



Contribution Analysis for U.S. Multiemployer Pension Plans

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Introduction and Executive Summary

Funding multiemployer pension plans (MEPP) involves many intricate factors, including collective bargaining, complex funding regulations, investment returns, discount rates and other actuarial assumptions. Regardless of the intricacies, the goal is to provide the plan with enough assets to pay participants' benefits when they come due.

The Society of Actuaries (SOA) is pleased to provide an update to its longitudinal study of contributions among MEPPs in the United States. The study compares employer contributions to benchmarks for measuring whether pension plan contributions—absent other influences—reduced unfunded liabilities or met other benchmarks, such as regulatory requirements. Because few plans involve employee contributions, for convenience the authors omit the adjective “employer” throughout this report.¹

This study presents results for 1999–2016 plan years, as well as preliminary results for 2017, based on a partial year of reporting. Analysis is based on publicly available Department of Labor Form 5500 filings as of Dec. 6, 2018. Data for 2016 includes approximately 1,200 plans covering roughly 10 million participants and roughly 200,000 employers. Data for 2017 show about 55% of plans reporting, representing roughly 70% of total MEPP liabilities.²

Highlights of the update include:

- In 2016, 83% of plans that covered 69% of all MEPP participants received enough contributions to reduce their unfunded liabilities as measured with funding discount rates—down from 86% of plans covering 78% of participants in 2015. The decrease stemmed in part from increased unfunded liabilities in 2016. Preliminary results for 2017 indicate the percentage may bounce back, partly because better-than-expected investment returns during 2016 contributed to decreased unfunded liabilities in 2017.
- Of the 83% of plans whose contributions were sufficient to reduce unfunded liabilities in 2016, half of them were on pace to eliminate unfunded liabilities within 8.3 years. Eighty percent of them were funding at a pace to eliminate unfunded liabilities within 16.8 years, and 90% of them were funding at a pace of 23.4 or fewer years.
- The participant-weighted distribution showed that larger plans tended to be on a longer funding pace than smaller plans. In 2016, half of MEPP participants were in plans with funding paces of 12.1 or fewer years, 80% of participants were in plans with funding paces up to 20.3 years, and 90% of participants were in

¹ The authors' data source includes withdrawal liability payments in employer contributions without differentiation.

² Refer to the Data and Methods for further information about Form 5500 filing dates.

plans with funding paces of as long as 33.6 years. The 2016 funding paces were roughly 17% longer than in 2015.

- In 2015 and 2016, over 80% of all MEPPs received more contributions for 2015 and 2016 than the minimum required by federal law. However, in the same years, 22% and 31%, respectively, of all MEPPs received insufficient contributions to reduce existing unfunded liabilities. Minimum required contributions may fall short of reducing unfunded liabilities primarily because regulations reduce the requirement by the “Credit Balance,” a mechanism for recognizing that a plan’s past contributions were more than the minimum required.³
- Current Liabilities are computed with much lower interest rates⁴ and compared to the market value of assets. During 2016, 7% of plans received enough contributions to maintain or reduce their existing unfunded Current Liabilities, about the same percentage as both 2014 and 2015.

Contribution Ratios Defined

This analysis considers the ratio of the contributions that a plan received against a plan-specific benchmark. A ratio that exceeds 1.0 means that the contribution exceeded the benchmark, while a ratio less than 1.0 means the contribution fell short of the benchmark. When a plan does not have an unfunded liability, it has neither a benchmark nor a contribution ratio.

This study considers four benchmarks that represent the contribution needed to:

- Reduce the unfunded liability (normal cost plus interest on the unfunded liability),⁵
- Eliminate the unfunded liability in 15 years (normal cost plus 15-year amortization of the unfunded liability),
- Satisfy the minimum required contribution (MRC),⁶ and
- Satisfy the MRC before recognizing any Credit Balances.⁷

The contribution ratios for reducing the unfunded liability and funding within 15 years are computed at two discount rates, reflecting different perspectives for multiemployer pension plan liabilities:

³ Internal Revenue Code §§431-432 and accompanying regulations set forth funding requirements for multiemployer pension plans. Credit Balances are a mechanism by which plans may recognize that past contributions exceeded minimum requirements. Credit Balances affect minimum funding requirements in the short term, but they do not alter the fact that the plan must ultimately fund its unfunded liability. The Pension Protection Act of 2006 put in place supplemental mechanisms that generally strengthen multiemployer pension plan funding rules. The SOA does not intend this benchmark as commentary on the appropriateness of Credit Balances or any of the multiemployer pension plan funding rules.

⁴ Discount rates used to compute Current Liability are based on an average of Treasury rates, which roughly approximates a risk-free rate. In addition, Current Liability reflects prescribed mortality assumptions that were developed largely from single employer (corporate) plan experience. Internal Revenue Code §431(c)(6)(D) governs the assumptions and methods used to compute Current Liability for multiemployer plans.

⁵ For contribution ratios, unfunded liabilities are computed using the unit credit actuarial cost methods and the market value of assets. Using these methods for contribution ratios is not intended to provide commentary on their appropriateness for funding multiemployer plans or for any other purpose.

⁶ Internal Revenue Code §§431-432 and accompanying regulations set forth funding requirements for multiemployer pension plans.

⁷ This study includes as a benchmark the MRC before recognizing any Credit Balances as a partial explanation of how plans with significant unfunded liabilities might have a very small or no MRC. Credit Balances are a mechanism by which plans can recognize that past contributions exceeded minimum requirements. The Pension Protection Act of 2006 put in place supplemental mechanisms that generally strengthen multiemployer pension plan funding rules. The SOA does not intend this benchmark as commentary on the appropriateness of Credit Balances or any of the multiemployer pension plan funding rules.

