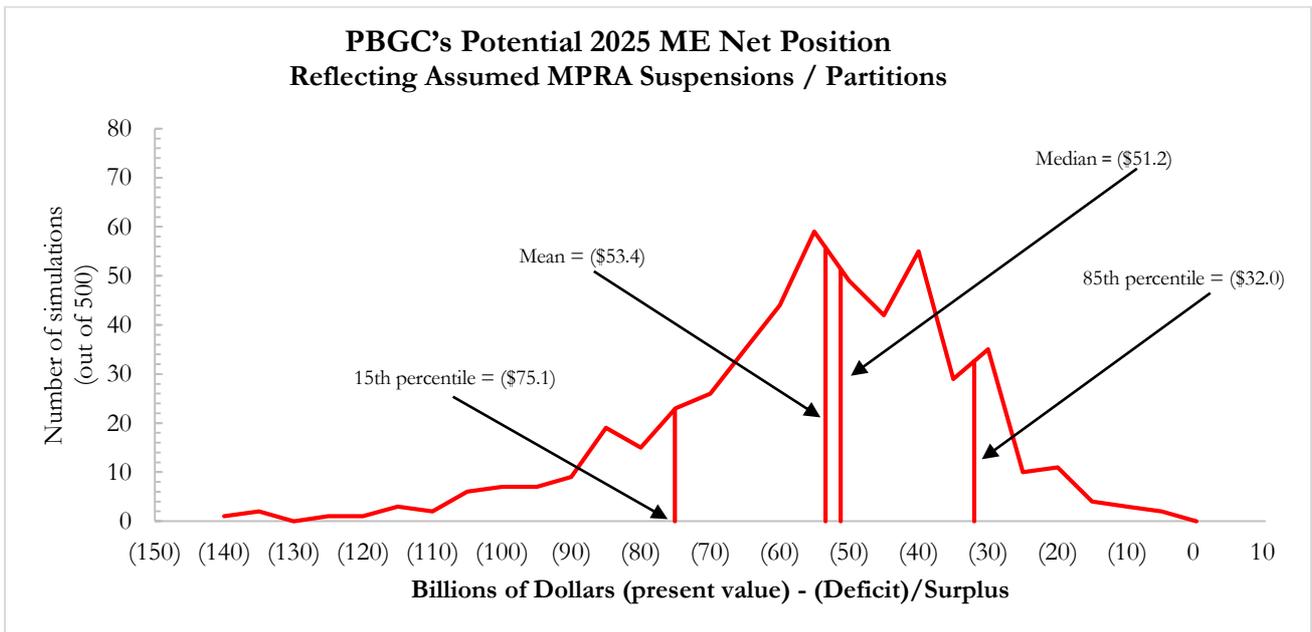
²³ The mean present value discounted to 2015 is a \$53 billion deficit. The mean discounted present value is the average across all simulation paths; discount rates vary among different simulation paths. The mean projected 2025 value is a \$72 billion deficit in nominal terms.

Figure 6 – Wide Range of Future Outcomes, Absent Suspensions, All Deficits



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 suspensions and partitions in the future), produces a 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 7 – 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 2016 to 2025, financial assistance payments are projected to exceed the PBGC’s resources, prior to the use of MPRA suspension and partition. Assets in the multiemployer program in 2015 are about \$1.9 billion while the present value of projected premiums over the 10-year period is about \$2.7 billion, totaling about \$4.6 billion. This is about \$1.5 billion below the mean present value of financial assistance of \$6.1 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 Future Suspensions/Partitions Under MPRA			
2015 Present Value <i>(Dollars in billions at year end)</i>	“Low” (15th percentile)	Mean	“High” (85th percentile)
PV PBGC ME Financial Assistance Payments FY 2016-2025	\$2.9	\$6.1	\$9.9
PV Assets Plus Premium FY 2016 - 2025	\$4.4	\$4.6	\$4.8

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, Partition and Facilitated Merger.”

Reflecting Assumed MPRA Suspensions / Partitions			
2015 Present Value <i>(Dollars in billions at year end)</i>	“Low” (15th percentile)	Mean	“High” (85th percentile)
PV PBGC ME Financial Assistance Payments FY 2016-2025	\$3.3	\$6.5	\$10.1
PV Assets Plus Premium FY 2016 - 2025	\$4.4	\$4.6	\$4.8

The PV of Financial Assistance Payments for the period 2016 to 2025 represents the value of near term cash flows. In contrast, the projected net 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” payments shown above.

ASSUMED UTILIZATION OF MPRA SUSPENSION, PARTITION AND FACILITATED MERGER

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. Under MPRA some plans facing insolvency within the next 20 years may take additional steps to improve long term solvency, including permanently reducing benefit promises to participants via benefit suspensions. In order to suspend benefits, plans must be in critical and declining status and submit an application to Treasury for approval of the benefit suspensions. The application must meet a number of conditions including: careful processes for measuring long term solvency improvements, a demonstration that benefit reductions have been equitably distributed, notice to participants, and a vote by participants on the proposed reductions.

The ME-PIMS Model explicitly estimates a plan census and benefit distribution for each plan in its sample. That information is used 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 period²⁴ and meets the criteria to be critical and declining, (3) the amount of 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.

The degree to which plans and participants will decide to apply for benefit suspensions as of this date is still, to some extent, unknown. The largest troubled plan applied for benefit suspensions in September, 2015; its application was denied in May, 2016 for failure to comply with the statute and regulations and the plan announced it will not reapply. Otherwise, only a few plans have applied for benefit suspensions and only one for partitions as of this reporting date; all of these other applications were submitted after September 30, 2015. Final regulations on the requirements for approval of an application for suspensions were only issued in April, 2016 and final regulations on partition only in December, 2015. Proposed regulations on facilitated merger assistance were issued shortly before the date of this report.

Our assumptions for these plans reflect two primary factors: whether Boards of Trustees will voluntarily undertake to apply for a suspension that is found to comply 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, whose applications are approved by Treasury, the law requires that Treasury override any “no” vote, either by accepting the original suspension proposal or by adjusting the proposed suspensions. In the latter case, the Board of Trustees would have the option not to implement the adjusted suspensions.

Development of FY 2014 Assumptions Regarding Suspensions and Partitions

For our FY 2014 Projections Report we developed assumptions to estimate future suspensions and partitions that were contrasted with an assumption of no suspensions or partitions. PBGC gathered information from the plans most likely to use these options and from multiemployer practitioners. Information on the composition of plans that intended to apply, by size and funded status, was limited and informal. Based on these factors we 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, the FY 2014 ME-PIMS model assumed (in its “best estimate” assumptions) that there was a 100 percent likelihood that the largest critical and declining plan would elect to apply and successfully complete regulatory requirements. It further assumed 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 finds that reducing benefits to the minimum protection levels set forth in MPRA would not be sufficient 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.

²⁴ Under MPRA plans in critical status must perform either a 15- or 20-year projection to determine whether they will become insolvent and thus “critical and declining.” The 20-year test applies if the plan is less than 80% funded or has a ratio of inactive to active participants of more than 2 to 1; it is rare for a plan to be in critical status if one of these conditions does not apply.

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, the FY 2014 ME-PIMS model assumed 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 would complete the regulatory requirements, receive PBGC approval, and implement the suspension and partition.

