MILLIMAN WHITE PAPER

2017 Corporate Pension Funding Study

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The 2017 edition of the Milliman Corporate Pension Funding Study (PFS) marks the 17th annual analysis of the financial disclosures of the 100 largest corporate defined benefit (DB) pension plan sponsors. These 100 companies are ranked highest to lowest by the value of their pension assets reported to the public, to shareholders, and to the U.S. federal agencies that have an interest in such disclosure.

These pension plans finished 2016 with pension assets of $1.395 trillion and projected benefit obligations (PBO) of $1.718 trillion. The funded ratio at the end of 2016 was 81.2%. This was comparable to the funded status at the end of 2015 of 81.9% and 2014 of 81.6%.

But a ratio is just one number divided by another, which doesn't tell the complete story. The 0.7% decline in the pension funded ratio and the resulting $22 billion fiscal year (FY) 2016 funded status deterioration, masks:

- Volatility in the interest rate environment, which caused the discount rate to decline steeply by 30 basis points in FY2016 to 3.99%.
- FY2016 pension trusts' investment return of 8.4% compared to the average return expectation for the Milliman 100 companies of 7.0% in 2016.
- Employers' 2016 plan contributions of $42.8 billion, a 38.0% increase from $31.1 billion in 2015.
- The second consecutive fiscal year of further decreases in future life expectancy resulting in an approximate $3.8 billion reduction in the actuarially determined benefit obligations for six Milliman 100 companies for which the value of the change was disclosed (IBM, GM, GE, AT&T, Verizon, and 3M).
- Seven companies exited the Milliman 100. For various reasons, seven plan sponsors had plan assets decline enough in 2016 that they are no longer Milliman 100 companies covered in the 2017 PFS:
  - CBS, Computer Sciences, RR Donnelley, J.C. Penney, Macy's, PPG, and Sears.
  - HP has changed as it divested into two companies: HP and HP Enterprises, both of which were included in our study.
- Seven companies joined the Milliman 100: HP Enterprises, Ameren, Kimberly Clark, Molson, Travelers, US Bancorp, and Union Pacific.

FY2016 pension expense (the charge to the income statement under Accounting Standards Codification Subtopic 715) decreased 7.6% to about $30.8 billion from about $33.3 billion in FY2015.

Forty-six of the Milliman 100 companies in this 2017 PFS indicated they have adopted or plan to adopt a "spot rate" approach for calculating pension expense. Thirty-seven companies included such disclosures for our 2016 PFS.

Pension risk transfer transactions and strategies from the plan sponsors to insurance companies continued in 2016. (Perhaps not news to the readers of the Milliman PFS, but enough news for pension risk transfer transactions to make page A1 of the March 13, 2017, *Wall Street Journal*.) FY2016 pension risk settlement payments to former but not yet retired participants continued as well. We've estimated that the sum of the pension risk transfers to insurance companies (sometimes referred to as "pension lift-outs") and the settlement payments totaled about $13.6 billion compared with $11.6 billion in FY2015. Examples among Milliman 100 companies are: Westrock ($2.5 billion), United Technologies ($1.6 billion), Hewlett Packard ($1.3 billion), Verizon ($1.3 billion), International Paper ($1.2 billion), and Pepsi ($1.0 billion). These pension risk transfer strategies also relieve the plan sponsor of the Pension Benefit Guaranty Corporation (PBGC) premium payments that are required for these former employees who are part of the participant head count.

FIGURE 1: HIGHLIGHTS (FIGURES IN $ BILLION)

	FISCAL YEAR ENDING 2015	2016	CHANGE
MARKET VALUE OF ASSETS	$1,362.7	$1,395.0	$32.3
PROJECTED BENEFIT OBLIGATION	$1,664.4	$1,718.3	$54.0
FUNDED STATUS	($301.7)	($323.4)	($21.7)
FUNDED PERCENTAGE	81.9%	81.2%	-0.7%
NET PENSION INCOME/(COST)	($33.3)	($30.8)	$2.5
EMPLOYER CONTRIBUTIONS	$31.1	$42.8	$11.7
DISCOUNT RATE	4.29%	3.99%	-0.30%
ACTUAL RATE OF RETURN	0.8%	8.4%	7.6%

Note: Numbers may not add up precisely due to rounding.

In addition to defined benefit pension plans, the PFS has been tracking the actuarial obligations of postretirement health care benefits. FY2016 marks the first year that the aggregate reporting of these accumulated postretirement benefit obligations (APBOs) is under $200 billion, at about $197.9 billion. This is consistent with the trend of divesting other postemployment benefits (OPEB) liabilities by plan sponsors over the last decade.

As we write this report in April 2017, we acknowledge that our year-end 2016 results do not reflect the gains in the financial markets since January 1, nor do they reflect any volatility in interest rates that were caused by the Federal Reserve's actions in March to raise short-term interest rates by 25 basis points. For 2017 results, see our April 2017 Pension Funding Index (PFI), which will review the funded status changes that occurred during the first quarter of 2017. The April PFI will be released within one week of the release date of this report and will reflect the FY2016 results included in the 2017 Pension Funding Study.

The most significant factors offsetting the adverse effect of the decrease in discount rates on the funded ratio were the favorable investment returns and an increase in employer contributions during 2016:

1. The actual return on the pension trusts was 8.4% when the expectation was an investment return of 7.0%—an investment gain of $16 billion.
   - For the eight years 2009 to 2016, there has always been a net investment increase over the asset value at the start of the year, and except for 2011 and 2015, *pension plan investment gains have exceeded the expected return* set at the start of the fiscal year. We also note that in those eight years, pension plan assets allocation to equities has decreased to about 36.0%, from about 46.0%, while fixed income allocation has increased to about 44.0% from about 36.0%.
2. Employers increased 2016 cash contributions by almost $12 billion compared with 2015. About $43 billion was contributed in 2016, compared with about $31 billion in 2015. Among other contribution strategies, there may have been a desire to reduce the PBGC premium applicable to pension plan underfunding.

Pension expense in 2016 declined $2.5 billion to $30.8 billion from $33.3 billion in 2015. One may reasonably conclude that pension expense will decrease in 2017 because of the favorable 2016 asset performance, however, the effect of lower discount rates, plan settlements, and more plan sponsors adopting the spot interest rate method will also need to be considered.