- Funding discount rate, which typically represents a long-term average expected return on plan assets, and
- Current Liability discount rate, which uses an average of 30-year Treasury rates, as prescribed by law.⁴

Contribution Ratios: Funding Discount Rate

Figure 1 illustrates by year the percentage of plans with contribution ratios that fall within given ranges when liabilities are measured using funding discount rates. Because Form 5500 data are plan-level values, the plan-weighted distribution in Figure 1 might also be considered an unweighted distribution. Figure 2 shows participant-weighted distributions of the same contribution ratios. Participant-weighted distributions take into account the size of plans; larger plans comprise a bigger share in the distribution than smaller plans. Refer to Figure 5 for the number of plans and participants included in analysis each year; refer to Figure 9 and Figure 10 for information about the discount rates.

Figure 1
PLAN-WEIGHTED CONTRIBUTION RATIO DISTRIBUTIONS USING FUNDING DISCOUNT RATES

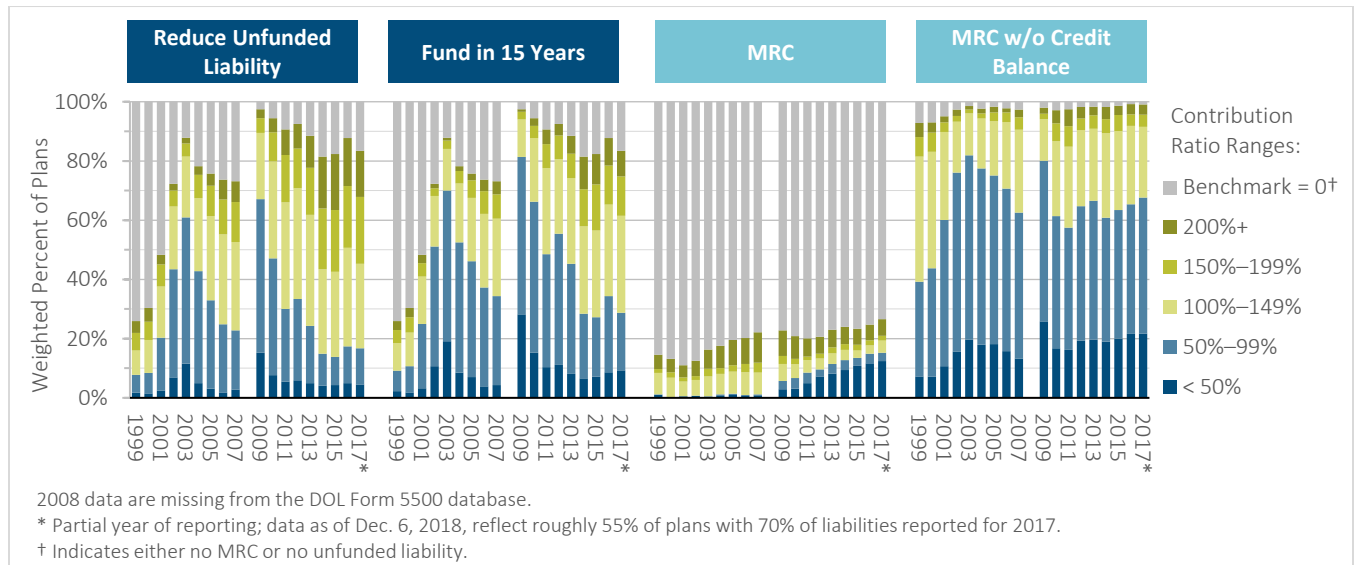
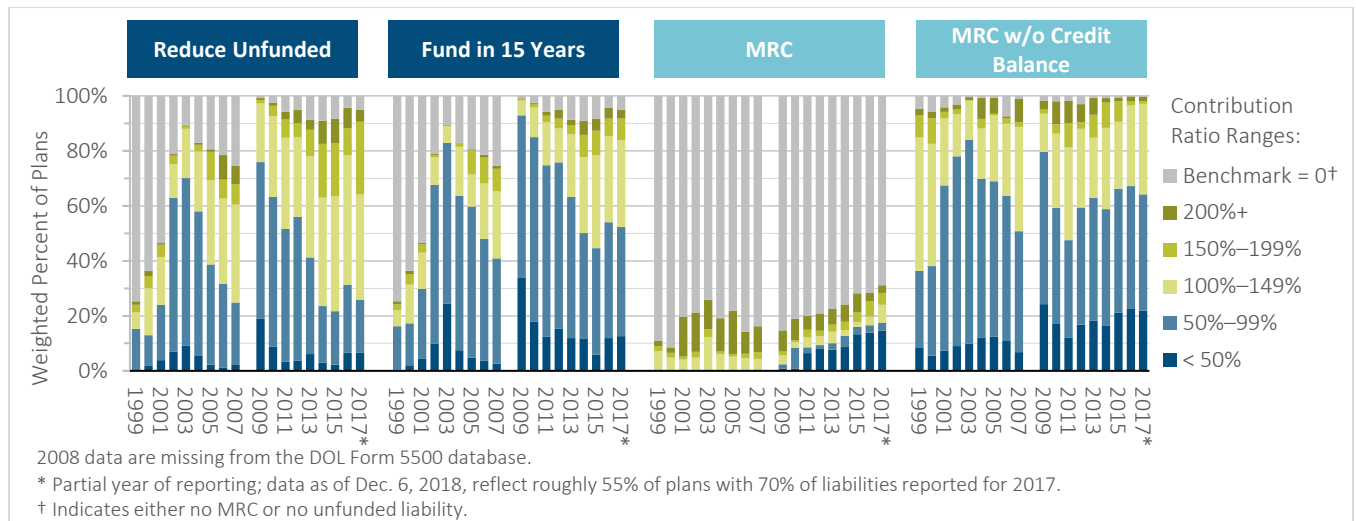