Given the similar impairment constraints on financial assistance, the facilitated merger authority is not separately modeled in ME-PIMS, but is incorporated within the modeling of the constrained financial assistance available under partition. Scenarios that assume no future partitions also assume no future facilitated mergers.

Due to the high uncertainty and the limited information regarding the likelihood that plans would suspend benefits, the FY 2014 Projections Report also illustrated the effects of using alternate (halved) rates of suspension of 50 percent for the largest critical and declining plan, 30 percent for other plans that can become solvent solely by suspending and 10 percent using suspension and partition or requiring facilitated merger.

Development of FY 2015 Assumptions Regarding Suspensions and Partitions

Subsequent to our FY 2014 Projections Report, some Boards of Trustees have made decisions as to whether to start the process of benefit suspensions. In particular, the largest troubled plan did apply for benefit suspensions. That application was denied, however, for failure to meet the requirements of the statute and regulations. The plan has announced it will not reapply. Thus we have revised our assumption regarding the likelihood that the largest troubled plan will suspend benefits from 100% to 0%. Additional sensitivity tests of that assumption are set forth below.

Rates at which plans have applied for suspension and partition have generally been slower and at a lower rate than we assumed in our previous valuation. Thus, for the FY 2015 valuation, we have assumed that the average date at which benefit suspensions will first be applicable will be FY 2017, one year later than incorporated into our prior set of assumptions. We also adopt the alternate (halved) rates of suspension and partition that we illustrated in our FY 2014 Projections Report for all but the largest plan.

In combination, reflecting the emerging experience under the program, this report adopts an assumption of 0 percent likelihood that the largest critical and declining plan will suspend benefits, 30 percent for other plans using suspension alone and 10 percent using suspension and partition. We expect to continue to evaluate our assumptions of future suspensions and partitions as more plans have an opportunity to consider whether or not to apply.

Sensitivity of Assumptions Regarding Suspensions and Partitions

Emerging experience is limited and the implications on the results of the reported deficit can be volatile. Effects on projected risk of insolvency tend to be minor, in part due to the non-impairment constraints on PBGC's ability to provide assistance. This section illustrates the sensitivity of the projected mean deficit to assumptions regarding use of suspensions and partitions under several alternate scenarios.

If we had continued the use of the primary FY 2014 Projections Report assumptions, but incorporated the delay in average effective date to 2017 (i.e., assumed 100 percent likelihood that the largest critical and declining plan

will suspend benefits, 60 percent for other plans using suspension alone and 20 percent using suspension and partition) the mean projected 2025 deficit would be \$37.7 billion in present value. This compares with the mean projected 2025 deficit of \$53.4 billion under the FY 2015 report assumptions. The mean projected 2025 deficit of \$37.7 billion is an increase of \$9.7 billion from the mean projected 2024 deficit numbers determined in our prior Projections Report using comparable assumptions.

If we had used the alternate set of FY 2014 Projections Report assumptions, but incorporated the delay in average effective date to 2017 (i.e., assumed 50 percent likelihood that the largest critical and declining plan will suspend benefits, 30 percent for other plans using suspension alone and 10 percent using suspension and partition), the mean projected 2025 deficit would be \$46.7 billion. The mean projected 2025 deficit of \$46.7 billion is an increase of \$10.6 billion from the mean projected 2024 deficit numbers determined in our prior Projections Report using comparable assumptions.

We also estimated the impact of the largest troubled plan deciding, after some period, to reapply for suspensions. To model this outcome we maintained our current assumptions regarding other plan suspension and partition rates (i.e. assumed a 30 percent likelihood that other plans using suspension alone would apply and 10 percent using suspension and partition) and assumed that the average effective date of suspensions would be in 2017. We then modeled outcomes for the largest plan along 500 economic paths and applied a 10 percent chance that the plan would reapply for suspensions effective in 2018, if suspensions were possible at that point along that path. Under this assumption the mean projected 2025 deficit would decrease slightly to \$52.5 billion

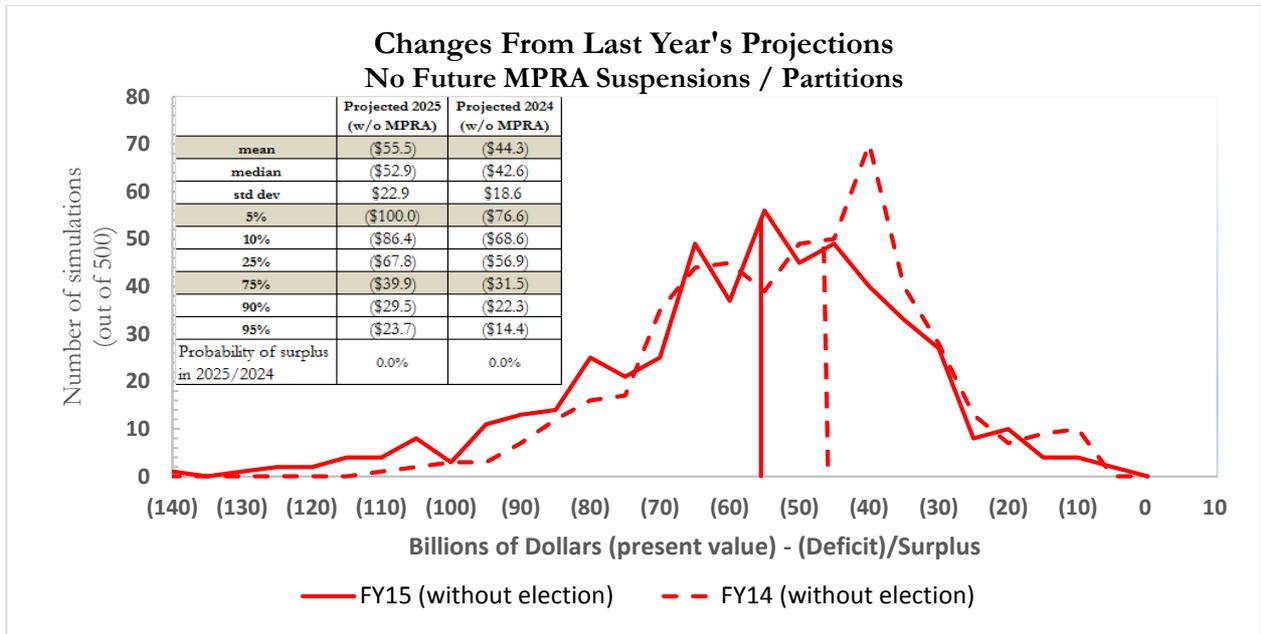
Finally we modeled the potential effects of a change in the investment return assumption plans use to demonstrate continued solvency. Applying a decrease of 100 basis points (1 percent) to the assumed solvency investment return rate increases the mean projected 2025 deficit to \$53.7 billion mean. This is approximately 1 percent higher than the projected 2025 deficit of \$53.4 billion under the FY 2015 report assumptions. Tests of the assumptions using other scenarios also increased mean projected 2025 deficits by approximately 1 percent.

VARIABILITY IN PROJECTED FINANCIAL POSITION, MULTIEMPLOYER PROGRAM

If no future suspensions or partitions under MPRA are assumed, about half of the simulations show improvement in PBGC's financial position over the next 10 years. As of September 30, 2015, the multiemployer program had a deficit of \$52.3 billion. The mean projected result for 2025 (discounted to a 2015 present value) is a \$55.5 billion deficit, and the median outcome in FY 2025 (discounted to a 2015 present value) is a \$52.9 billion deficit.

