MILLIMAN WHITE PAPER

2018 Corporate Pension Funding Study

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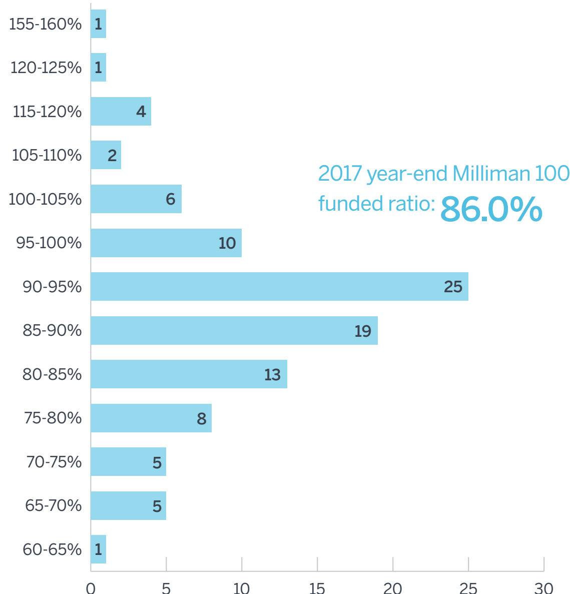
The 2018 edition of the Milliman Corporate Pension Funding Study (PFS) is our 18th annual analysis of the financial disclosures of the 100 largest corporate defined benefit (DB) pension plan sponsors. These 100 companies are ranked highest to lowest by the value of their pension assets reported to the public, to shareholders, and to the U.S. federal agencies that have an interest in such disclosures.

We're pleased to report that during 2017 the private single-employer defined benefit plans of the Milliman 100 companies made significant funding improvements. The Milliman 100 funded ratio settled at 86.0%, an improvement from the year-end 2016 funded ratio of 81.1%. The funding deficit dropped by a noteworthy $72 billion, ending the year at $252 billion.

FIGURE 1: DISTRIBUTION BY FUNDED RATIO



Corporate plan sponsors made the strategic decision in fiscal year (FY) 2017 to contribute $62 billion to their plans, pushing 2017's total assets to a record $1.55 trillion. This year's contributions represent a 45.0% increase from the $42.6 billion contributed in 2016, and are tied with 2012 for the highest amount contributed to the Milliman 100. Seventeen of these employers contributed at least $1 billion, with seven of them contributing more than $2 billion.

Soaring global equity markets contributed to very strong investment returns in 2017 with the average plan earning about 12.7%. Overall, investment returns added $175 billion to plan assets ($92 billion was expected based on the companies' long term investment return assumptions, while the excess above the expected was $83 billion).

The impact on the income statement was just as dramatic. FY2017 pension expense (the charge to the income statement under Accounting Standards Codification Subtopic 715) decreased 36.6% to $19.7 billion from $31.1 billion in FY2016.

An additional factor contributing to the improvement in funded ratios was a modest decline in life expectancy assumptions due to participants and pensioners not living quite as long as previously predicted by the Society of Actuaries. This reduced the actuarial present value of the pension benefits, referred to as the projected benefit obligation (PBO).

Despite the strong equity markets and higher short-term interest rates, the one metric over which an employer has no control, the discount rate, declined during 2017 to end the year at 3.60%, down 37 basis points from the 3.97% rate a year earlier. As a result, the PBO of the Milliman 100 plans increased to an all-time high of $1.80 trillion (an $82 billion increase since the end of 2016). Note that the record $62 billion in contributions still left a $20 billion hole to be covered, which investment returns helped to overcome.

During 2017, pension settlements or pension risk transfer (PRT) programs matured with an apparent overall acceptance by the participants and the financial markets. We are unaware of any significant litigation by participant plaintiffs claiming they were harmed or otherwise disadvantaged by the actions taken by an employer to effect a PRT. We also have observed that the number of high-quality insurance companies chosen to accept the responsibilities to pay the agreed-to pension claims has broadened. While we make no inference on the process of how employers are choosing these insurers, the selection is clearly defined in U.S. Department of Labor (DOL) rules as a fiduciary obligation.

Underneath the effect of PRT, of course, is the measurable reductions in future premiums to be collected by the Pension Benefit Guaranty Corporation (PBGC), which itself experienced funded status gains in the federal fiscal year ending September 30, 2017. The PBGC recorded a 91% funded ratio for the plans

that terminated (when the sponsoring employer filed for Chapter 11 insolvency) and were sent to PBGC as the receiving custodian. In 2017, PBGC total premium income exceeded pension claims by over $1 billion for the first time. A discussion of PBGC considerations is included in this report.

Last, we acknowledge that, as of this publication date, there have been four new tax laws, the Tax Cut and Jobs Act of 2017 (December 22, 2017), the Continuing Appropriations Act, 2018 (January 22, 2018), the Bipartisan Budget Act of 2018 (February 8, 2018), and the Consolidated Appropriations Act, 2018 (March 23, 2018).