Figure 2
PARTICIPANT-WEIGHTED CONTRIBUTION RATIO DISTRIBUTIONS USING FUNDING DISCOUNT RATES



From 2009 through 2015, a generally increasing percentage of plans received sufficient contributions to reduce their unfunded liabilities as measured with funding discount rates. In 2009, essentially at the bottom of the market crash when unfunded liabilities were especially high, contributions for 33% of MEPPs covering 24% of MEPP participants were enough to reduce unfunded liabilities. Those percentages generally increased to 86% of plans covering 78% of participants in 2015 before dropping to 83% of plans covering 69% of participants in 2016.

Fewer plans met their 15-year funding-pace benchmarks. In 2009, contributions of only 19% of plans covering 7% of MEPP participants met a 15-year funding-pace benchmark. By 2015, 73% of plans covering 55% of participants met their benchmarks, and in 2016, 66% of plans covering 46% of participants met their benchmarks.⁸ The Funding Paces section of this report examines funding paces in further detail.

Preliminary results for 2017, based on a partial year of reporting, indicate a larger percentage of plans meeting both of these benchmarks, in part because unfunded liabilities decreased in 2017.

In general, most MEPP participants were in plans whose contributions greatly exceeded the MRC. In 2015, contributions of 86% of plans covering 84% of MEPP participants exceeded the MRC. These figures fell only slightly in 2016, to 85% of plans covering 83% of participants.

In fact, the MRC is zero for most plans, even though most of those plans have unfunded liabilities. This situation can happen because federal law reduces minimum contribution requirements by the plan's Credit Balance. Credit Balances are a means for plans to recognize that past contributions exceeded minimum requirements. While Credit Balances may reduce immediate contribution requirements, they do not change the fact that the plan must ultimately fund all its benefits.⁹

As a conservative and perhaps oversimplified metric, the last metric in Figure 1 and Figure 2 considers the MRC if regulations did not recognize when past contributions exceeded minimum requirements. In other words, the metric is the MRC if the Credit Balance were completely ignored. Contributions would have exceeded this metric for 2016 for 35% of plans that covered 33% of MEPP participants.

Contribution Ratios: Current Liability Discount Rate

The authors also compared contributions to benchmarks computed from Current Liability, which uses much lower discount rates.¹⁰ Figure 3 shows the distribution of plans whose contributions met benchmarks on a Current Liability basis, and the participant-weighted distribution of the same contribution ratios appears in Figure 4.

Across 2014–2016, a fairly constant 18% of plans covering about 7% of MEPP participants received enough contributions to reduce the existing unfunded Current Liability. Roughly 3% of plans covering less than 1% of

⁸ Percentages include plans that did not have an unfunded liability.

⁹ Internal Revenue Code §§431-432 and accompanying regulations set forth funding requirements for multiemployer pension plans. The Pension Protection Act of 2006 put in place supplemental mechanisms and processes that generally strengthen multiemployer pension plan funding rules and may supersede MRC rules. This study includes as a benchmark the MRC before recognizing any Credit Balance as a partial explanation of how plans with significant unfunded liabilities might have a very small or no MRC. The SOA does not intend this benchmark as commentary on the appropriateness of Credit Balance rules or multiemployer pension plan funding rules in general.

¹⁰ Discount rates used to compute Current Liability are based on an average of Treasury rates, which roughly approximates a risk-free rate. In addition, Current Liability reflects prescribed mortality assumptions that were developed largely from single employer (corporate) plan experience. Internal Revenue Code §431(c)(6)(D) governs the assumptions and methods used to compute Current Liability for multiemployer plans.

participants received enough contributions to meet a 15-year funding pace as measured with Current Liability discount rates.

Preliminary results for 2017 using funding discount rates indicated increased percentages. But when using Current Liability discount rates, slightly fewer plans covering slightly fewer participants are meeting the benchmarks. The interest rates used to compute Current Liabilities were lower in 2017 than in 2016, which resulted in greater liabilities. Refer to Figure 9 and Figure 10 for further information about the discount rates.