Future reductions in pension expense can result from changes in the assumptions under which pension expense is calculated. Forty-six of the Milliman 100 companies indicated in Form 10-K that they have adopted or plan to adopt a "spot rate" approach to calculate the interest cost component of pension expense, which is a refined use of the individual "spot" interest rates on the corporate bond yield curve used to develop the actuarial liabilities or projected benefit obligation (PBO).

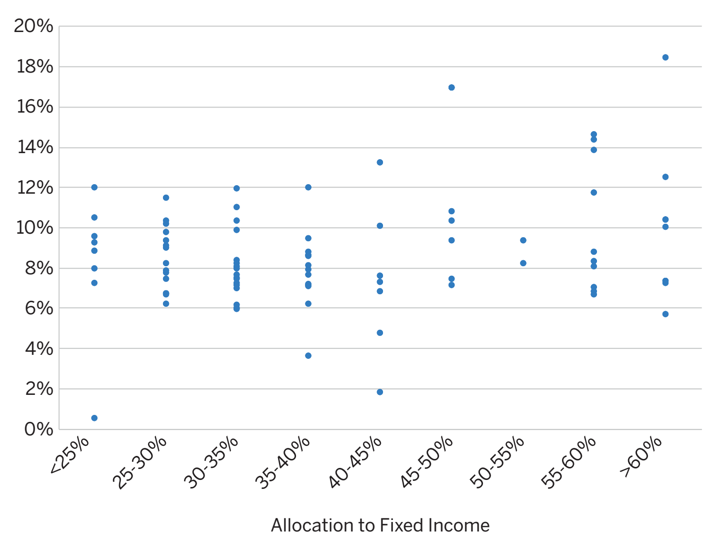
For an upwardly sloping yield curve, the use of the spot rate method is expected to lower interest cost and therefore total pension expense in comparison with using the former single-weighted average discount rate methodology. In fact, if all of the Milliman 100 companies were to adopt the spot rate accounting method to calculate the interest cost component of pension expense in 2017, the pension expense savings is estimated to be $11.1 billion. This calculation assumes a 20.0% reduction in the interest cost for a typical company in the Milliman 100 study adopting the spot rate methodology.

De-risking transactions continued in 2016, and the estimated dollar volume of pension risk transfers collected from the accounting disclosures was higher in 2016 ($13.6 billion) compared with 2015 ($11.6 billion). Note that the federal Department of Labor (DOL) prefers the use of "pension risk transfer" (PRT) when referring to these transactions in which the complete divestiture of DB plan obligations to participants or to insurance companies occurs.

PRT transactions may continue to occur in 2017, spurred by the significant increases in the premiums payable to the PBGC.

Strong year for investment returns—especially for plans with significant allocations to U.S. versus international investments

FIGURE 2: ESTIMATED RATES OF RETURN EARNED IN 2016 FOR THE 88 PLANS WITH CALENDAR FISCAL YEARS BY THEIR ALLOCATION TO FIXED INCOME



Rates of return earned in 2016 for the 88 pension plans with calendar year fiscal years ranged from 0.5% to 18.4%, with an average of 8.7%. Returns mostly fell in the 6.0% to 12.0% range (73 plans) with seven plans earning returns below 6.0% and eight plans earning returns above 12.0%. Generally, plans with greater allocations to fixed income earned slightly higher returns, but differences in the basic asset allocation among equities, fixed income, and other assets did little to explain differences in returns. Instead, we believe the return differences were most likely explained by the plans' allocations to U.S. equities and to U.S. corporate bonds, especially long-duration bonds. U.S. equities significantly outperformed non-U.S. equities in 2016, and U.S. corporate bonds significantly outperformed U.S. government bonds and interest rate swaps in 2016. Plans with heavy allocations to fixed income as part of a liability-driven investment (LDI) strategy typically have significant allocations to long-duration corporate bonds. Returns on long-duration corporate bonds almost matched the returns on U.S. equities, with both of these assets contributing double-digit returns in 2016.

FIGURE 3: FIXED-INCOME ALLOCATION 50% OR HIGHER (CALENDAR YEAR FISCAL YEARS ONLY)

	FIXED-INCOME ALLOCATION 50% OR HIGHER		ALL OTHERS	
YEAR	NUMBER OF COMPANIES	AVERAGE INVESTMENT RETURN	NUMBER OF COMPANIES	AVERAGE INVESTMENT RETURN
2016	21	9.8%	67	8.4%
2015	20	0.1%	68	-0.1%
2014	16	13.4%	72	9.5%
2013	12	3.9%	76	12.3%
2012	13	10.6%	75	12.3%

Equity allocations in the pension portfolios dropped to 36.1% by the end of 2016. The companies comprising the Milliman PFS have generally shifted toward higher allocations to fixed income investments. This trend has surfaced as plan sponsors reconfigured allocations to de-risk their pension plans over the past several years.

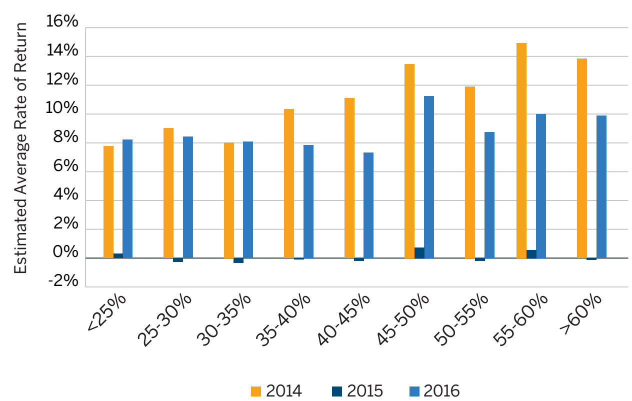
The actual asset return for the plan sponsor with the highest allocation to equities (81.1%) was 12.0%, which was a little better than the return of 10.4% for the plan sponsor with the lowest allocation to equities (7.0%) in 2016. The highest asset return among all companies with calendar year fiscal years was 18.4%, while the lowest was 0.5%.

In prior years, investment allocations made by plan sponsors had showed a trend toward implementing LDI strategies. Generally, this involves shifting more assets into fixed income positions. This trend continued in 2016. The percentage of pension fund assets allocated to equities, fixed income, and other investments was 36.1%, 44.1%, and 19.8%, respectively, at the end of 2016, compared with 37.4%, 42.6%, and 20.0%, respectively, at the end of 2015.