None of these four laws affected the ERISA laws governing the provisions, compliance, or administration of single-employer defined benefit pension plans. We do know that the reduction of the corporate marginal tax rates to 21% in 2018 from 35% in 2017 may cause plan sponsors to implement certain strategies concerning the recognition of the contribution in a specific tax year. It is possible that many plan sponsors anticipated the lowering of corporate tax deductibility of contributions made for plan years after 2017. This could have been a major driver for the increase in 2017 plan sponsor contributions relative to the past few years. The trend in higher contributions may also continue into the 2018 calendar year, as plan sponsors with calendar year plans can continue to designate contributions toward the 2017 plan year and hence claim higher tax deductions, as long as such contributions are made before September 15, 2018. We will be following this activity carefully.

We discuss in more detail the results of our study below:

- Three companies exited the Milliman 100 study due to mergers and are no longer part of the Milliman 100 companies covered in the 2018 PFS:
  - Reynolds American was acquired by British American Tobacco.
  - Dow Chemical and DuPont merged and formed DowDuPont, which is included in our study.
- Three companies newly joined the Milliman 100: DowDuPont, Edison International, and Rockwell Automation

Forty-three of the Milliman 100 companies in this 2018 PFS indicated they have adopted or plan to adopt a “spot rate” approach for calculating pension expense. Forty-six companies included such disclosures for our 2017 PFS.

Pension risk transfer transactions from the plan sponsors to insurance companies continued in 2017. FY2017 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 $12.7 billion, compared with $13.6 billion in FY2016. Examples among Milliman 100 companies are: Hartford Financial ($1.6 billion), International Paper ($1.3 billion), and DowDuPont ($1.2 billion). These pension risk transfer strategies also relieve the plan sponsor of the PBGC premium payments that are required for the former employees, who are part of the participant head count. The downside of these pension risk transfers is the opportunity costs in potential excess investment earnings, as witnessed in 2017, and the premium or additional cost sponsors have to bear beyond ordinary funding requirements to transfer pension risk to third parties.

FIGURE 2: HIGHLIGHTS (FIGURES IN $ BILLION)

	FISCAL YEAR ENDING 2016	2017	CHANGE
Market Value of Assets	$1,396.2	$1,550.5	$154.3
Projected Benefit Obligation	$1,720.7	$1,802.6	$81.9
Funded Status	($324.6)	($252.1)	$72.4
Funded Percentage	81.1%	86.0%	4.9%
Net Pension Income/(Cost)	($31.1)	($19.7)	$11.4
Employer Contributions	$42.6	$61.8	$19.2
Discount rate	3.97%	3.60%	-0.37%
Actual Rate of Return	8.4%	12.7%	4.3%

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 healthcare benefits. FY2016 marked the first year that the aggregate reporting of these accumulated postretirement benefit obligations (APBOs) was under $200 billion (at about $199.1 billion). This trend continued in FY2017, with the APBOs decreasing an additional $3.1 billion to $196.0 billion. This is consistent with the trend by plan sponsors over the last decade of divesting other postemployment benefits (OPEB) liabilities.

As we write this report in April 2018, we acknowledge that our year-end 2017 results do not reflect the changes in the financial markets since January 1.

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 2017:

1. The actual return on the pension trusts was 12.7%, when the expectation was an investment return of 6.8%—an investment gain of $83 billion.

   For the nine years 2009 to 2017, 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 nine years, pension plan asset allocations to equities decreased to about 36.0%, from about 46.0%, while fixed income allocation has increased to about 45.0% from about 36.0%.

2. Employers increased 2017 cash contributions by $19 billion compared with 2016. About $62 billion was contributed in 2017, compared with about $43 billion in 2016. Among other contribution strategies, there may have been a desire to reduce the PBGC premium applicable to pension plan underfunding and to leverage the higher tax deductions on 2017 contributions under tax reform changes.

Pension expense in 2017 declined by $11.4 billion to $19.7 billion, from $31.1 billion in 2016. One may reasonably conclude that pension expense will decrease in 2018 because of the favorable 2017 asset performance. However, the effect of lower discount rates and possible plan settlements 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-three 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 for some or all of their plans, which is a refined use of the individual "spot" interest rates on the corporate bond yield curve used to develop the projected benefit obligation (PBO).

De-risking transactions continued in 2017, and the estimated dollar volume of pension risk transfers collected from the accounting disclosures was lower in 2017 ($12.7 billion) compared with 2016 ($13.6 billion). Note that the federal DOL prefers the use of "pension risk transfer" (PRT) when referring to these transactions in which a complete divestiture of DB plan obligations to participants or to insurance companies occurs. PRT transactions may continue in 2018, spurred by the significant increases in the premiums payable to the PBGC.

Very strong year for investment returns—especially for plans with significant allocations to equities

With the average discount rate falling 43 basis points for the calendar fiscal year plans, we estimate that their pension liabilities increased approximately 10% on an economic basis (due to the passage of time and changes to discount rates, ignoring benefit payments and accruals). Plans with significant allocations to fixed income as part of a liability-driven investment (LDI) strategy typically have allocations to long-duration high-quality bonds. Returns on these bonds in 2017 were in the low double digits and did their job of tracking the increase to pension liabilities. But equities, both U.S. and non-U.S., performed even better than long-duration bonds in 2017 and rewarded those plans with large equity allocations.