Figure 3
 PLAN-WEIGHTED DISTRIBUTIONS OF CONTRIBUTION RATIOS USING CURRENT LIABILITY DISCOUNT RATES

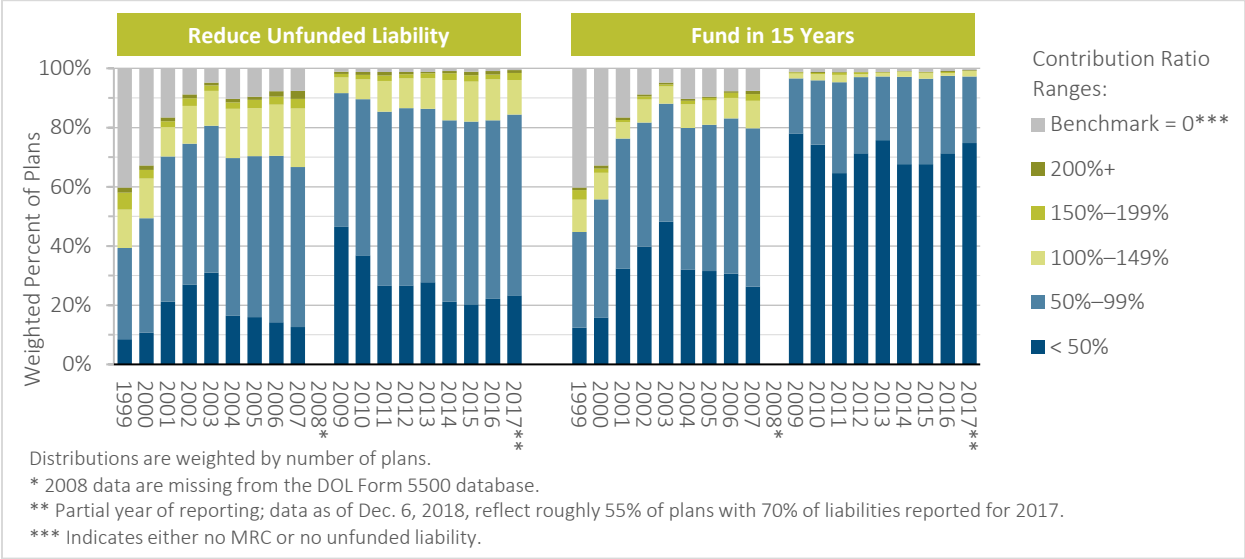
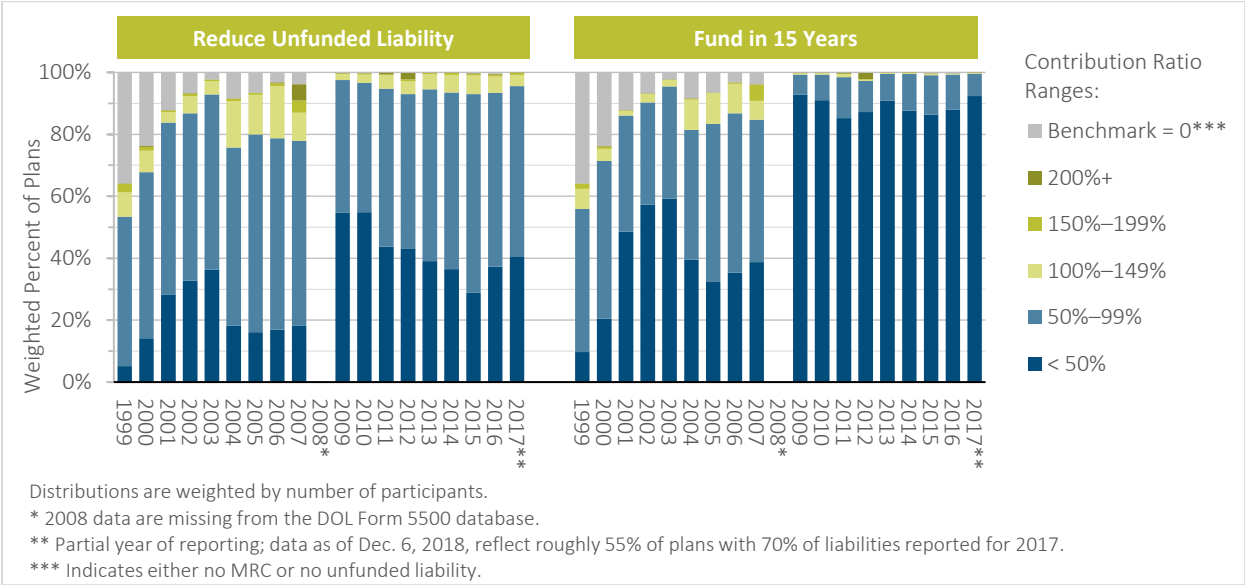


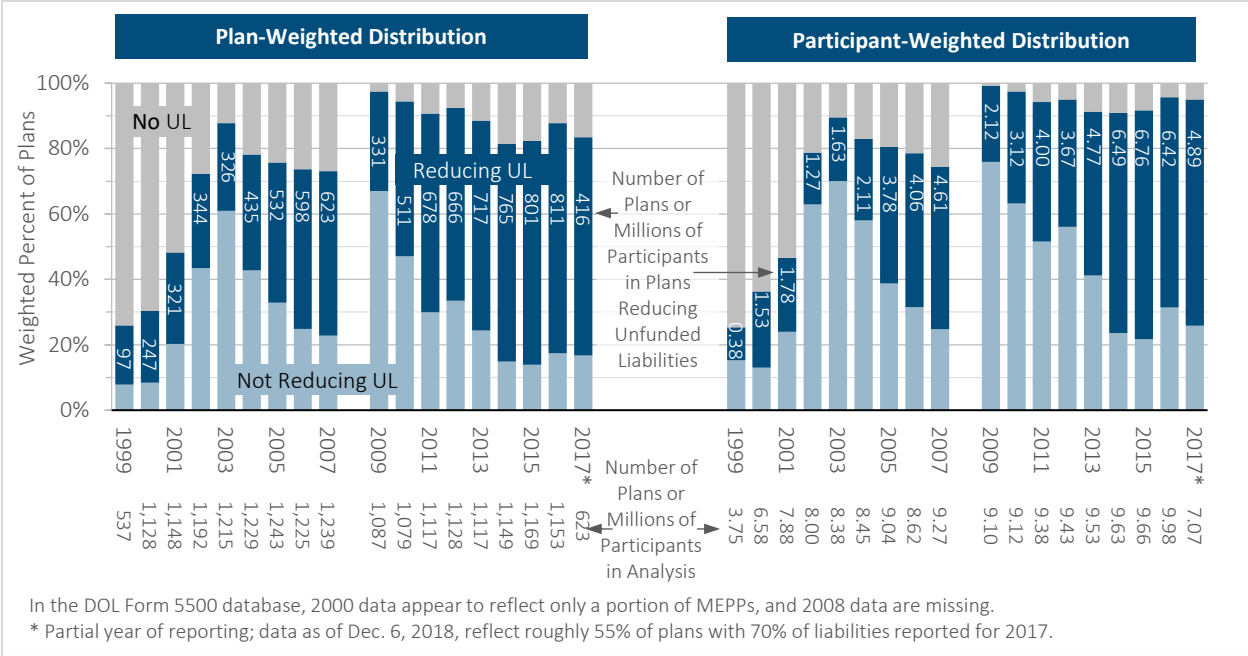
Figure 4
 PARTICIPANT-WEIGHTED DISTRIBUTIONS OF CONTRIBUTION RATIOS USING CURRENT LIABILITY DISCOUNT RATES