Unlike in 2015, when plans with high allocations to fixed income (over 50.0%) performed comparably to the other plans (0.06% average return compared with -0.07%), in 2016 the plans with high allocations to fixed income outperformed the other plans (9.84% compared with 8.38%).

Over the last five years, the plans with consistently high allocations to fixed income have slightly underperformed the other plans while experiencing lower funded ratio volatility. Among the 88 companies in the Milliman PFS with calendar year fiscal years, 23 pension plans had fixed income allocations greater than 40.0% at the end of 2011 and maintained an allocation of at least 40.0% to fixed income through 2016. Over this five-year period, these 23 plans experienced lower funded ratio volatility than the other 65 plans (an average funded ratio volatility of 4.4% versus 6.2% for the other 65 plans) while earning a slightly lower five-year annualized rate of return (an average of 8.0% versus 8.4%). Similar to 2015, when these 23 plans outperformed relative to the other 65 plans (0.3% average return versus -0.2%), they also outperformed the other plans in 2016 (10.0% average return versus 8.3%).

FIGURE 4: ESTIMATED AVERAGE RATE OF RETURN BY ALLOCATION TO FIXED INCOME – 2014-2016



Overall allocations to equities decreased during 2016, resulting in an average allocation of 36.1%—the lowest equity allocation in the 17-year history of the Milliman PFS. None of the 100 companies had increases to its equity allocations of more than 10.0% in 2016. Only three companies decreased their equity allocations by more than 10.0% in 2016, compared with four companies in 2015, 11 in 2014, five in 2013, three in 2012, and 12 in 2011.

FIGURE 5: ASSET ALLOCATION – EQUITIES

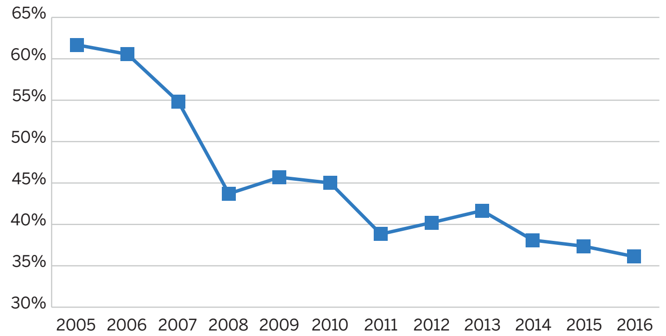
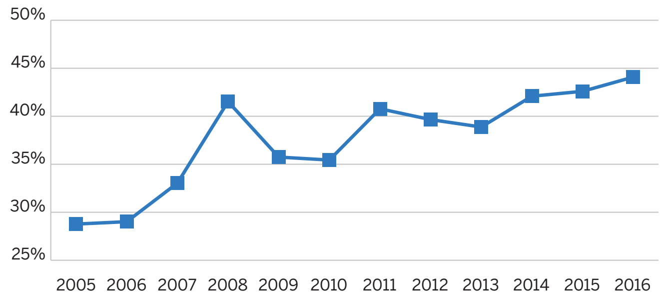
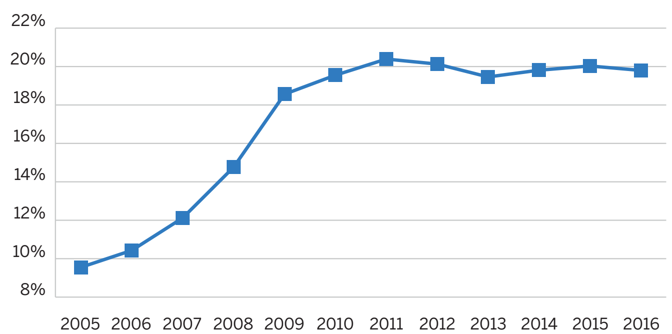


FIGURE 6: ASSET ALLOCATION – FIXED INCOME



Overall allocations to fixed income increased in 2016, resulting in an average allocation of 44.1%. Only two companies had a decrease of more than 10.0% in their fixed income allocations. Five companies, however, increased their fixed income allocations by more than 10.0% in 2016, compared with three in 2015, seven in 2014, four in 2013, two in 2012, and seven in 2011.

FIGURE 7: ASSET ALLOCATION – OTHER



Other asset classes include real estate, private equity, hedge funds, commodities, and cash equivalents. More specific details on how investments are allocated to the other categories are generally not available in the companies' U.S. Securities and Exchange Commission (SEC) filings. Overall allocations to other asset classes remained stable in 2016. Eight companies increased their allocations by 5.0% or more to other asset classes during 2016.

For comparison purposes, we have looked at historical changes since 2005, the first year when the Milliman 100 companies consistently made allocation information available. The allocation to equities was down from 61.7% at the end of 2005 and the allocation to fixed income instruments was up from 28.8% at the end of 2005. The percentage of investments in other asset classes was also up from the 9.6% allocation at the end of 2005.

Pension Risk Transfer activities continue

Similar to the past few years, plan sponsors continued to execute pension risk transfer (PRT) activities in 2016 as a way of divesting pension obligations from their DB plans and corporate balance sheets. Large-scale pension buyout programs were transacted for six of the Milliman 100 companies, as pension assets and liabilities were transferred to an insurance company. Westrock, United Technologies, Hewlett Packard, Verizon, International Paper, and Pepsi reported transactions of $2.5 billion, $1.6 billion, $1.3 billion, $1.3 billion, $1.2 billion, and $1.0 billion, respectively. PPG and J.C. Penney, former Milliman 100 companies not included in the 2016 Study, had PRT transfers during 2016 of $2.3 billion and $1.6 billion, respectively. These settlements were significant enough to drop these companies from the largest 100 plan sponsor companies listing of the Milliman PFS.

The 2016 PRT market was slightly more active when compared with the 2015 market. Extracting the dollar volume of PRT activities from Form 10-K is an estimate and it appears that the dollar volume in 2016 was $13.6 billion, an increase of $2.0 billion compared with the 2015 dollar volume of $11.6 billion.

PRTs are deemed an effective way to reduce a pension plan's balance sheet footprint by plan sponsors, but generally they have an adverse effect on the plan's funded status, as assets paid to divest accrued pension benefits are higher than the corresponding actuarial liabilities that are extinguished from plans. Much of this incongruity stems from Internal Revenue Service (IRS) pension plan valuation rules differing from an insurance company's underwriting assessment of its new future risks.