FIGURE 3: ESTIMATED RATES OF RETURN EARNED IN 2017 FOR THE 87 PLANS WITH CALENDAR FISCAL YEARS BY THEIR ALLOCATION TO EQUITIES

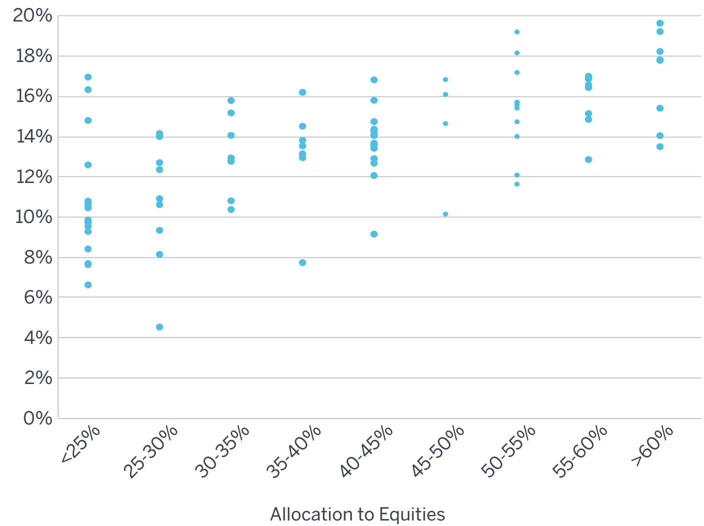
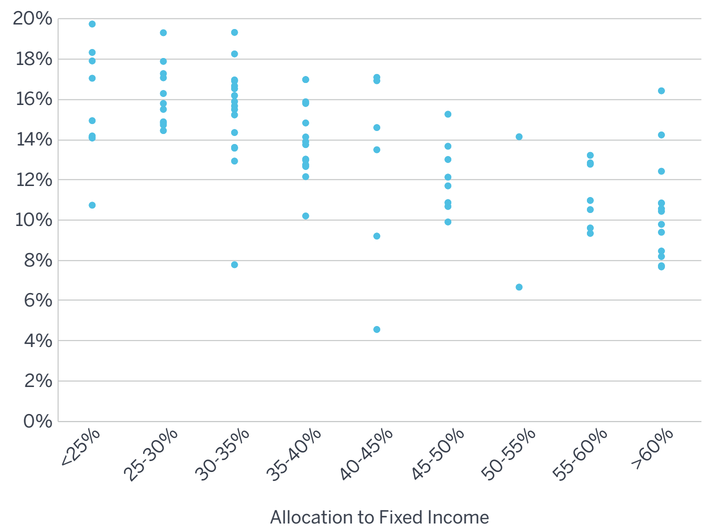


FIGURE 4: ESTIMATED RATES OF RETURN EARNED IN 2017 FOR THE 87 PLANS WITH CALENDAR FISCAL YEARS BY THEIR ALLOCATION TO FIXED INCOME



Rates of return earned in 2017 for the 87 pension plans with calendar fiscal years ranged from 4.6% to 19.7%, with an average of 13.6%. Returns mostly fell in the 8.0% to 18.0% range (77 plans), with five plans earning returns below 8.0% and five plans earning returns above 18.0%. Generally, plans with greater allocations to equities earned higher returns. The eight plans with equity allocations of at least 60% earned an average return of 17.0% while the 17 plans with equity allocations below 25% earned an average return of 10.8%.

FIGURE 5: 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
2017	22	10.8%	65	14.6%
2016	20	9.9%	67	8.4%
2015	19	0.2%	68	-0.1%
2014	15	13.6%	72	9.5%
2013	11	4.0%	76	12.3%

Equity allocations in the pension portfolios fell slightly to 36.0% by the end of 2017. 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.

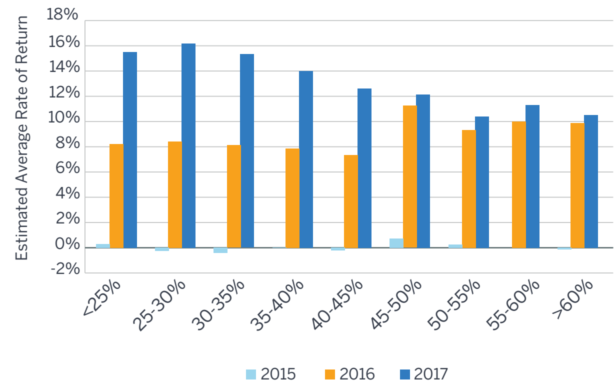
The actual asset return for the plan sponsor with the highest allocation to equities (81.9%) was 14.1%, which was better than the return of 7.7% for the plan sponsor with the lowest allocation to equities (7.1%) in 2017. The highest asset return among all companies with calendar year fiscal years was 19.7%, while the lowest was 4.6%.

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 appears to have stabilized in 2017. The percentage of pension fund assets allocated to equities, fixed income, and other investments was 36.0%, 45.2%, and 18.8%, respectively, at the end of 2017, compared with 36.2%, 44.0%, and 19.8%, respectively, at the end of 2016.

Unlike in 2016, when plans with high allocations to fixed income (over 50%) outperformed the other plans (9.9% average return compared with 8.4%), in 2017 the plans with high allocations to fixed income underperformed the other plans (10.8% compared with 14.6%).