Funding Paces

Using funding discount rates, Figure 1 and Figure 2 showed that some plans' contributions were sufficient to reduce unfunded liabilities. This section of the study looks more closely at such plans. For context, Figure 5 replicates in simpler form the distributions of contribution ratios for reducing unfunded liabilities that were presented in Figure 1 and Figure 2. Figure 5 also shows for each year the number of plans and participants included in the analysis, as well as the number of plans and participants in those plans whose contributions were sufficient to reduce unfunded liabilities; the numbers varied significantly from year to year.

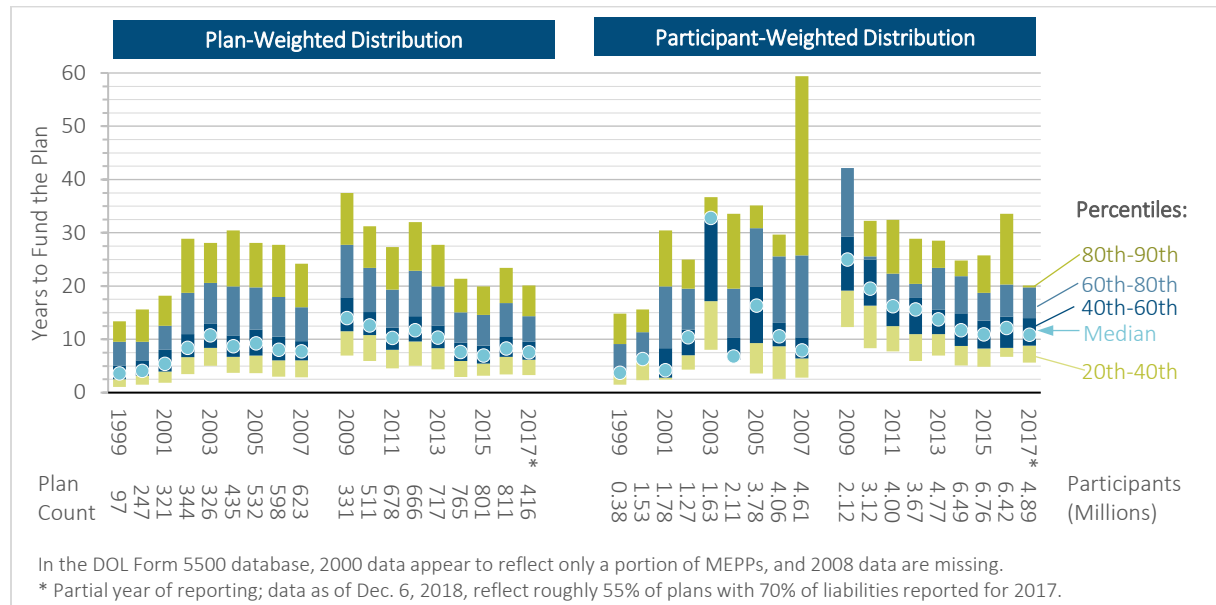
Figure 5
DISTRIBUTIONS OF CONTRIBUTION RATIOS FOR REDUCING UNFUNDED LIABILITY USING FUNDING DISCOUNT RATES (FROM FIGURE 1 AND FIGURE 2)



Among the plans that received contributions sufficient to reduce their unfunded liabilities, the authors estimated the pace at which plans were funding. The authors' estimates use the same type of approach as contribution ratios. In other words, the authors assume that each plan's normal cost and contributions remain flat for the complete funding period. Figure 6 shows the results; Figure 6 shows only the plans whose contributions reduced their unfunded liability (i.e., plans that appear as dark blue in Figure 5).

In 2000, 247 MEPPs covering 1.53 million participants received contributions sufficient to reduce their unfunded liabilities. Among those 247 plans, 80% were on pace to eliminate their unfunded liabilities within 9.5 or fewer years, and 90% were on a pace of 15.6 or fewer years. Eighty percent (80%) of participants in those 247 plans were in plans that were funding on a pace of 11.3 or fewer years, and 90% of participants were in plans on a pace of 15.6 or fewer years. In 2000, the median plan was on a 4.1-year funding pace, and the participant-weighted median funding pace was a bit higher at 6.3 years.