Last year, we reported that a more prevalent de-risking measure came in the form of a "lump-sum window" program, in which some plan sponsors settled the pension obligation by distributing a payment to a specific group of former participants. However, the IRS issued Notice 2015-49 that effectively and permanently ended the ability of a plan sponsor to offer a lump-sum settlement to retirees or their surviving beneficiaries who were collecting annuities. On the other hand, lump-sum offerings via windows to terminated vested plan participants continued in 2016 and more are expected in 2017 as well as plan sponsors' rush to divest some additional liability before the new IRS-required mortality tables applicable for determining lump-sum distribution amounts from qualified retirement plans possibly become effective.

Last year, we also reported on an analysis of mortality experience of participants in all U.S. DB plans. While we don't plan to delve into the development of life expectancy factors in this study, we reference below a couple of noteworthy items that will affect funded status.

1. A further refinement of the mortality study by the Society of Actuaries in October 2016, reduced expected rates of mortality improvements. The revisions shorten life expectancy by a few years and reduce the fiscal year-end PBO. While we are unable to collect specific details of the reduction for all companies included in our study, there were several noteworthy disclosures regarding the impact on this refinement on the pension liability for several companies. General Motors, AT&T, General Electric, IBM, Verizon, and 3M each noted that the adoption of the refined mortality improvement scale reduced their pension and OPEB liabilities by $888 million, $793 million, $600 million, $600 million, $500 million, and $440 million respectively.

2. We've been reporting for a few years that the IRS has planned to update the federal pension regulations that dictate the rates of mortality used for the valuation of DB pension plan actuarial obligations. In December 2016, the IRS finally proposed such regulations, based on the above-mentioned Society of Actuaries report, with an expected effective date of plan years starting after December 31, 2017. We remain somewhat pessimistic about these regulations affecting the 2018 contributions and, in particular, lump-sum payments for plans that offer these one-time settlements. The executive orders issued by President Trump in January 2017, freeze or delay the effective date of all federal agencies' proposed regulations, and the president has not yet set up review teams he has proposed for the IRS (or DOL), who will serve as the authorities to review and set regulation release dates. The "mortality table regulations" are one of those affected regulations.

The Bipartisan Budget Act of 2015 included increases in the PBGC's flat rate and variable rate premiums. These premiums are paid to insure certain accrued pension benefits to participants if an employer sponsoring a single-employer DB pension plan becomes insolvent.

The flat dollar amount increases to $69 in 2017 from $64 in 2016.

The variable rate premium has increased to 3.4% of the pension plan's PBGC-funded status deficit in 2017, from 3.0% of the 2016 deficit. (PBGC's funded status deficit uses interest rates and mortality assumptions that are different from the funded status of the Milliman 100 companies.)

The 2016 funded ratio of 81.2% was slightly higher than we reported in the January 2017 Milliman 100 Pension Funding Index (PFI). The January 2017 PFI funded ratio of 81.0% was based on data collected for the 2016 Milliman Pension Funding Study. This revised funded ratio of 81.2% from our current study reflects the collection and collation of publicly available information. Investment returns and contributions during 2016 were higher than we had forecasted, both key factors for the higher funded ratio.

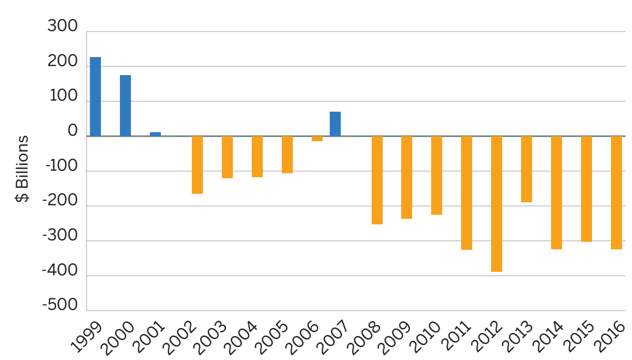
The higher-than-expected cash contributions during 2016 are likely in response to rising PBGC premiums. As background, PBGC variable rate premiums are calculated based on a plan's funded status determination, without respect to interest rate funding relief as afforded to plan sponsors under the Employee Retirement Income Security Act (ERISA), for purposes of minimum funding requirements. Faced with the prospect of escalating PBGC premiums in future years, many plan sponsors have developed strategies to narrow their funded status gaps sooner than what may be required based on minimum funding. This often results in higher-than-required (under IRS rules) cash contributions being made.

Impact of decreasing discount rates evident in 2016 financial statements of the Milliman 100 companies

Discount rates used to measure plan obligations, determined by reference to high-quality corporate bonds, decreased during 2016, thereby increasing liabilities and reversing the trend from the prior year. The median discount rate decreased to 3.99% at the end of 2016 from 4.29% in 2015. The 3.99% discount rate at the end of 2016 was the lowest in the 17-year history of the Milliman PFS. Discount rates had been generally declining from 7.63% at the end of 1999. Discount rates were 237 basis points higher at the end of 2008.

The impact of the decreasing discount rates in 2016 and increased PBO was partially offset with a favorable investment gain of 8.4%. This resulted in a modest decrease in the funded status. The 2016 funding deficit of $323.4 billion is a $21.7 billion increase over the year-end 2015 funding deficit of $301.7 billion. It is the fourth-largest deficit in the 17-year history of the Milliman PFS.