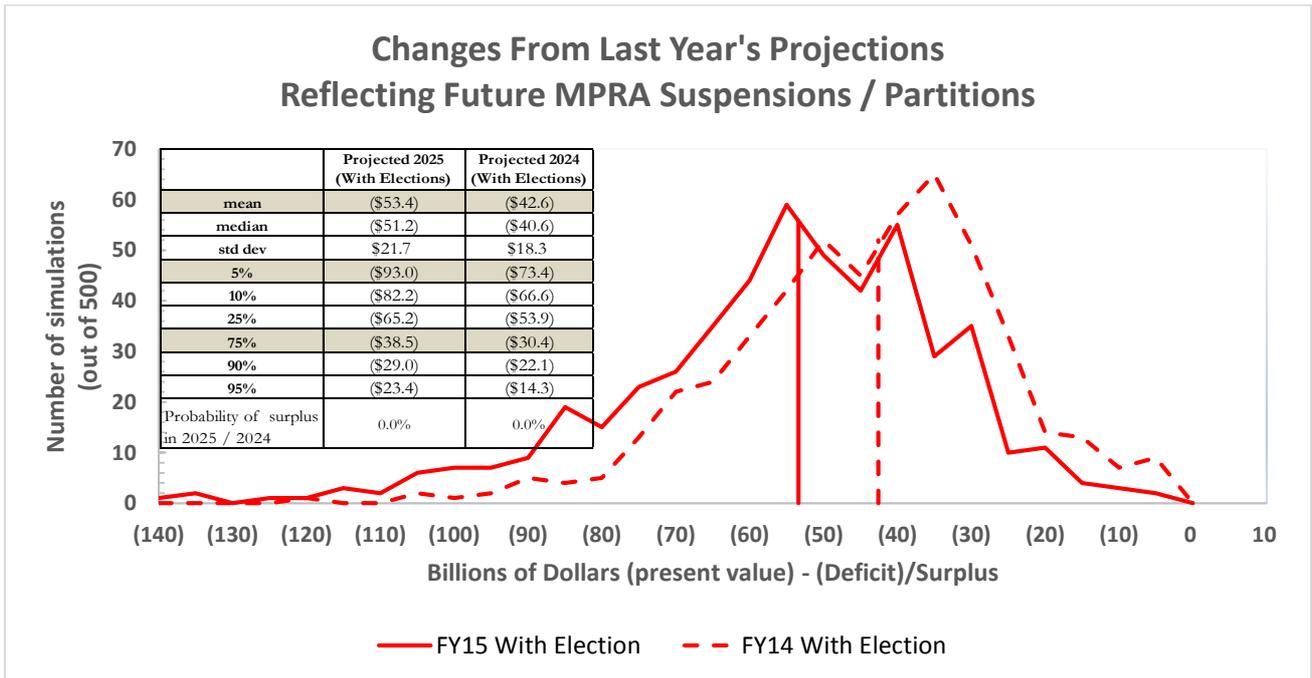
Figure 8 below illustrates the shift in the distribution of outcomes for the program compared to the prior report.

Figure 8 – Range of Multiemployer Outcomes Shows Higher Likely Deficits, if There are No Future Suspensions



If plans are assumed to use suspensions and partitions, the graph changes. As previously noted, the mean present value of the 2025 deficit decreases from \$56 to \$53 billion, with more outcomes to the right of the graph. However, there are no projected positive net position outcomes in either scenario.

Figure 9 – Range of Multiemployer Outcomes with Suspensions Also Worsen vs Prior Year



RECONCILING ME-PIMS RESULTS FROM 2014 TO 2015

The following table displays a detailed reconciliation (in dollars, as well as percentages) of the changes from 2014 to 2015. 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 \$53.4 billion under any order. Because the projected assets are small compared to the liabilities, the percentages displayed would change less significantly, regardless of the order of measurement.

Figure 10 – Reconciliation of Changes in ME-PIMS Results

Reconciliation of Changes in ME-PIMS Results, 2014 to 2015 Results (No Future Suspensions / Partitions under MPRA)			
Description of Change	Value of Change (\$ billions)	Net Deficit (\$ billions)	% Change
Initial Position for Mean PV of 10-Year Projected Net Deficit from 2014 Projections Report		\$44.3	
1. Changes due to passage of time from FY 2014 to FY 2015	0.6	44.9	+1.4%
2. Changes due to new plan data	3.7	48.6	+8.2%
3. Changes in economy and economic assumptions from FY 2014 to FY 2015	8.8	57.4	+18.1%
4. Changes to ME-PIMS Model	0.1	57.5	+0.2%
5. Change in mortality assumption	(2.0)	55.5	-3.5%
Year 2025 Mean PV of Projected Net Deficit based on 2015 ME- PIMS Model – No Future Suspensions or Partitions		\$55.5	
(Reflecting Future Suspensions / Partitions under MPRA)			
6. Reflect Suspensions and Partitions Using FY 2014 Report assumptions	(17.8)	37.7	-32.1%
7. Reflect FY 2015 Assumptions Regarding Suspensions and Partitions	15.7	53.4	+41.6%
Year 2025 Mean PV of Projected Net Deficit based on 2015 ME- PIMS Model – Reflecting Future Suspensions or Partitions		\$53.4	

Expected Change Due to Passage of Time: The 2014 report projected the PBGC net position in 2024 and presented the results valued in 2014 dollars. To compare with the 2015 report, which projects to 2025 with values reported in 2015 dollars, the 2014 projection is rolled forward to project one additional year with one less year of present value discounting. The effect of the roll forward is an increase in the projected net deficit of \$0.6 billion.

Data changes: Changes in the starting data between FY 2014 and FY 2015 include an increase in the number of plans in the sample in ME-PIMS, and incorporates new plan data that plans provide on Form 5500.²⁵ These changes increase the present value of the deficit by \$3.7 billion.

Economy and economic assumptions: Between fiscal years 2014 and 2015, there were 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. Reflecting these changes increases the present value of the projected deficit by \$8.8 billion. This is primarily due to a slight decrease in the projected discount rates and relatively weak investment returns in multiemployer plans for the prior year resulting in an increase in the number of plans which may run out of money.

Changes to the Model: This report reflects several modifications to the coding (1) to allow the use of pre-defined suspensions and partitions percentages for individual sample plans, (2) to allow the use of pre-defined election percentages for suspensions and/or partitions, (3) to allow the use of pre-defined contribution rates in the MPRA forecast for individual sample plans and (4) to enhance the MPRA solvency forecasts. These changes pertain to individual plans utilizing MPRA suspension or partition.

Change in mortality assumption: This year's model reflects the most recent version of the new tables issued by the Society of Actuaries.²⁶ This change decreases mean projected liabilities by \$2.0 billion.

Assumptions Regarding Election of Suspension and Partition: Based on emerging experience, this report adopts new assumptions for FY 2015. For more information on the change see the discussion beginning on p. 19. The change increases the mean present value of the projected deficit by \$15.7 billion, but has only a small effect on projected solvency.