Figure 6
DISTRIBUTION OF FUNDING PACES USING FUNDING DISCOUNT RATES FOR PLANS REDUCING UNFUNDED LIABILITIES



In 2009, as one might expect after the 2008 market crash, fewer plans were reducing unfunded liabilities, and their funding paces had lengthened. In general, the plans that had the longest funding paces in 2007 were no longer receiving sufficient contributions to reduce their increased unfunded liabilities in 2009. Half of the 331 plans reducing their unfunded liabilities had a funding pace of 14.0 or fewer years. Eighty percent (80%) of plans were funding at a pace of 27.7 or fewer years, and 90% of plans were funding over 37.5 or fewer years. The participant-weighted distribution shows that some of the largest of the 331 plans were on a funding pace that exceeded 40 years: At least 20% of participants among the 331 plans were in plans with a funding pace of 42.2 years or longer, and the median funding pace was 25.0 years. Note that in the participant-weighted distribution for 2009, the funding paces at the 80th and 90th percentiles are the same (42.2 years).

From 2009 to 2015, the number of plans whose contributions reduced their unfunded liabilities mostly increased, and their contributions were funding the plans faster. In 2015, half of the plans were on a funding pace of 8.2 or fewer years, 80% of plans were on track to fund within 14.6 years, and 90% of plans were on track to eliminate their unfunded liabilities in 19.9 or fewer years. The participant-weighted distribution showed that larger plans tended to be on a longer funding pace than smaller plans. The corresponding participant-weighted figures were 10.9 years, 18.8 years and 25.8 years, respectively.

In 2016, the number of plans reducing their unfunded liabilities increased, but funding paces also generally slowed. Half of the 811 plans that reduced unfunded liabilities in 2016 had a funding pace of 8.3 or fewer years; 80% of plans had a pace of 16.8 or fewer years, and 90% were funding at a pace of 23.4 or fewer years. The corresponding funding paces in the participant-weighted distributions were significantly longer at 12.1 years, 20.3 years and 33.6 years, respectively.

Aggregate Contributions and Benchmarks

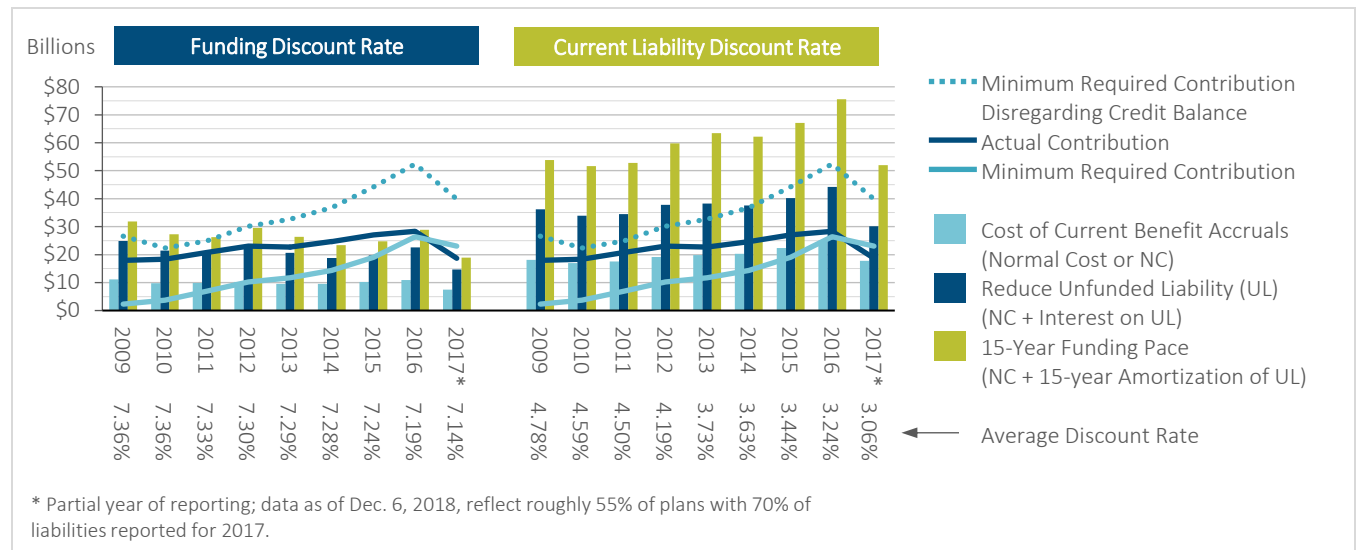
Taking a broader view, Figure 7 shows total contributions across all plans against their total benchmarks. Note that unweighted average discount rates are shown beneath the horizontal axis. Using funding discount rates, actual contributions in 2014 and 2015 exceeded 15-year funding pace benchmarks and significantly exceeded the MRC. In 2016, actual contributions exceeded the MRC and roughly equaled the aggregate 15-year funding pace benchmark.

Through 2015, the aggregate MRC fell slightly short of the aggregate benchmark required to reduce unfunded liabilities. In 2016, the aggregate MRC exceeded the aggregate amount required to reduce unfunded liabilities.

Using the lower Current Liability discount rates that roughly approximate a risk-free rate, aggregate actual contributions were enough to cover the aggregate cost of current benefit accruals but fell significantly short of aggregate benchmarks for reducing unfunded liabilities.¹¹

Further, Figure 7 shows that if regulations disregarded Credit Balances and did not otherwise provide a means to recognize past contributions in excess of those required, since 2012, aggregate minimum required contributions would have been sufficient to fund aggregate funding-discount-rate unfunded liabilities within 15 years.

Figure 7
AGGREGATE CONTRIBUTIONS AND BENCHMARKS



Aggregate Liabilities and Funded Status

Although some plans are in good financial condition, the multiemployer pension system carries significant unfunded liabilities. Figure 8 shows aggregate funded status on three bases:

- Liabilities as computed for minimum funding standards with the actuarial value of assets. The actuarial cost methods used to compute liabilities vary by plan, and asset values may reflect actuarial smoothing techniques that recognize market gains and losses over several years.
- Unit Credit (UC) liabilities computed on the discount rate used for minimum funding standards with the market value of assets. This is the basis from which the authors developed benchmarks that use funding discount rates.