FIGURE 8: PENSION FUNDING SURPLUS/(DEFICIT)



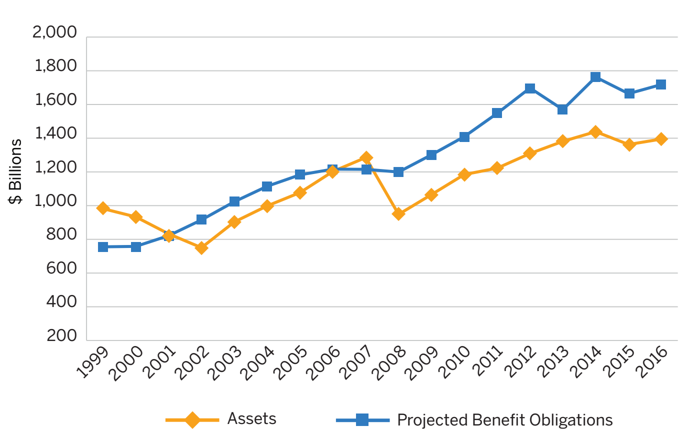
Pension expense—the charge to company earnings—decreased to $30.8 billion in 2016 as compared with $33.3 billion during fiscal year 2015, a $2.5 billion decrease. The peak level of pension expense occurred in 2012, when it was $55.9 billion. In addition, 46 of the Milliman 100 companies indicated that they have adopted or plan to adopt a "spot rate" approach for estimating the service and interest cost components of net periodic benefit costs. Thirty-seven companies included such disclosure for our 2016 PFS. This approach is likely to produce a pension expense savings in the near term. In spite of the decrease in discount rates during 2016, the 2017 pension expense is not likely to increase significantly, which is due to the investment gains experienced during 2016 and the change in accounting method to a spot rate approach.

The "spot rate" approach, which is a refined use of the individual "spot" interest rates on the corporate bond yield curve used to develop the actuarial liabilities or PBO. This contrasts with the measurement of PBO utilizing a customized bond matching model. The plan sponsor can choose to use only one of the valuation methodologies, and cannot change it each year unless there is agreement with the auditors to do so.

For an upwardly sloping yield curve, the use of the spot rate method is expected to lower the "interest cost" component of pension expense, thus lowering the total pension expense in comparison with using the former single-weighted average discount rate methodology. This method leads to an expectation of PBO losses when the PBO is remeasured at the end of fiscal year 2017 for pension disclosure.

We've estimated an $11.1 billion decrease in FY2017 pension expense if all Milliman 100 companies adopted the spot rate accounting method to calculate the interest cost component. We've made the assumption of a 20.0% reduction in the interest cost for each of the other 54 Milliman 100 companies for this calculation.

FIGURE 9: PLAN ASSETS AND OBLIGATIONS



The effect of a decrease of 30 basis points in discount rates was partially offset by the favorable investment returns during 2016, revisions to life expectancy assumptions, and the impact of PRT activity.

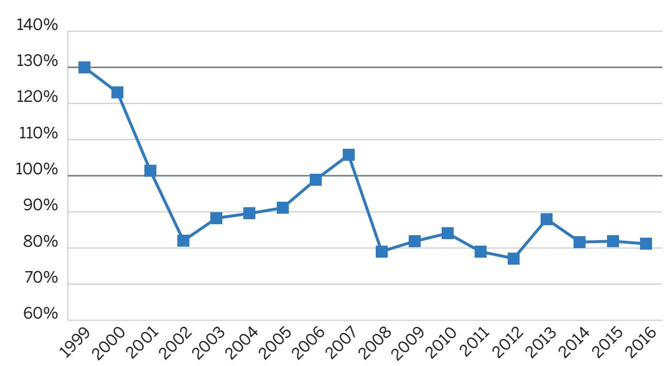
The net 3.2% increase in pension obligations generated by the decrease in discount rates, revisions to life expectancy assumptions used to measure pension plan obligations (at a median rate of 3.99% at year-end 2016, down 30 basis points from 4.29% at year-end 2015), and PRT activity resulted in a liability increase of $54.0 billion. Pension liabilities for IBM and General Motors remained below the $100 billion pension obligation mark in 2016, which helped their plans to improve their funded status, assisted by investment gains of 8.3% and 6.6%, respectively.

The 8.4% investment gain (actual weighted average return on assets during 2016) resulted in an increase of $32.3 billion in the market value of plan assets when combined with the higher contributions, and approximately $13 billion paid out in annuity purchases or lump-sum settlements. The Milliman 100 companies had set an expectation that 2016 investment returns would be, on average, 7.0%.

Funded ratios barely decrease

The funded ratio of the Milliman 100 pension plans decreased during 2016 to 81.2% from 81.9% at the end of 2015 (81.4% for plans with calendar year fiscal years in 2016, down from 81.7% for 2015). The aggregate pension deficit increased by $12.8 billion during these calendar year companies' 2016 fiscal years to $292.8 billion, from an aggregate deficit of $280.0 billion at the end of 2015. For fiscal year 2016, funded ratios ranged from a low of 49.0% for Delta Airlines to a high of 148.0% for NextEra Energy, Inc.

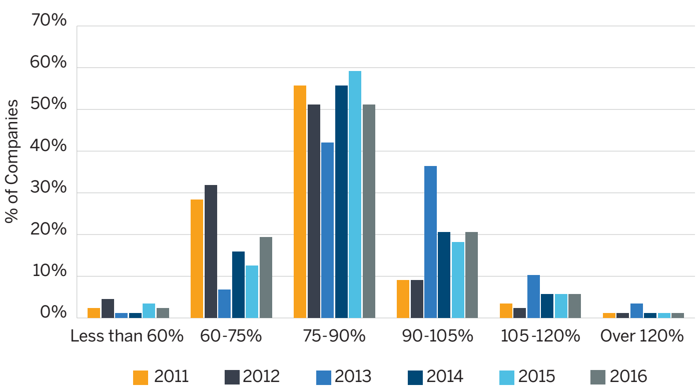
FIGURE 10: FUNDED RATIO – ASSETS/PROJECTED BENEFIT OBLIGATION



The 0.7% decrease in the 2016 funded ratio reversed the 2015 increase. The funded ratio had been 81.6% at the end of 2014. Note that there has not been a funding surplus since the 105.8% funded ratio in 2007.

Only eight of the 88 Milliman 100 companies with calendar-year fiscal years reported surplus funded status at year-end 2016, compared with nine companies in 2015, eight in 2014, 19 in 2013, and six in 2012. These numbers pale in comparison with the 50 companies with reported surplus funded status at year-end 2007. Because of the offsetting impact of higher investment returns and the increase in liabilities caused by lower discount rates, only 38 of the Milliman 100 companies with calendar fiscal years reported an increase in funded ratio for 2016 compared with 51 for 2015.