SENSITIVITY OF CHANGES TO THE MODEL AND DISCOUNT RATE

Similar to the FY 2014 Projections Report, PBGC includes tests of the sensitivity to increases and decreases in the PIMS discount rate for valuing PBGC obligations. Using the FY 2015 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 2025 multiemployer net position of \$53.4 billion by \$3.3 billion to \$50.1 billion and discount rates 50 basis points lower would worsen the mean present value of the deficit by \$3.9 billion to \$57.3 billion. Neither scenario shows any chance of a surplus in 2025.

²⁵ Information about Form 5500 and its attachments is available at <http://www.dol.gov/ebsa/5500main.html>.

²⁶ Information about the RP2014 Mortality table and the MP2015 Projection Scale is available at <https://www.soa.org/Research/Experience-Study/Pension/research-2015-mp.aspx>. The PIMS models use a static projection of the mortality scales as discussed in the Appendix.

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 reflection of more up-to-date mortality (both for funding requirements and for determining PBGC liabilities), explicit recognition of the actuary’s interest crediting rate in modeling funding of hybrid plans, refinement of the modeling of plan administrative expenses, adjustments to bankruptcy probabilities for certain plan sponsors, modifications to the variable rate premium projections, and recognition of the effects of BBA 15. In 2015, PBGC’s single-employer program covered over 30 million participants in over 22,000 plans.

The 2014 Projections Report projected a mean present value deficit of \$4.9 billion for 2024. The 2015 Projections Report shows an improving prospect with a projected 2025 mean present value surplus of \$2.6 billion. The report continues to show a wide range of variability in the potential outcomes for the projected surplus or deficit. However, none of the simulations project that the program will run out of money within the next 10 years.

WILL PBGC HAVE FUNDS TO PAY SINGLE-EMPLOYER GUARANTEES?

As discussed in the section “Financial Obligations” beginning on Page 5, 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 2015 and then also project:

- Future premium income (assuming the premium rates enacted in the BBA 15),

- 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.

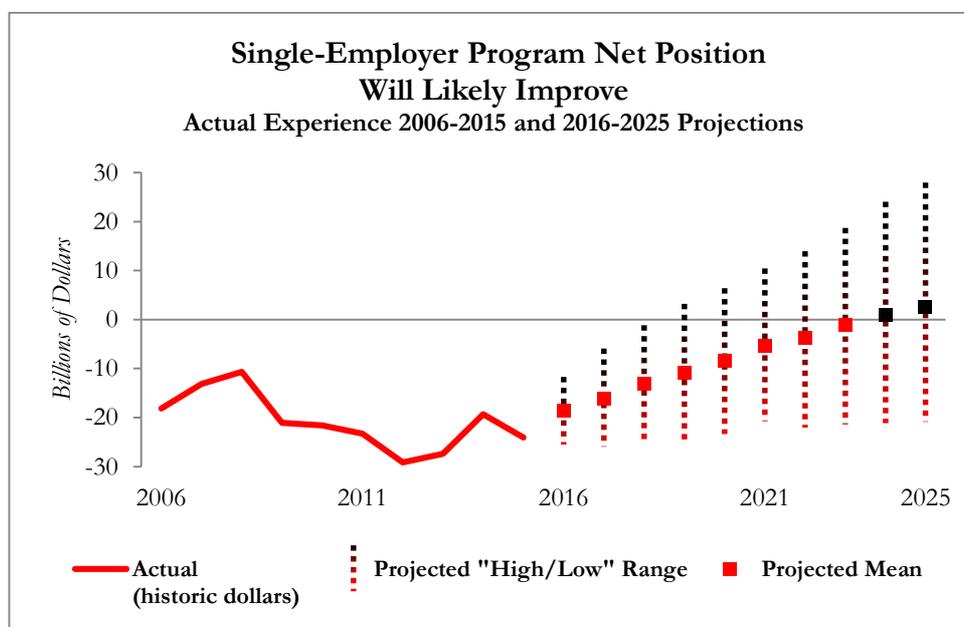
In the 5,000 scenarios simulated in SE-PIMS, there are none in which PBGC assets are completely exhausted within the 10-year projection period.

SUMMARY PROJECTIONS

Net Position

The FY 2015 single-employer program financial statement assets of \$85.7 billion and liabilities of \$109.8 billion result in a net deficit of \$24 billion.²⁷ The following chart shows PBGC’s actual net financial position from fiscal years 2006 to 2015, 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 15th and 85th percentiles for that future year. Since each year’s position affects the following year’s position, the uncertainty of PBGC’s financial position grows every year through FY 2025, as reflected in the progressively longer vertical bars:

Figure 11 – Single-Employer Program Likely to Reach Surplus Over Time



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). However, a majority of our simulations show that future premiums net of claims may be

²⁷ Individual figures may not sum or subtract due to rounding.

sufficient to eliminate the deficit over time, although that point still appears to be many years in the future. Whether or not the deficit is eliminated over time, from a year-over-year cash flow basis the program appears to be able to operate over the near term. Out of 5,000 simulations, none project that PBGC's single-employer program will run out of money within the next 10 years.

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 2025 (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.

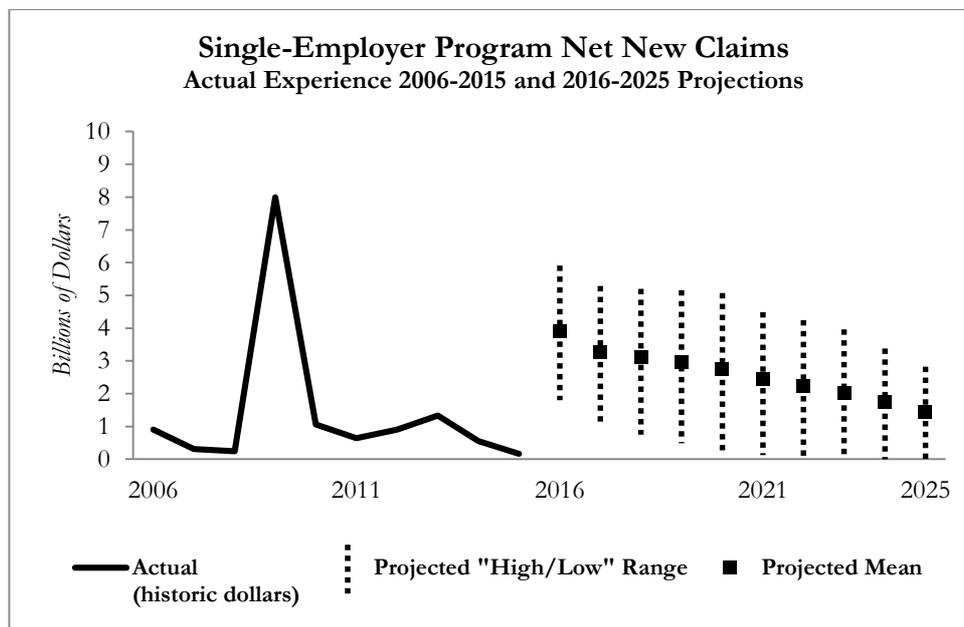
How Much Will PBGC Owe Participants?

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 2015 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 following chart) 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 15th and 85th 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 patterns in the amount of variability reflect long-term trends rather than cumulative effects.

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.²⁸ 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.