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 rates. Among the 87 companies in the Milliman PFS with calendar year fiscal years, 21 pension plans had fixed income allocations greater than 40.0% at the end of 2012 and maintained an allocation of at least 40.0% to fixed income through 2017. Over this five-year period, these 21 plans experienced lower funded ratio volatility rates than the other 66 plans (an average funded ratio volatility of 4.6% versus 6.2% for the other 66 plans) while earning a slightly lower five-year annualized rate of return (an average of 7.9% versus 8.9%). Contrary to 2016, when these 21 plans outperformed relative to the other 66 plans (9.8% average return versus 8.4%), they underperformed the other plans in 2017 (10.4% average return versus 14.6%).

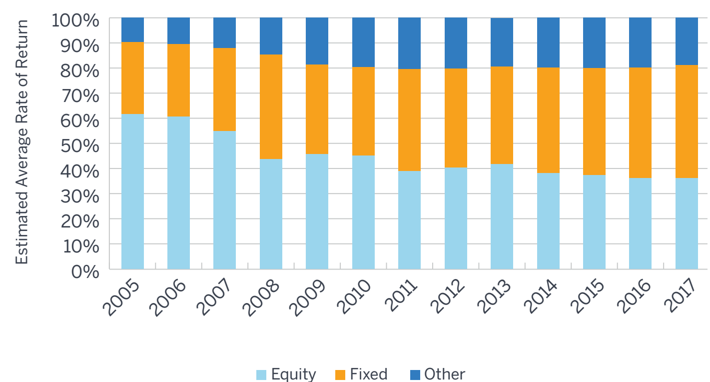
FIGURE 6: ESTIMATED AVERAGE RATE OF RETURN BY ALLOCATION TO FIXED INCOME, 2015-2017



Overall allocations to equities decreased during 2017, resulting in an average allocation of 36.0%—the lowest equity allocation in the 18-year history of the Milliman PFS. Two of the 100 companies had increases to their equity allocations of more than 10.0% in 2017. Only one company decreased its equity allocation by more than 10.0% in 2017, compared with three companies in 2016, four in 2015, 11 in 2014, five in 2013, three in 2012, and 11 in 2011.

Overall allocations to fixed income increased in 2017, resulting in an average allocation of 45.2%. Only one company had a decrease of more than 10.0% in its fixed income allocation. Three companies, however, increased their fixed income allocations by more than 10.0% in 2017, compared with five in 2016, three in 2015, seven in 2014, four in 2013, two in 2012, and six in 2011.

FIGURE 7: ASSET ALLOCATION OVER TIME



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 2017. Five companies increased their allocations by 5.0% or more to other asset classes during 2017.

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 28.6% at the end of 2005. The percentage of investments in other asset classes was also up from the 9.7% allocation at the end of 2005.

PRT activities continue

Similar to the past few years, plan sponsors continued to execute pension risk transfer (PRT) activities in 2017 as a way of divesting pension obligations from their DB plans and corporate balance sheets. Large-scale pension buyout programs were transacted for three of the Milliman 100 companies, as pension assets and liabilities were transferred to insurance companies. DowDuPont, International Paper, and Hartford Financial reported transactions of $1.2 billion, $1.3 billion, and $1.6 billion, respectively.

The 2017 PRT market was slightly less active when compared with the 2016 market. Extracting the dollar volume of PRT activities from Form 10-K is an estimate and it appears that the reported dollar volume in 2017 was $12.7 billion, a decrease of $0.9 billion compared with the 2016 reported dollar volume of $13.6 billion.

PRTs are deemed by plan sponsors to be an effective way to reduce a pension plan's balance sheet footprint, but generally they have an adverse effect on the plan's funded status, as assets paid to transfer accrued pension liabilities 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 these same liabilities.

In 2016, 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, which effectively and permanently ended the ability of a plan sponsor to offer lump-sum settlements 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 2017 and more are expected in 2018 as well, as plan sponsors continue to transfer pension liabilities in order to lower PBGC variable rate premiums.

The PBGC flat dollar amount increases to $74 in 2018 from $69 in 2017 and $64 in 2016. The variable rate premium has increased to 3.8% of the pension plan's PBGC-funded status deficit in 2018, from 3.4% of the 2017 deficit. (PBGC's funded status deficit uses interest rates and mortality assumptions that are different from those used to determine the funded status of the Milliman 100 companies.)

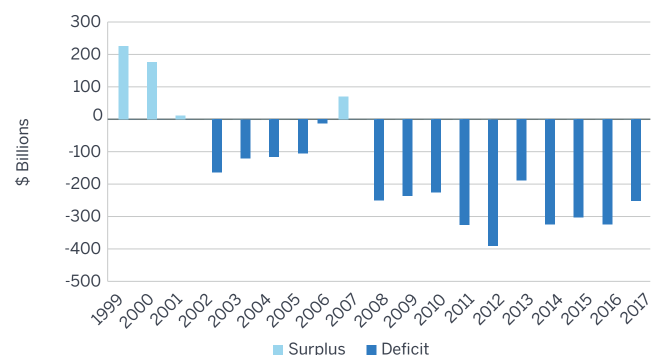
The 2017 funded ratio of 86.0% was higher than we reported in the January 2018 Milliman 100 Pension Funding Index (PFI). The January 2018 PFI funded ratio of 84.1% was based on data collected for the 2017 Milliman Pension Funding Study. This revised funded ratio of 86.0% from our current study reflects the collection and collation of publicly available information. Investment returns and contributions during 2017 were higher than we had forecasted, both key factors for the higher funded ratio. The higher-than-expected cash contributions during 2017 are likely in response to rising PBGC premiums as well as the added advantage of taking the tax deduction in 2017 at the higher applicable tax rates as a result of tax reform changes.