FIGURE 11: DISTRIBUTION BY FUNDED STATUS – 2011-2016 (CALENDAR YEAR FISCAL YEARS ONLY)

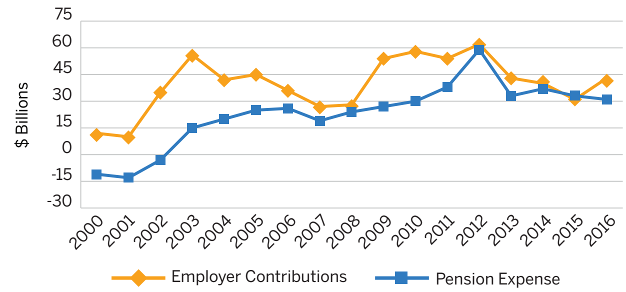


2016 pension expense decreases

There was a net decrease in 2016 pension expense: a $30.8 billion charge to earnings ($2.5 billion lower than in 2015). This is well below the $55.9 billion peak level in 2012. Twenty-two companies recorded 2016 pension income (i.e., a credit to earnings). Sixteen companies also recorded income in 2015 and 17 companies in 2014 and 2013, up from 10 in 2012.

The discount rate for 2016 pension expense is based on the year-end 2016 SEC disclosures. We estimate that 2017 pension expense will decrease to $23.5 billion, a $7.3 billion decrease compared with 2016, under the assumption of a continued 3.99% discount rate. This reduction includes an estimated $5.1 billion decrease in expense that is due to 46 of the Milliman 100 plan sponsor companies adopting the spot rate method for calculation of the interest cost component of pension expense.

FIGURE 12: PENSION EXPENSE (INCOME) AND CONTRIBUTIONS



The aggregate 2016 cash contributions of the Milliman 100 companies were $42.8 billion, an increase of $11.7 billion from the $31.1 billion contributed in 2015, and an $18.7 billion decrease from the 2012 record high level of $61.5 billion. Contributions had been decreasing in 2015 and 2014 ($31.1 billion and $40.0 billion, respectively) from the 2013 level of $43.5 billion. However, the contributions of $42 .8 billion in 2016 reverses this trend. We speculate that this is due to increased contributions by many plan sponsors to minimize their PBGC premium increases, as discussed earlier.

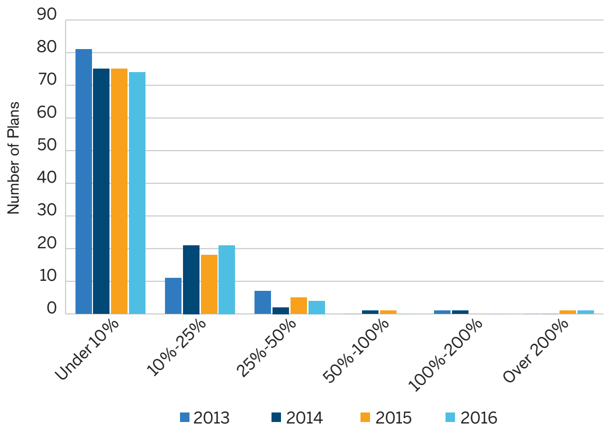
Many plan sponsors may continue to contribute at these higher levels for 2017 if they can't find better uses for their corporate cash. We expect that some plan sponsors undertaking PRT activities (e.g., lump-sum payouts, annuity purchases, etc.) may have to increase contributions to maintain funded status. Also some plan sponsors that want to minimize PBGC premium costs may choose to accelerate plan funding to close pension deficits sooner.

Pension deficit decreases slightly as a percentage of market capitalization

The total market capitalization for the Milliman 100 companies increased by 10.3%. The increase in pension obligations (which is due to lower discount rates) resulted in a small decrease in the unfunded pension liability as a percentage of market capitalization of 4.3% at the end of 2016 from 4.4% at the end of 2015. Pension deficits represented less than 10.0% of market capitalization for 74 of the Milliman 100 companies in 2016 and 75 of the Milliman 100 companies in 2015 and 2014 (down from 81 companies in 2013). However, this is still an increase from 2012, when only 60 companies had deficits that were less than 10.0% of their market capitalizations.

Since 2011, we have had investment returns exceeding expectations in four out of five years, and this has resulted in elevated levels of market capitalization. There is one company whose deficit exceeds 50.0% of market capitalization in 2016, down from two companies in 2015. This is down from nine in 2012, the year we first started tracking this figure.

FIGURE 13: UNDERFUNDED PENSION LIABILITY AS A PERCENTAGE OF MARKET CAPITALIZATION 2013-2016



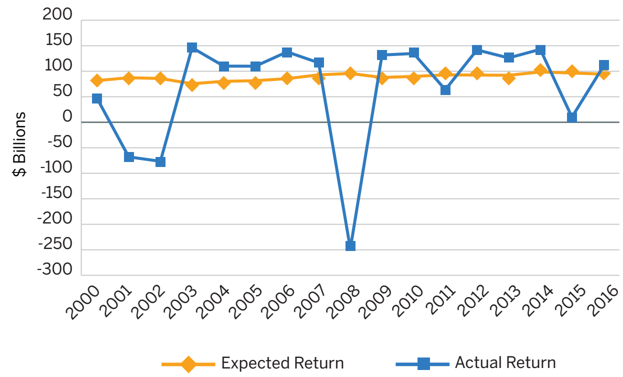
Investment performance exceeds expectations

The weighted average investment return on pension assets for the Milliman 100 companies' 2016 fiscal years was 8.4%, which was above their average expected rates of return of 7.0%. Seventy-three of the Milliman 100 companies exceeded their expected returns in 2016, including all six that had off-calendar fiscal years. Only three companies exceeded their expected returns in 2015 and all three had off-calendar-year fiscal years. But 80 companies in 2014 exceeded their expected returns compared with 77 in 2013, 93 in 2012, 20 in 2011, and 98 in 2010.

The 2016 investment return was favorable, and now investment returns above expectations during six out of the last eight years have been earned by the plan sponsors of the Milliman 100 companies. At December 31, 2016, total asset levels were $1.395 trillion. This is $109.7 billion above the value of $1.285 trillion at the end of 2007, prior to the collapse of the worldwide financial markets.

During 2016, investment gains offset by the combination of annuity purchases and lump-sum settlements increased the market value of assets by $32.3 billion. The Milliman 100 companies' actual investment return for 2016 was $110.4 billion compared with the expected return of $94.4 billion, a difference of $16.0 billion. For the five-year period ending in 2016, investment performance has averaged 8.28% compounded annually. There were three years of investment losses over the past 17 years (2001, 2002, and 2008), contributing to an annualized investment return of only 6.0% over that period.