2015 Present Value (PV) <i>(Dollars in billions at year end)</i>	“Low” (15th percentile)	Mean	“High” (85th percentile)
PV PBGC SE Benefit Payments FY 2016-25	\$67	\$76	\$85
PV PBGC SE Net New Claims FY 2016-25	\$11	\$26	\$42

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 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 approximately \$22.3 billion. The mean present value of claims is higher, about \$25.9 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 2025?

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

²⁸ 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.

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 2025 varies by \$75 billion (discounted to a 2015 present value), as shown in the following chart.

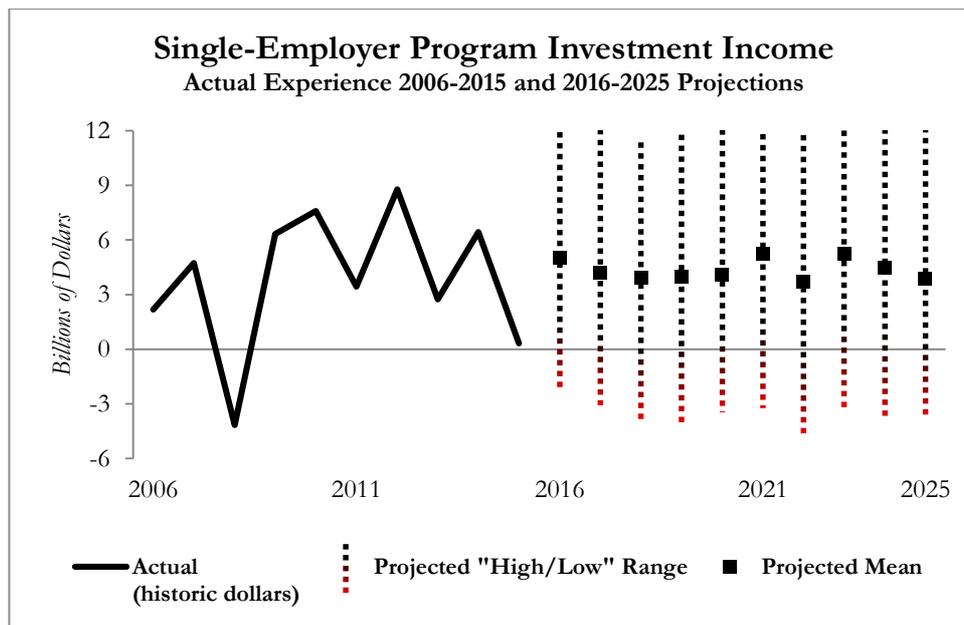
2015 Present Value (Dollars in billions at year end)	“High” (85th percentile)	Mean	“Low” (15th percentile)
PV PBGC SE Liabilities in FY 2025	\$144	\$106²⁹	\$69

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 15th and the 85th percentiles. The vertical bars in the chart remain similar in size. For FY 2016 (the first year of the projection) that pool of projected results ranges from an \$11.9 billion gain to a \$2.2 billion loss, expressed as present values discounted to 2015.

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.

²⁹ The mean present value discounted to 2015 is \$106 billion. The mean projected 2025 value is \$142 billion in nominal terms.

The table below summarizes projections for the total base of assets in the single-employer program by 2025, as well as for the amount PBGC will earn in investment income through FY 2025.

2015 Present Value <i>(Dollars in billions at year end)</i>	“Low” (15th percentile)	Mean	“High” (85th percentile)
PV PBGC SE Assets in FY 2025	\$78	\$109³⁰	\$140
PV PBGC SE Investment Income FY 2016-25	\$18	\$44	\$69

Within the results shown in the table (15th percentile to 85th percentile), there is a range of \$51 billion projected in the investment returns that PBGC will realize and a \$62 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.

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:

2015 Present Value <i>(Dollars in billions at year end)</i>	“Low” (15th percentile)	Mean	“High” (85th percentile)
PV PBGC SE Premiums FY 2016-25	\$31	\$45	\$62

The present value of premiums figures shown above are higher than the corresponding values last year. For example, the mean present value of premiums increased by 32.4 percent, and the 15th and 85th percentiles increased by 34.8 percent and 31.9 percent respectively. This 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 BBA 15 changes to funding requirements, and increases in premium rates from BBA 15.

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 2015 financial position as the starting point.

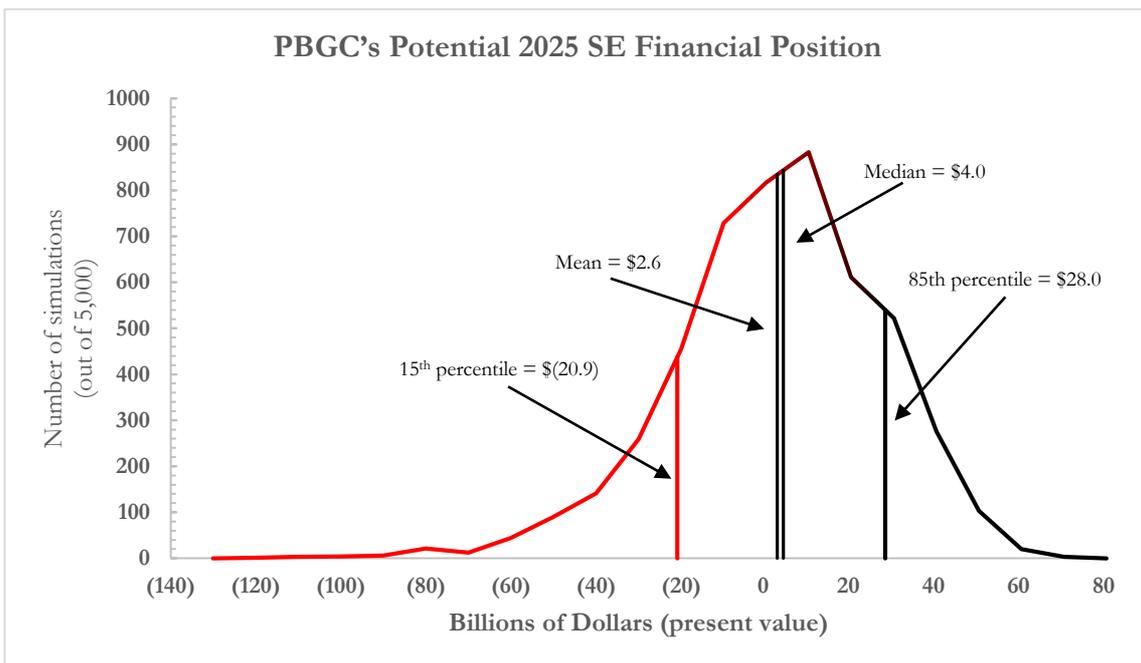
The financial position of the single-employer program as of September 30, 2015, was a deficit of \$24.1 billion. In a majority of simulations, the FY 2015 projections show an improvement; the median present value of the projected position in 2025 is a \$4.0 billion surplus. The mean present value of the projected position in 2025 is a slightly lower \$2.6 billion surplus. The table below shows the mean position, along with the values at the 15th and 85th percentiles.

³⁰ The mean present value discounted to 2015 is \$109 billion. The mean projected 2025 value is \$145 billion in nominal terms.