Impact of decreasing discount rates evident in 2017 financial statements of the Milliman 100 companies

Discount rates used to measure plan obligations, determined by reference to high-quality corporate bonds, decreased during 2017, thereby increasing liabilities and continuing the trend from the prior year. The median discount rate decreased to 3.60% at the end of 2017 from 3.97% in 2016. The 3.60% discount rate at the end of 2017 was the lowest in the 18-year history of the Milliman PFS. Discount rates have generally declined from 7.63% at the end of 1999.

The impact of the decreasing discount rates in 2017 and increased PBO was more than offset with a favorable investment gain of 12.7%. This resulted in an increase in the funded status. The 2017 funding deficit of $252.1 billion is a $72.4 billion decrease over the year-end 2016 funding deficit.

FIGURE 8: PENSION SURPLUS/(DEFICIT)

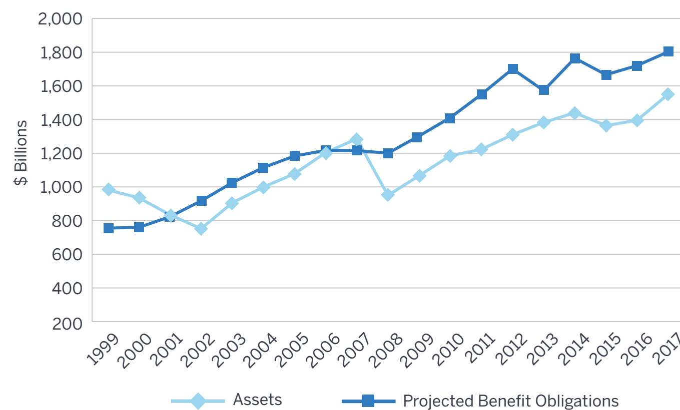


Pension expense—the charge to company earnings—decreased to $19.7 billion in 2017 as compared with $31.1 billion during fiscal year 2016, an $11.4 billion decrease. The peak level of pension expense occurred in 2012, when it was $56.3 billion. In addition, 43 of the Milliman 100 companies indicated that they have adopted or plan to adopt a "spot rate" approach for estimating the service and interest cost components of net periodic benefit costs. This approach is likely to produce a pension expense savings in the near term. In spite of the decrease in discount rates during 2017 and corresponding higher PBO and service costs, the 2018 pension expense is likely to decrease due to the investment gains experienced during 2017.

The "spot rate" approach 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 2018 for pension disclosure.

FIGURE 9: PLAN ASSETS AND OBLIGATIONS



The effect of a decrease of 37 basis points in discount rates was partially offset by the favorable investment returns during 2017, continued revisions to life expectancy assumptions, and the impact of PRT activity.

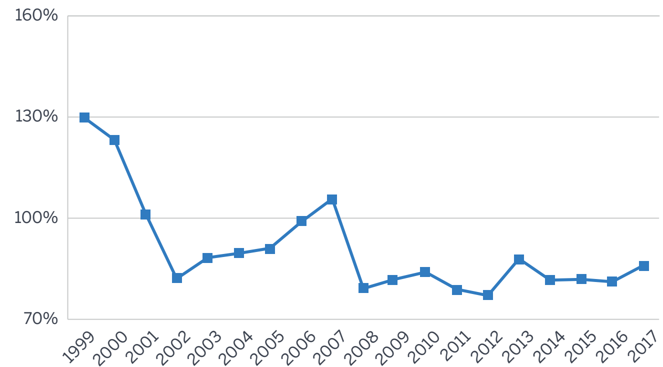
The net 4.8% increase in pension obligations generated by the decrease in discount rates, revisions to life expectancy assumptions used to measure pension plan obligations (at a median rate of 3.60% at year-end 2017, down 37 basis points from 3.97% at year-end 2016), and PRT activity resulted in a liability increase of $81.9 billion. Pension liabilities for IBM increased above the $100 billion pension obligation mark in 2017, but a favorable investment return of 8.4% helped its plan to improve its funded status to 92.1% at the end of 2017, up from 89.9% at the end of 2016.

The 12.7% investment gain (actual weighted average return on assets during 2017) resulted in an increase of $154.3 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 their long term investment return expectations to be, on average, 6.8%.

Funded ratios increase

The funded ratio of the Milliman 100 pension plans increased during 2017 to 86.0% from 81.1% at the end of 2016 (85.9% for plans with calendar year fiscal years in 2017, up from 81.4% for 2016). The aggregate pension deficit decreased by $58.6 billion during these calendar year companies' 2017 fiscal years to $234.1 billion, from an aggregate deficit of $292.7 billion at the end of 2016. For fiscal year 2017, funded ratios ranged from a low of 62.4% for American Airlines to a high of 155.0% for NextEra Energy, Inc.