FIGURE 14: INVESTMENT RETURN ON PLAN ASSETS



Expected rates of return

Companies continued to lower their expected rates of return on plan assets to an average of 7.0% for 2016, as compared with 7.1% for 2015, 7.3% for 2014, 7.4% for 2013, 7.6% for 2012, 7.8% for 2011, and 8.0% for 2010. This represents a significant drop from the average expected rate of return of 9.4% back in 2000.

Only one of the Milliman 100 companies utilized an expected rate of return for 2016, 2015, 2014, and 2013 of at least 9.0%, whereas three companies also assumed an expected rate of return of at least 9.0% in 2012, 2011, and 2010, but this was down from five in 2009 and a high of 84 in 2000.

What to expect in 2017 and beyond

Our expectations in the coming year include:

- Contributions are expected to stay at their current levels, given the anticipated desire of plan sponsors to fund in excess of IRS minimum requirements in an effort to stave off PBGC premium increases.
- Pension expense is expected to decrease compared with the 2016 level, which is due to reductions in interest cost as a result of the interest rate spot method and the investment gains experienced during 2016. The expense reduction will be tempered by the drop in discount rates and the resulting decline in pension funded status during 2016.
- PBO losses are expected at year-end 2017 due to the use of the aforementioned spot rate methods for determining the interest cost component of pension expense.
- PBO gains are expected due to further refinements in mortality assumptions.
- Further pension risk transfer activities should occur depending on the movement of discount rates and asset returns in 2017.

HISTORICAL VALUES (All dollar amounts in millions. Numbers may not add up correctly due to rounding.)

FUNDED STATUS

FISCAL YEAR	MARKET VALUE OF PLAN ASSETS	CHANGE FROM PRIOR YEAR	PROJECTED BENEFIT OBLIGATION	CHANGE FROM PRIOR YEAR	FUNDED RATIO	CHANGE FROM PRIOR YEAR	FUNDED STATUS	CHANGE FROM PRIOR YEAR
2016	$1,394,983	$32,302	$1,718,335	$53,962	81.2%	-0.7%	($323,352)	($21,660)
2015	$1,362,681	($76,070)	$1,664,373	($97,896)	81.9%	0.2%	($301,692)	$21,825
2014	$1,438,752	$57,452	$1,762,268	$192,256	81.6%	-6.3%	($323,517)	($134,805)
2013	$1,381,300	$72,155	$1,570,012	($127,829)	88.0%	10.9%	($188,712)	$199,984
2012	$1,309,145	$86,983	$1,697,841	$150,371	77.1%	-1.9%	($388,696)	($63,387)
2011	$1,222,162	$37,381	$1,547,471	$138,008	79.0%	-5.1%	($325,309)	($100,626)
2010	$1,184,780	$119,352	$1,409,463	$107,940	84.1%	2.2%	($224,683)	$11,412
2009	$1,065,429	$117,256	$1,301,523	$102,119	81.9%	2.8%	($236,094)	$15,137
2008	$948,173	($337,112)	$1,199,404	($15,961)	79.1%	-26.7%	($251,232)	($321,151)
2007	$1,285,285	$82,650	$1,215,365	($1,044)	105.8%	6.9%	$69,920	$83,694
2006	$1,202,635	$125,004	$1,216,409	$33,533	98.9%	7.8%	($13,774)	$91,471
2005	$1,077,631	$79,121	$1,182,875	$67,919	91.1%	1.5%	($105,245)	$11,202
2004	$998,510	$95,170	$1,114,956	$91,564	89.6%	1.3%	($116,446)	$3,607
2003	$903,340	$152,710	$1,023,393	$108,098	88.3%	6.3%	($120,053)	$44,612
2002	$750,629	($82,001)	$915,294	$93,565	82.0%	-19.3%	($164,665)	($175,566)
2001	$832,630	($100,578)	$821,729	$63,569	101.3%	-21.8%	$10,901	($164,148)
2000	$933,209	N/A	$758,160	N/A	123.1%	N/A	$175,049	N/A

RETURN ON ASSETS

FISCAL YEAR	EXPECTED RATE OF RETURN	ACTUAL RATE OF RETURN (ESTIMATED)		EXPECTED RETURN	ACTUAL RETURN (ALL PLANS)	DIFFERENCE
		ALL PLANS	CALENDAR FISCAL YEARS			
2016	7.0%	8.4%	8.7%	$94,432	$110,414	$15,982
2015	7.1%	0.8%	0.0%	$96,542	$10,168	($86,374)
2014	7.3%	10.7%	10.2%	$98,550	$142,903	$44,353
2013	7.4%	10.0%	11.1%	$92,108	$126,105	$33,997
2012	7.6%	11.8%	12.0%	$92,545	$141,814	$49,270
2011	7.8%	5.6%	4.3%	$92,787	$63,831	($28,956)
2010	8.0%	12.7%	12.6%	$89,870	$134,805	$44,935
2009	8.1%	14.5%	17.3%	$87,793	$131,775	$43,982
2008	8.2%	-19.3%	-22.5%	$95,636	($247,834)	($343,470)
2007	8.3%	9.9%	9.0%	$92,913	$116,678	$23,764
2006	8.3%	12.9%	12.7%	$85,520	$137,898	$52,378
2005	8.4%	11.2%	10.5%	$81,469	$109,888	$28,419
2004	8.4%	12.3%	11.8%	$80,249	$110,063	$29,814
2003	8.5%	19.6%	19.8%	$75,529	$146,145	$70,617
2002	9.2%	-8.8%	-8.3%	N/A	N/A	N/A
2001	9.4%	-6.5%	-6.5%	N/A	N/A	N/A
2000	9.4%	4.2%	3.3%	N/A	N/A	N/A

PENSION COST

FISCAL YEAR	PENSION INCOME/(COST)	CHANGE FROM PRIOR YEAR	EMPLOYER CONTRIBUTION	CHANGE FROM PRIOR YEAR	DISCOUNT RATE
2016	($30,778)	($2,538)	$42,773	($11,673)	3.99%
2015	($33,317)	($3,631)	$31,099	$8,922	4.29%
2014	($36,948)	$4,395	$40,021	$3,433	4.00%
2013	($32,552)	($23,393)	$43,454	$18,062	4.76%
2012	($55,945)	$17,906	$61,516	($7,639)	4.04%
2011	($38,040)	$7,980	$53,877	$4,139	4.81%
2010	($30,060)	$3,309	$58,016	($3,642)	5.44%

HISTORICAL VALUES (All dollar amounts in millions. Numbers may not add up correctly due to rounding.)