2015 Present Value (Dollars in billions at year end)	“Low” (15th percentile)	Mean	“High” (85th percentile)
PV FY 2025 PBGC SE Financial Position (deficit)/surplus	\$(21)	\$3³¹	\$28

Full distribution of results by financial position. Figure 14 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 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 2025 SE Financial Position



Vertical lines on the graph show the present value of PBGC’s projected 2025 net position at the 15th and 85th percentiles, and the mean and median values of projected net positions. The median (as mentioned above) is a \$4.0 billion surplus in FY 2025, while the mean is a \$2.6 billion surplus.

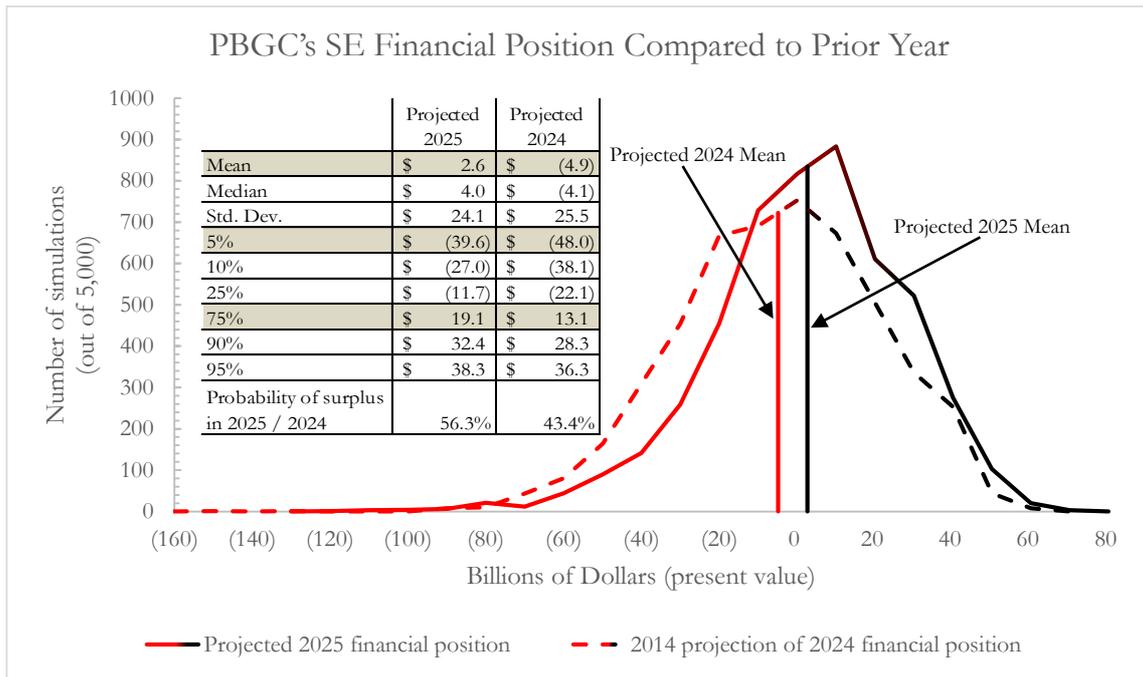
RECONCILING SE-PIMS RESULTS FROM 2014 TO 2015

Comparison of financial position with last year’s results. Figure 15 compares the 2014 projections of PBGC’s 2024 financial position with this year’s projections of the 2025 financial position. The peak of the distribution has

³¹ The mean present value discounted to 2015 is a \$2.6 billion surplus. The mean projected 2025 value is a \$3.3 billion surplus in nominal terms.

not moved much (the changes to the mean and median between the projections are relatively small), but the curve is taller in the middle in 2025. This means that the average results are about the same, but there is somewhat less variance around these averages, at least in the middle of the distribution. The mean projected position has improved by about \$7.5 billion, from a deficit of \$4.9 billion to a surplus of \$2.6 billion. The median projected position has similar improvement.

Figure 15 – SE Financial Position: Comparison to Prior Year



The following table explores the effects of each of the changes in our model and data on the projected 2025 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 2025 surplus, this is largely because the projected surplus is close 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, 2014 to 2015 Results		
Description of Change	Value of Change (\$ billions)	Net Position (\$billions)
Initial Position for Mean PV of 10-Year Projected Net Position from 2014 Projections Report		\$(4.9)
1. Expected change due to passage of time	\$1.6	\$(3.3)
2. Changes in economic conditions, updates to plan data and modeling and assumption updates	\$(3.9)	\$(7.2)
3. Changes to variable-rate premium projection assumptions	\$1.1	\$(6.1)
4. Changes to mortality assumptions	\$6.3	\$0.1
5. Effects of BBA 15 changes to premium rates, funding requirements and provisions for plan-specific mortality tables	\$2.5	\$2.6
Year 2025 Mean PV of Projected Net Position based on 2015 SE-PIMS Model		\$2.6

Expected Change Due to Passage of Time: The 2014 report projected the PBGC net position in 2024 and presented the results valued in 2014 dollars. To compare with the 2015 report, which projects to 2025 with values reported in 2015 dollars, the 2014 projection is rolled forward to project one additional year with one less year of present value discounting. The effect of the roll forward is an increase in the projected net position of \$1.6 billion.

Economic, Data, Modeling and Assumption Updates: Between FY 2014 and FY 2015, there were changes in the underlying economy, upon which all the SE-PIMS projections are based. For instance, earnings on pension plan assets in 2015 were lower than assumed and lower rates of return are being projected in coming years.³² Also, PBGC has made a number of changes to the SE-PIMS Model. Each individual change had a relatively modest effect, and some of the effects offset one another. The combined effect of these changes is a net decrease in the present value of the projected net position of \$3.9 billion.

Changes to variable-rate premium projection assumptions: Each year PBGC compares initial years of variable-rate premiums projected by PIMS with actual premium collections for the same period. To calibrate the PIMS premium projection, PBGC scales the premium projection to align the projection with the most recent observed collections. Variable-rate premium collections for the 2015 plan year significantly exceeded the initial PIMS projected value, leading PBGC to examine more data. In previous years, based on predominant plan methods, PBGC had assumed plans would use a (permissibly) smoothed interest rate for determining variable-rate premium underfunding, but for the 2015 plan year, the predominant plan method has switched to using a spot-value interest rate. After adopting the assumptions of spot-value interest rates from PIMS variable-rate premium projections, PBGC then proceeded to recalibrate the scaling factor for the projections. The effect of these changes is an increase in the projected net position of \$1.1 billion.

Changes to mortality assumptions: PBGC’s assumptions for mortality in plans it holds from claims include projections for future improvements to mortality. In 2015, the Society of Actuaries provided an updated scale for use in projecting future mortality improvements. PBGC’s assumptions were changed to implement the estimated

³² Across all simulations, PIMS projects a mean arithmetic rate of return on plan assets of 5.8 percent, corresponding to a mean geometric rate of return of 5.3 percent.

impact of this scale. This change decreases the projected values of the liabilities PBGC currently holds from previous claims and also decreases the projected values of future claims. PBGC also assumes a future statutory change in the mortality assumptions plans are permitted to use in determining funding requirements and variable-rate premiums. This change, assumed to take effect in 2018, increases statutory funding requirements (thereby decreasing the projected value of future claims) and increases the projected value of future premiums. The net effect of these mortality assumption updates is an increase in the projected net position of \$6.3 billion.