¹¹ Discount rates used to compute Current Liability are based on an average of Treasury rates, which roughly approximates a risk-free rate. In addition, Current Liability reflects prescribed mortality assumptions that were developed largely from single employer (corporate) plan experience. Internal Revenue Code §431(c)(6)(D) governs the assumptions and methods used to compute Current Liability for multiemployer plans.

- Current Liability as prescribed by federal law with the market value of assets.¹² This is the basis the authors used to compute benchmarks that use Current Liability discount rates.

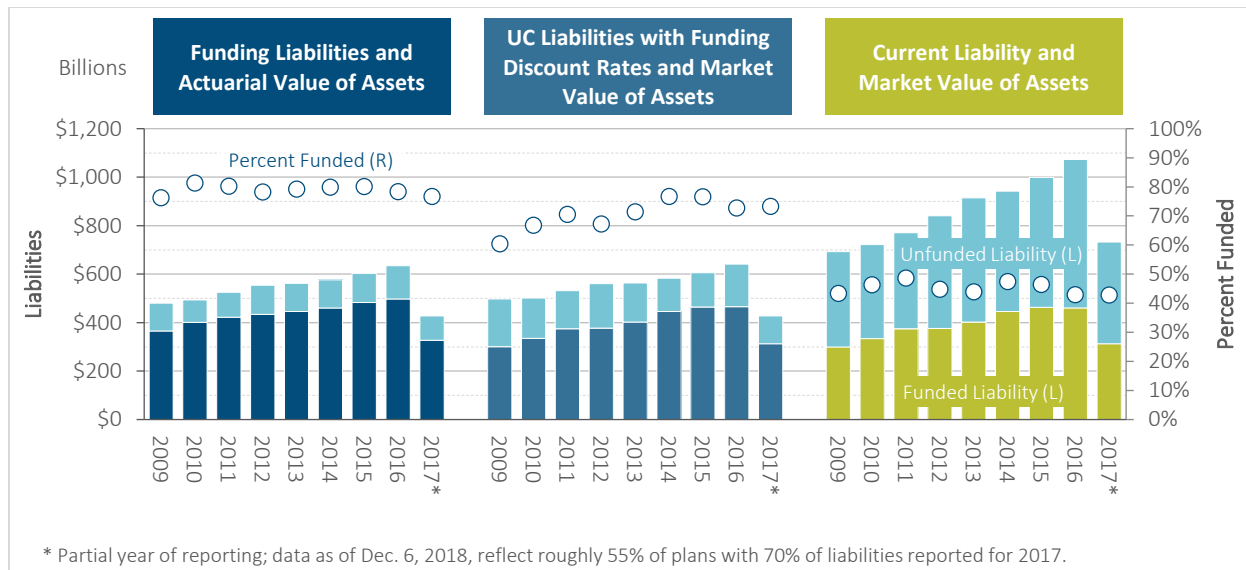
Refer to Figure 9 and Figure 10 for more specific information about the interest rates used in each basis.

Using the actuarial methods and discount rates reported for minimum funding purposes, aggregate unfunded liabilities increased from about \$133 billion for 2015 to about \$151 billion for 2016, the most recent year of complete reporting. Most plans continued to have an unfunded liability on the funding basis. The increase in unfunded liabilities was in part because of lower-than-expected asset returns during 2015 and lower discount rates for some plans. Additional factors that affect unfunded liabilities include contributions, plan changes, assumptions changes and/or favorable financial and demographic experience compared with the actuarial assumptions and are beyond the scope of this study.

Using UC liabilities for all plans at their funding discount rates and the market value of assets, aggregate liabilities were very similar to aggregate liabilities as computed for minimum funding standards. However, aggregate unfunded liabilities were greater during this period, primarily because the full impact of the 2008 market crash was immediately recognized in the market value of assets. On this basis, aggregate unfunded liabilities increased from \$142 billion for 2015 to \$175 billion for 2016.

Unfunded Current Liabilities increased from \$535 billion in 2015 to \$613 billion in 2016. Almost all plans had an unfunded liability on a Current Liability basis.

Figure 8
AGGREGATE LIABILITIES AND FUNDED STATUS



¹² Discount rates used to compute Current Liability are based on an average of Treasury rates, which roughly approximates a risk-free rate. In addition, Current Liability reflects prescribed mortality assumptions that were developed largely from single employer (corporate) plan experience. Internal Revenue Code §431(c)(6)(D) governs the assumptions and methods used to compute Current Liability for multiemployer plans.

Discount rates for funding purposes generally represent assumed long-term rates of return on plan assets and therefore may vary significantly among plans, as is evident in Figure 9. Current Liability discount rates, as seen in Figure 10, are prescribed by federal law and roughly approximate a risk-free rate.¹³