PENSION COST (CONTINUED)

FISCAL YEAR	PENSION INCOME/(COST)	CHANGE FROM PRIOR YEAR	EMPLOYER CONTRIBUTION	CHANGE FROM PRIOR YEAR	DISCOUNT RATE
2009	($26,751)	$2,575	$54,374	($26,160)	5.83%
2008	($24,177)	$4,712	$28,214	($1,347)	6.36%
2007	($19,465)	($6,901)	$26,868	$8,773	6.20%
2006	($26,366)	$1,464	$35,641	$8,913	5.75%
2005	($24,902)	$5,142	$44,554	($2,722)	5.55%
2004	($19,759)	$4,919	$41,832	$14,666	5.75%
2003	($14,841)	$18,185	$56,498	($21,254)	6.13%
2002	$3,344	$9,249	$35,244	($24,908)	N/A
2001	$12,594	($1,282)	$10,336	$1,547	N/A
2000	$11,311	N/A	$11,883	N/A	N/A

ASSET ALLOCATIONS

	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
EQUITY ALLOCATION	36.12%	37.37%	38.10%	41.66%	40.21%	38.83%	45.01%	45.69%	43.71%	54.84%	60.55%	61.68%
CHANGE FROM PRIOR YEAR	-3.34%	-1.92%	-8.54%	3.59%	3.56%	-13.73%	-1.48%	4.53%	-20.30%	-9.42%	-1.83%	N/A
FIXED ALLOCATION	44.08%	42.60%	42.09%	38.88%	39.65%	40.78%	35.44%	35.75%	41.53%	33.04%	29.02%	28.77%
CHANGE FROM PRIOR YEAR	3.46%	1.21%	8.26%	-1.94%	-2.75%	15.06%	-0.87%	-13.91%	25.72%	13.84%	0.87%	N/A
OTHER ALLOCATION	19.80%	20.03%	19.81%	19.46%	20.13%	20.39%	19.55%	18.56%	14.76%	12.12%	10.43%	9.55%
CHANGE FROM PRIOR YEAR	-1.13%	1.14%	1.79%	-3.35%	-1.27%	4.31%	5.33%	25.74%	21.78%	16.16%	9.20%	N/A

The table below shows the trend of the divestiture of OPEB liabilities from $317 billion in 2003 to $198 billion in 2016.

OPEB FUNDED STATUS

FISCAL YEAR	OPEB MV OF ASSETS	CHANGE FROM PRIOR YEAR	OPEB APBO	CHANGE FROM PRIOR YEAR	OPEB FUNDED STATUS	CHANGE FROM PRIOR YEAR	OPEB FUNDED RATIO	CHANGE FROM PRIOR YEAR
2016	$53,702	($2,117)	$197,912	($8,295)	($144,210)	$6,193	27.1%	0.1%
2015	$55,819	($4,664)	$206,207	($26,848)	($150,403)	$22,169	27.1%	1.1%
2014	$60,483	($1,358)	$233,055	$13,852	($172,572)	($13,603)	26.0%	-2.3%
2013	$61,842	$4,128	$219,203	($39,988)	($158,969)	$43,990	28.2%	5.9%
2012	$57,714	$3,953	$259,190	$11,613	($202,959)	($7,662)	22.3%	0.6%
2011	$53,761	($3,561)	$247,577	$2,510	($195,297)	($5,449)	21.7%	-1.7%
2010	$57,321	$6,162	$245,067	$9,179	($189,848)	($5,120)	23.4%	1.7%
2009	$51,159	($7,049)	$235,887	($42,782)	($184,728)	$35,733	21.7%	0.8%
2008	$58,208	($29,842)	$278,669	($42,650)	($220,461)	$12,808	20.9%	-6.5%
2007	$88,049	$4,539	$321,319	($10,826)	($233,269)	$15,366	27.4%	2.3%
2006	$83,510	$5,979	$332,145	($17,086)	($248,635)	$23,065	25.1%	2.9%
2005	$77,531	$6,906	$349,231	$14,881	($271,700)	($7,976)	22.2%	1.1%
2004	$70,626	$15,474	$334,350	$17,541	($263,724)	($2,067)	21.1%	3.7%
2003	$55,152	N/A	$316,809	N/A	($261,657)	N/A	17.4%	N/A

Who are the Milliman 100 companies?

The Milliman 100 companies are the 100 U.S. public companies with the largest defined benefit pension plan assets for which a 2016 annual report was released by March 5, 2017.

This 2017 report is Milliman's 17th annual study. The total value of the pension plan assets of the Milliman 100 companies was more than $1.39 trillion at the end of 2016.

About the study

The results of the Milliman 2017 Pension Funding Study are based on the pension plan accounting information disclosed in the footnotes to the companies' Form 10-K annual reports for the 2016 fiscal year and for previous fiscal years. These figures represent the Generally Accepted Accounting Principles (GAAP) accounting information that public companies are required to report under Financial Accounting Standards Board (FASB) Accounting Standards Codification Subtopics 715-20, 715-30, and 715-60. In addition to providing the financial information on the funded status of their U.S. qualified pension plans, the footnotes may also include figures for the companies' nonqualified and foreign plans, both of which are often unfunded or subject to different funding standards from those for U.S. qualified pension plans. The information, data, and footnotes do not represent the funded status of the companies' U.S. qualified pension plans under ERISA.

Twelve of the companies in the 2017 Milliman Pension Funding Study had fiscal years other than the calendar year. The 2017 study includes seven new companies to reflect mergers, acquisitions, and other corporate transactions during 2016. Figures quoted from 2015 reflect the 2017 composition of Milliman 100 companies and may not necessarily match results published in the 2016 Milliman PFS. Generally, the group of Milliman 100 companies selected remains consistent from year to year. Privately held companies, mutual insurance companies, and U.S. subsidiaries of foreign parents were excluded from the study.

The results of the 2017 study will be used to update the Milliman 100 PFI as of December 31, 2016, the basis of which will be used for projections in 2017 and beyond. The Milliman 100 PFI is published on a monthly basis and reflects the effect of market returns and interest rate changes on pension funded status.

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