Changes to premium rates and funding requirements from BBA 15: Increases to premium rates, provided for by BBA 15 result in increases to projected values of future premiums. Changes to funding requirements under BBA 15³³ result in increases to projected claims but also offsetting increases to projected variable premiums. Provisions enabling plans to use plan specific mortality rates result in increases in projected claims and decreases in projected premiums. In the aggregate, the changes increased the mean present value of the projected net position by \$2.5 billion.

In total, the present value of the single-employer program mean projected net position increased from a \$4.9 billion deficit to a \$2.6 billion surplus.

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.

PIMS historically did 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. We have begun to implement modeling of lump sum calculations in limited circumstances (PIMS reflects lump sum payment of benefits to workers leaving active employment from a cash balance plan that is at least 80 percent funded). However, the use of annuity buyouts and lump sums by companies seeking to transfer risk for significant portions of their liabilities is not currently modeled 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 continue investigating this trend.

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

³³ Among other provisions, BBA 15 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 2020, 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.

than in the base projection, this would improve the mean present value of the 2025 single-employer net position by \$6.0 billion and improve the likelihood of a surplus in 2025 from 56.3 percent to 67.8 percent. Discount rates 50 basis points lower would increase the mean present value of the deficit by \$6.7 billion and reduce the likelihood of a surplus in 2025 to 45.9 percent.

STATEMENT OF ACTUARIAL OPINION

We, the undersigned, certify that this actuarial evaluation has been prepared in accordance with generally accepted actuarial principles and practices and, subject to the disclaimers herein, to the best of our knowledge, fairly reflects the possible distribution of projected outcomes relative to the operations and status of the Corporation's single-employer and multiemployer plan insurance programs as of September 30, 2015, after reflecting estimated effects of BBA 15 on single-employer plans.

In preparing this evaluation, we have relied upon information provided to us regarding plan and participant data, plan sponsor financial information, historic asset yield and bankruptcy information and other matters. We have checked this information for reasonableness as appropriate based on the purpose of the evaluation; the responsibility for the source information obtained from Forms 5500 and elsewhere rests with the preparers of these data.

Subject to the disclaimers herein, in our opinion,

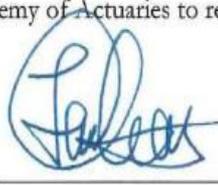
- (1) The techniques and methodology used are generally acceptable within the actuarial profession.
- (2) The assumptions used are appropriate for the purposes of this report.
- (3) The resulting evaluation represents a reasonable estimate of the possible distribution of projected outcomes relative to the operations and status of these programs.

The undersigned are available to discuss the material in this report.

I, Christopher M. Bone, am the Director of PBGC's Policy, Research, and Analysis Department. I am a Member of the American Academy of Actuaries, a Fellow of the Society of Actuaries and an Enrolled Actuary. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.

I, Jensen Chan, am the Supervisory Actuary at PBGC who directly oversees PIMS. I am a Member of the American Academy of Actuaries, a Fellow of the Society of Actuaries and an Enrolled Actuary. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.


Christopher M. Bone 6/16/16

 6/16/16

Christopher M. Bone

Date

Jensen Chan

Date

Director, Policy, Research and Analysis Department, PBGC

Manager, Pension Insurance Modeling Division, PBGC

Member, American Academy of Actuaries

Member, American Academy of Actuaries

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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 2015). 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.³⁴ 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, 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 10 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.

³⁴ 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 FY 2015, 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.

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.³⁵

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 2013 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 PBGC collected additional data beyond the general information available on the Form

³⁵ 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.

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 \$52.3 billion deficit in the case of FY 2015) for currently insolvent and probable plans. The starting net position is modeled using a sample of 29 insolvent plans, 32 terminated probable plans, and 54 (including 21 small booked plans) ongoing probable plans. This is a change from 27, 29, and 44 plans, respectively, used in FY 2014. In addition, ME-PIMS starts with data on the funded status of 180 non-booked plans (compared to 184 in 2014) 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 FY 2014 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 the same as FY 2014. 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 27 sample plans total in the three MPRA groups; the weights are 1.00, 1.059 and 6.24 for the large, medium and small size plans, respectively. There are 9 tiers of plans in the "others" groups, 2 for the large plans, 4 for the medium plans and 3 for the small plans. The weights for the tiers range from 1 for the tier of largest plans to 15.69 for the tier representing the smallest plans.

Under the new booking procedures (implemented in FY 2014) 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."³⁶ 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, 1.389 in FY 2015, 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

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 Model also reflects potential adoption of suspension of benefits and partition by plan sponsors of critical and declining plans, based on the financial status of each sample plan along each modeled economic path. Plans that are critical and declining along a particular path are assumed to make a one-time decision whether or not to apply for suspensions and partitions based on the assumptions regarding partition and suspension probabilities.

To determine whether a plan will need partition assistance along a particular economic path, ME-PIMS uses the imputed plan census to calculate benefits at the maximum suspension level (110% of PBGC's guarantee, with additional protections for aged and disabled participants).³⁷ If this reduction is sufficient to achieve long-term

³⁶ The revised methodology is discussed on Page 83 of PBGC's 2014 Annual Report, available at <http://www.pbgc.gov/about/reports/ar2014.html>

³⁷ This calculation uses imputed census data. A percentage of the population is assumed to be disabled.

solvency, the plan election will be for suspension-only or no changes. Otherwise, the plan is further processed to determine whether an election for suspension plus partition will be modeled.

For a suspension only candidate plan, the maximum suspensions are adjusted using aggregate cash flows to calculate the benefit levels just high enough to achieve long-term solvency. For a suspension plus partition candidate plan, the benefits are reduced to the maximum suspension level and the amount of partition assistance required is determined so as to maintain solvency. If the present value of partition assistance required is less than the present value of future assistance by more than a de minimis amount, assuming no partition occurs, the plan is assumed to pass MPRA's expected long-term loss test (see ERISA §4233(b)(3)(A)). Should the plan meet these requirements, it is then modeled as electing between suspension and partition or no changes.

ME-PIMS does not currently model other forms of financial assistance such as facilitated merger assistance, since they are subject to similar limits on plans except the requirement for maximum suspensions. Given MPRA's impairment tests (see ERISA §4233(b)(4) and §4231(e)(2)(c)) the effect on PBGC outcomes is likely similar whether financial assistance is provided through facilitated merger or partition.

The 2015 version of ME-PIMS includes significant new modeling around the anticipation of actual implementation of benefits suspensions and partitions for individual plans. These changes also delay the assumed date of benefit suspensions by one year (from FY 2016 to FY 2017) and allow individual plan election rates to be implemented.

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 imputed on a basis that varies by age, service, form of benefit (modeling life annuities and joint and survivor annuities), gender, and benefit amount. 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 to generate each plan's initial inactive census.

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 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 MP2015 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 endangered³⁸ 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 2015 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

³⁸ 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))

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 2015 Projections Report reflects additional assumptions to model the effects of MPRA (the alternate assumption in the 2014 Projections Report):
 - Suspension only: For plans that can suspend benefits and remain solvent without requiring partition assistance, ME-PIMS assumes that one large plan has a 0 percent likelihood of suspending benefits and that the other suspension-only eligible plans will do so 30 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 10 percent likelihood that a plan that could be successfully partitioned under the standard would actually be approved for partition.
 - These assumptions differ from the assumed rates used as the primary assumption for modeling suspension and partition for the FY 2014 Projections Report. Reflecting emerging experience, we believe the alternate rates provide a more reasonable view of the uncertainties and volatility of the immediate outlook.