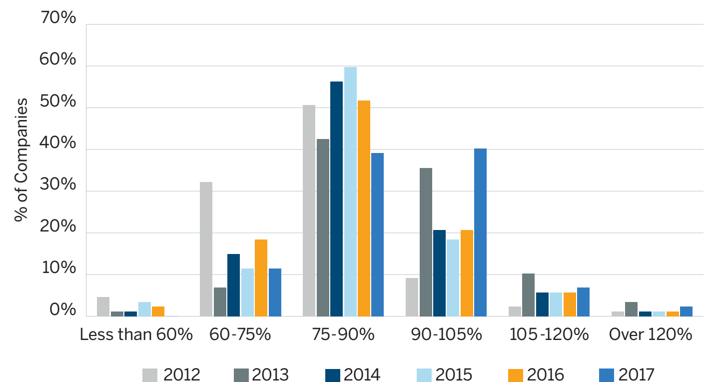
FIGURE 10: FUNDED RATIO – ASSETS/PROJECTED BENEFIT OBLIGATION



The 4.9% increase in the 2017 funded ratio reversed the 2016 decrease. The funded ratio had been 81.9% at the end of 2015. Note that there has not been a funding surplus since the 105.8% funded ratio in 2007.

Thirteen of the 87 Milliman 100 companies with calendar year fiscal years reported surplus funded status at year-end 2017, compared with eight companies in 2016, nine in 2015, eight in 2014, 19 in 2013, and six in 2012. These numbers pale in comparison with the 49 companies with reported surplus funded status at year-end 2007. The combined impact of higher contributions and favorable investment returns offset the increase in liabilities caused by lower discount rates. As a result, 79 of the Milliman 100 companies with calendar year fiscal years reported an increase in funded ratio for 2017, compared with 37 for 2016.

FIGURE 11: DISTRIBUTION BY FUNDED STATUS – 2012-2017 (CALENDAR YEAR FISCAL YEARS ONLY)

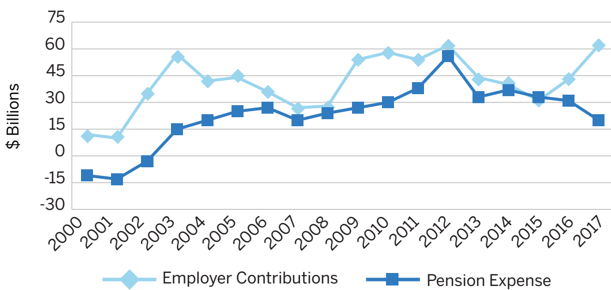


2017 pension expense decreases

There was a net decrease in 2017 pension expense: a $19.7 billion charge to earnings ($11.4 billion lower than in 2016). This is well below the $56.3 billion peak level in 2012. Twenty-six companies recorded 2017 pension income (i.e., a credit to earnings). Twenty-one companies also recorded income in 2016 and 16 companies in 2015, up from nine in 2012.

The discount rate for 2018 pension expense is based on the year-end 2017 SEC disclosures. We estimate that 2018 pension expense will decrease to $12.0 billion, a $7.7 billion decrease compared with 2017, under the assumption of a continued 3.60% discount rate.

FIGURE 12: PENSION EXPENSE (INCOME) AND CONTRIBUTIONS



The aggregate 2017 cash contributions of the Milliman 100 companies were $61.8 billion, an increase of $19.2 billion from the $42.6 billion contributed in 2016, and only $0.1 billion less than the 2012 record high level of $61.9 billion. Contributions had started to increase in 2016 to $42.6 billion from the amounts contributed in 2015 and 2014 ($31.2 billion and $40.2 billion, respectively). We speculate that this is due to increased contributions by many plan sponsors to minimize their PBGC premium increases, in addition to the tax benefits under tax reform changes as discussed earlier.

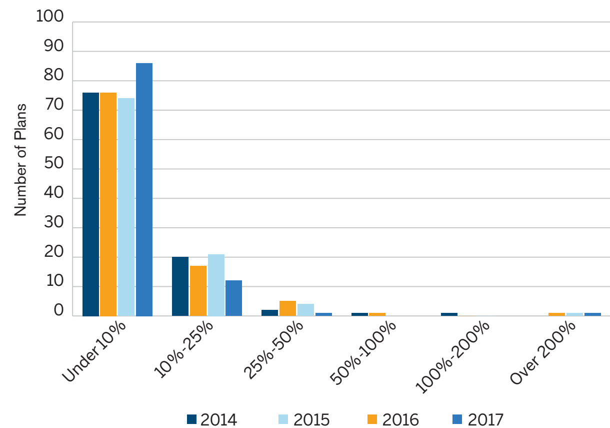
Many plan sponsors may continue to contribute at these higher levels for 2018 if they can't find better uses for their corporate cash. We expect that some plan sponsors undertaking PRT activities (e.g., lump-sum payouts, annuity purchases, etc.) may have to increase contributions to maintain funded status. 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 8.9%, which offset the increase in pension obligations (which is due to lower discount rates). This resulted in a decrease in the unfunded pension liability as a percentage of market capitalization of 3.1% at the end of 2017, from 4.3% at the end of 2016. Pension deficits represented less than 10.0% of market capitalization for 86 of the Milliman 100 companies in 2017 and 74 of the Milliman 100 companies in 2016. This is also an increase from 2013, when 81 companies had deficits that were less than 10.0% of their market capitalizations.

Since 2011, we have had investment returns exceeding expectations in five out of seven years, which has resulted in elevated levels of market capitalization. In 2017, one company's plan deficit exceeded 50.0% of market capitalization, down from two companies in 2015. This is down from nine in 2012 and 2011, the year we first started tracking this figure.