Figure 9
FUNDING DISCOUNT RATE DISTRIBUTION

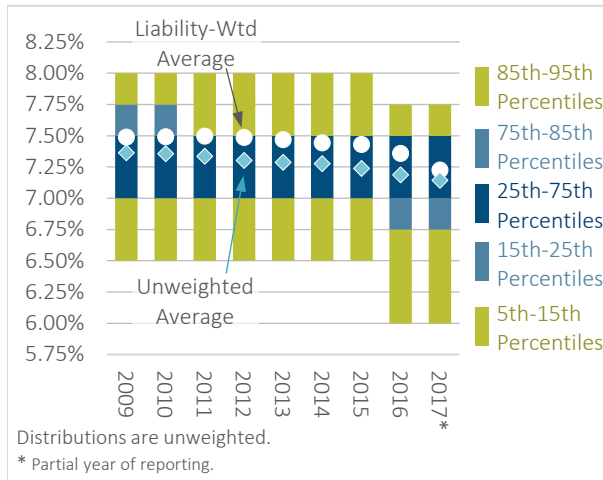
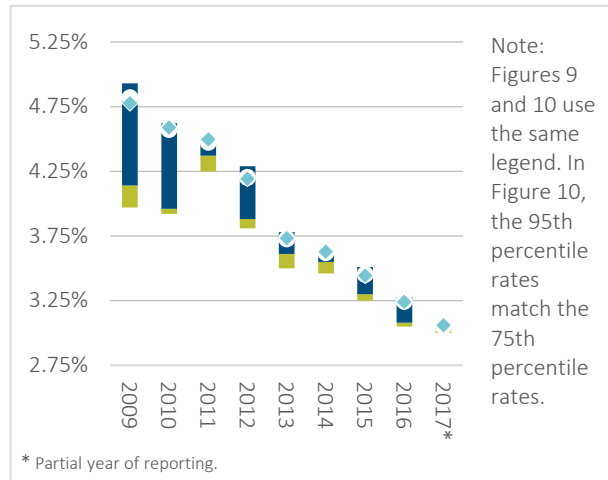


Figure 10
CURRENT LIABILITY DISCOUNT RATES



Data and Methods

Tabulations and analyses are based on publicly available data from the Department of Labor Form 5500 as of Dec. 6, 2018, which reflects completed reporting for plan years through 2016 and a partial year of reporting for 2017. Refer to Table 1 for a summary of the plans included in this study, and note the following items about the data:

- With typical extensions, Form 5500 is generally due 9.5 months after the end of the plan year. For example, for a plan year that runs from Jan. 1, 2017, through Dec. 31, 2017, Form 5500 is due Oct. 15, 2018. Most plans file on or immediately before the deadline. Thus, the 2017 data included in our analysis reflect primarily plans with calendar year plan years plus any plans that filed earlier than required.
- Other than exclusions or adjustments for obvious errors, data were used as reported. The use of the reported values is not intended to provide commentary on the appropriateness of the underlying assumptions and methods for funding these plans or for any other purpose.
- Data for the 2008 Schedule MB are missing from the Department of Labor Form 5500 database; consequently all 2008 data are excluded from this study.
- Data in the DOL database for previous years may have changed, and authors' criteria for errors and missing data may differ slightly from some previous analyses. Consequently, results for previously published years may differ.
- Many participants have earned benefits under more than one multiemployer plan, and many employers contribute to more than one of these plans. This study reflects the sum of reported counts for each plan.

¹³ Internal Revenue Code §431(c)(6)(D) governs the assumptions and methods used to compute Current Liability for multiemployer plans. Discount rates are based on an average of Treasury rates. In addition, Current Liability reflects prescribed mortality assumptions that were developed largely from single employer (corporate) plan experience.

- For computing contribution ratios that measure whether contributions reduced unfunded liabilities using funding discount rates, the authors used the unit credit liability reported for years after 2008 for zone determination under the Pension Protection Act of 2006. For years prior to 2008, the authors estimated unit credit liabilities by adjusting Current Liability for different discount rates. In the early iterations of this study, the authors estimated unit credit liabilities for all years. As a result, some of the figures in this study may not match previously published figures for some years, although the general outcome remains the same.
- The techniques and assumptions used were developed for the multiemployer sector as a whole and may not be appropriate for any given plan or small set of plans. Modifications to the assumptions and methods used may result in different numerical outcomes, but the overall conclusions are likely to be similar.
- Table 1 shows a summary of the data included in the study. However, some plans may be excluded from analysis because of missing data elements that are critical to the analysis. Consequently, the numbers in Table 1 may not match the numbers shown in the figures throughout the report.

Table 1
SUMMARY OF DATA INCLUDED

Plan Year	Excluded	Included in Study		
	Number of Plans	Number of Plans	Number of Participants (Millions)	Number of Contributing Employers
1999	52	584	3.96	N/A
2000	76	1,187	6.90	N/A
2001	79	1,222	8.16	N/A
2002	58	1,249	8.45	N/A
2003	44	1,269	8.53	N/A
2004	38	1,285	8.60	N/A
2005	33	1,307	9.18	N/A
2006	34	1,305	9.25	N/A
2007	34	1,309	9.39	N/A
2008	N/A	N/A	N/A	N/A
2009	134	1,197	9.37	219,486
2010	147	1,173	9.33	212,539
2011	100	1,203	9.57	214,660
2012	95	1,209	9.57	205,756
2013	100	1,194	9.68	208,144
2014	61	1,216	9.76	203,082
2015	42	1,221	9.74	204,767
2016	37	1,212	10.07	199,849
2017	20	662	7.13	117,482

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The SOA supports actuaries and advances knowledge through research and education. As part of its work, the SOA seeks to inform public policy development and public understanding through research. The SOA aspires to be a trusted source of objective, data-driven research and analysis with an actuarial perspective for its members, industry, policymakers and the public. This distinct perspective comes from the SOA as an association of actuaries, who have a rigorous formal education and direct experience as practitioners as they perform applied research. The SOA also welcomes the opportunity to partner with other organizations in our work where appropriate.

The SOA has a history of working with public policymakers and regulators in developing historical experience studies and projection techniques as well as individual reports on health care, retirement and other topics. The SOA's research is intended to aid the work of policymakers and regulators and follow certain core principles:

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