- **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 2015 version of ME-PIMS uses the same assumptions³⁹ as used in the 2014 version of the Model except as detailed below:

- **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

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

valuation year using the MP 2015 scale, replaces the RP2014 Combined Healthy male and female mortality tables projected with using the MP2014 scale the year of valuation plus 13 years. Up-to-date mortality tables enable the consistent projection of interest factors and long-term interest rates in the economy in PIMS.

- **Assumptions used to Facilitate Suspension and Partition:** The assumptions shown differ from those used in 2014 to support the modeling of suspensions and partitions particularly for the largest troubled plan. For that plan, whose initial application for benefit suspensions was denied and which has announced it will not reapply, the assumption has been revised from 100% likelihood to 0%. For smaller plans, the revised assumptions were used as an alternate disclosure basis last year. We believe the revised assumptions better reflect emerging experience under the program.

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 PBGC'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 450 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 450 actual plans, sponsored by more than 350 firms, which represent about half of PBGC's insurance exposure in the single-employer defined benefit system measured from the 2013 Form 5500 filings (the most recent year of complete Form 5500 filing data available). SE-PIMS also reflects any available contributions from later years' filings that are available when the initial results are generated. 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 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.

SE-PIMS — Methodology

The SE-PIMS sample of more than 350 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 2013 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, and then extrapolates the results to the universe of single-employer plans.

Funding rules and PBGC premiums under current law (as amended through December 2015) 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.

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).⁴⁰ 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.
 - 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

⁴⁰ 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.

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. The bankruptcy risks generated for PIMS are compared to market indices and the largest outliers have their modeled risk recalibrated to equal the mean of the market estimate of bankruptcy risk for their class of bonds. Bankruptcy probability formulas generally do not vary by industry.⁴¹ 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.

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 underfunding at termination, the RP2014 Combined Healthy male mortality tables with a static projection of 13 years beyond the applicable valuation year using the MP2015 scale. For purposes of determining statutory minimum funding requirements beginning in 2018, we modeled updates to the table by changing our assumption to the RP-2014 table projected on a static basis for 10 years beyond the valuation date using scale MP-2015.
- **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 BBA 15 (new in 2015) and that any credit balance remaining will be used to the maximum extent permitted

⁴¹ 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.

until the balance is completely depleted. Updated actual 2014 contributions are reflected where available as of the data compilation date.

- **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:** SE-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. Premiums are assumed paid by the employer.
- **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. The adjustment to assets also reflects increasing tendencies for sponsors to reduce underfunding through extra contributions as variable premium rates increase. Variable-rate premiums are further scaled to match recent experience. This report reflects a one-year delay in the portion of asset increase related to premium rates 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 2015 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 <http://www.pbgc.gov/documents/1998databook.pdf>.)

The 2015 version of SE-PIMS recognizes the following changes in assumptions from those used in the 2014 version of the Model.⁴²

- **Mortality Table used to determine 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 MP2015 scale, replaces the MP2014 scale used in the FY 2014 model. 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 minimum funding and variable rate premium requirements:** For purposes of determining statutory minimum funding requirements beginning in 2018, we modeled updates to the table by changing our assumption to the RP-2014 table projected on a static basis for 10 years beyond the valuation date using scale MP-2015. The revised table would also apply to variable rate premium determinations. The change in assumption is anticipated to better model the statutory process for updating the table, now that a revised table has been issued.
- **Assumed basis for determining underfunding for Variable Rate Premium Purposes:** For purposes of determining variable rate premium collections, we changed the methodology we assumed plan sponsors would apply from a smoothed interest rate to a spot rate interest rate basis. The change was based on analysis of recent premium collections.
- **Variable-Rate Premium Adjustments for BBA 15 Changes to Funding Requirements:** The adjustments to projected variable-rate premiums for sponsor tendencies to contribute more than minimum required amounts (described above) act only in relation to the levels of assets PIMS otherwise projects while assuming contributions at minimum required levels. That is, they do not directly model other factors affecting sponsors’ contribution decisions (such as cash flow management, incentives to reduce variable-premium payments, etc.). Provisions of BBA 15 reducing plans’ future funding requirements do not affect the other factors influencing contribution decision. Since those factors are not directly reflected in the variable-premium adjustment, the adjustments are revised, for the 2015 projection, to reflect their effects. The revisions limit increases in mean projected variable-premiums to levels that maintain the same ratio of projected variable-premium to projected claims that would be projected without changes to future funding requirements.

⁴² 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.

SAMPLE STATISTICS FROM FY 2015 RUNS IN ME-PIMS AND SE-PIMS

The following tables show selected output statistics from runs of ME-PIMS and SE-PIMS for this (2015) report. These statistics are specific to the Model runs for this report.

Table 1

**Arithmetic Means, Standard Deviations and Correlations of Key Financial Market Values FY 2015
Single-Employer and Multiemployer Model Runs
(across 2016-2025 for 500 economic scenarios)**

	Long-Term Treasury Yield	Return on 30-year Treasury Bonds	Stock Market Return
Mean	3.1%	2.9%	8.8%
Standard Deviation	1.1%	8.4%	20.3%
Correlations:			
Long-Term Treasury Yield	1.00	-0.30	-0.01
Return on 30-year Treasury		1.00	0.20
Stock Market Return			1.00

Table 2

**Arithmetic Means and Standard Deviations of Market Rates Derived From Projected Long-Term
Treasury Yields in FY 2015 Single-Employer and Multiemployer Model Runs**

	Long-Term Corporate Rate	Inflation Rate	Wage, Salary and Flat Benefit Growth Rate
Mean	4.2%	2.9%	4.6%
Standard Deviation	1.1%	1.1%	1.1%

Table 3

**Projected Plan Returns⁴³
FY 2015 Single-Employer and Multiemployer Model Runs**

Arithmetic Mean	5.8%
Geometric Mean	5.3%
Standard Deviation	10.3%

⁴³ 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.

Table 4

**Projected Annual Bankruptcy Probabilities⁴⁴
FY 2015 Single-Employer Model Runs**

Arithmetic Mean	0.7%
Standard Deviation	1.8%

Table 5a

**Annual Probability of Plans' Projected Mass Withdrawal FY 2015
Multiemployer Model Runs
No Future MPRA Suspensions/Partitions**

Arithmetic Mean	3.6%
Standard Deviation	8.8%

Table 5b

**Annual Probability of Plans' Projected Mass Withdrawal FY 2015
Multiemployer Model Runs
Assuming MPRA Election Rates**

Arithmetic Mean	3.3%
Standard Deviation	8.4%

Table 6a

**Annual Rate of Plans' Projected Insolvency FY 2015
Multiemployer Model Runs
No Future MPRA Suspensions/Partitions**

Arithmetic Mean	1.50%
Standard Deviation	0.70%

Table 6b

**Annual Rate of Plans' Projected Insolvency FY 2015 Multiemployer
Model Runs
Assuming MPRA Election Rates**

Arithmetic Mean	1.40%
Standard Deviation	0.70%

⁴⁴ 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.