FIGURE 13: UNDERFUNDED PENSION LIABILITY AS A PERCENTAGE OF MARKET CAPITALIZATION 2014-2017



Investment performance exceeds expectations

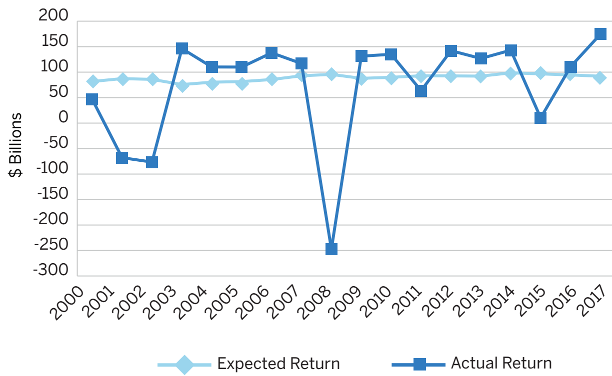
The weighted average investment return on pension assets for the Milliman 100 companies' 2017 fiscal years was 12.7%, which was above their average expected rates of return of 6.8%. Ninety-eight of the Milliman 100 companies exceeded their expected returns in 2017, including 12 of the 13 with off-calendar fiscal years. Seventy-four companies exceeded their expected returns in 2016. However, only three companies exceeded their expected returns in 2015 and all three had off-calendar fiscal years. But 81 companies in 2014 exceeded their expected returns compared with 78 in 2013, 93 in 2012, 20 in 2011, and 98 in 2010.

The 2017 investment return was favorable, with plan sponsors of the Milliman 100 companies now achieving investment returns above expectations during seven out of the last nine years. At December 31, 2017, total asset levels were $1.55 trillion. This is $264 billion above the value of $1.286 trillion at the end of 2007, prior to the collapse of the global financial markets.

During 2017, investment gains offset by the combination of annuity purchases and lump-sum settlements increased the market value of assets by $154.3 billion. The Milliman 100 companies' actual investment return for 2017 was $174.6 billion compared with the expected return of $92.0 billion, a difference of $82.6 billion. For the five-year period ending in

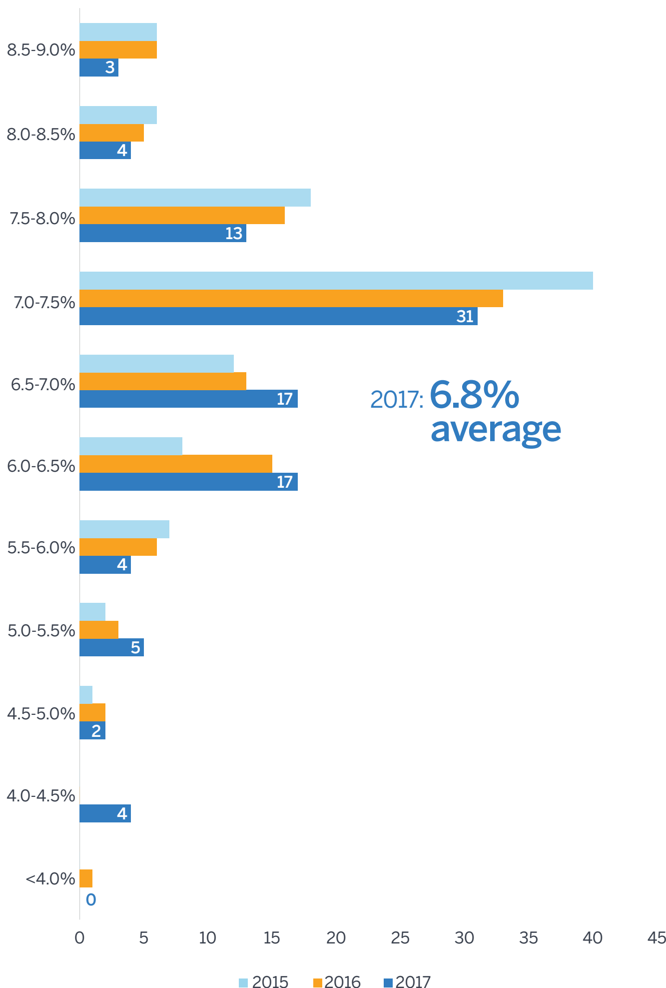
2017, investment performance had averaged 8.5% compounded annually. There were three years of investment losses over the past 18 years (2001, 2002, and 2008), contributing to an annualized investment return of only 6.4% over that period.

FIGURE 14: INVESTMENT RETURN ON PLAN ASSETS



Expected rates of return

FIGURE 15: SPONSOR-REPORTED ASSUMED RATE OF RETURN ON INVESTMENTS



Companies continued to lower their expected rates of return on plan assets to an average of 6.8% for 2017, as compared with 7.0% for 2016, 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.

None of the Milliman 100 companies utilized an expected rate of return for 2017 of at least 9.0% (the highest was 8.96% for 2017). Only one company had utilized an expected rate of return of at least 9.0% in 2016, 2015, 2014, and 2013, 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 83 in 2000.

What to expect in 2018 and beyond

Our expectations in the coming year include:

- While the financial disclosures indicate that up to $34 billion may be contributed in 2018, preliminary forecasts of contributions are fickle.
- Pension expense is expected to decrease compared with the 2017 level by $7.7 billion. This is due to reductions in interest cost as a result of the lower discount rate and the investment gains experienced during 2017.
- As funding levels improve, we expect plan sponsors to continue to shed equity risk and explore asset-liability matching (ALM) and risk-hedging strategies.
- Further pension risk transfer activities are likely to occur in the form of lump-sum windows for terminated vested participants and pension lift-outs as rising PBGC premiums remain a concern for plan sponsors.

Appendix

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

FIGURE 16: 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
2017	$1,550,462	$154,291	$1,802,591	$81,861	86.0%	4.9%	($252,130)	$72,430
2016	$1,396,171	$32,280	$1,720,731	$54,439	81.1%	-0.7%	($324,560)	($22,159)
2015	$1,363,891	($76,597)	$1,666,291	($98,342)	81.9%	0.2%	($302,400)	$21,745
2014	$1,440,488	$57,564	$1,764,633	$192,256	81.6%	-6.3%	($324,145)	($134,692)
2013	$1,382,924	$72,446	$1,572,377	($128,270)	88.0%	10.9%	($189,453)	$200,716
2012	$1,310,477	$87,700	$1,700,647	$150,966	77.1%	-1.8%	($390,169)	($63,267)
2011	$1,222,778	$37,210	$1,549,680	$138,486	78.9%	-5.1%	($326,903)	($101,277)
2010	$1,185,568	$119,129	$1,411,194	$108,446	84.0%	2.2%	($225,626)	$10,683
2009	$1,066,439	$116,831	$1,302,748	$102,505	81.9%	2.7%	($236,308)	$14,326
2008	$949,609	($336,556)	$1,200,243	($15,881)	79.1%	-26.6%	($250,635)	($320,675)
2007	$1,286,165	$82,821	$1,216,124	($744)	105.8%	6.9%	$70,041	$83,565
2006	$1,203,344	$125,303	$1,216,868	$33,402	98.9%	7.8%	($13,524)	$91,901
2005	$1,078,041	$79,152	$1,183,465	$68,411	91.1%	1.5%	($105,425)	$10,741
2004	$998,889	$93,772	$1,115,054	$89,840	89.6%	1.3%	($116,165)	$3,933
2003	$905,117	$152,888	$1,025,215	$108,510	88.3%	6.2%	($120,098)	$44,378
2002	$752,228	($82,294)	$916,704	$93,650	82.1%	-19.3%	($164,476)	($175,944)
2001	$834,522	($100,988)	$823,054	$63,770	101.4%	-21.8%	$11,468	($164,759)
2000	$935,511	N/A	$759,284	N/A	123.2%	N/A	$176,227	N/A

FIGURE 17: 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			
2017	6.8%	12.7%	13.6%	$92,020	$174,587	($82,567)
2016	7.0%	8.4%	8.7%	$94,498	$110,638	($16,140)
2015	7.1%	0.8%	0.0%	$96,625	$10,358	$86,267
2014	7.3%	10.7%	10.2%	$98,637	$143,049	($44,412)
2013	7.4%	10.1%	11.3%	$92,206	$126,812	($34,606)
2012	7.6%	11.9%	12.0%	$92,631	$142,118	($49,487)
2011	7.8%	5.6%	4.3%	$92,857	$63,580	$29,277
2010	8.0%	12.7%	12.7%	$89,914	$134,974	($45,061)
2009	8.1%	14.4%	17.3%	$87,816	$131,415	($43,599)
2008	8.1%	-19.3%	-22.5%	$95,607	($247,476)	$343,083
2007	8.3%	9.9%	9.0%	$92,863	$116,941	($24,077)
2006	8.3%	12.9%	12.7%	$85,496	$137,881	($52,385)
2005	8.4%	11.2%	10.6%	$81,476	$109,981	($28,505)
2004	8.4%	12.3%	11.7%	$80,319	$110,149	($29,830)
2003	8.5%	19.6%	19.8%	$75,650	$146,274	($70,625)
2002	9.2%	-8.8%	-8.3%	N/A	N/A	N/A
2001	9.4%	-6.5%	-6.6%	N/A	N/A	N/A
2000	9.4%	4.2%	3.4%	N/A	N/A	N/A

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

FIGURE 18: PENSION COST

FISCAL YEAR	PENSION INCOME/(COST)	CHANGE FROM PRIOR YEAR	EMPLOYER CONTRIBUTION	CHANGE FROM PRIOR YEAR	DISCOUNT RATE
2017	($19,690)	($11,378)	$61,760	($19,175)	3.60%
2016	($31,068)	($2,341)	$42,585	($11,344)	3.97%
2015	($33,409)	($3,422)	$31,241	$8,981	4.29%
2014	($36,831)	$3,880	$40,222	$3,404	4.00%
2013	($32,951)	($23,343)	$43,626	$18,303	4.76%
2012	($56,294)	$17,948	$61,929	($7,941)	4.04%
2011	($38,346)	$8,146	$53,987	$3,525	4.80%
2010	($30,200)	$3,298	$57,513	($3,275)	5.44%
2009	($26,902)	$2,541	$54,238	($25,915)	5.84%
2008	($24,361)	$4,732	$28,322	($1,610)	6.36%
2007	($19,629)	($6,858)	$26,713	$9,256	6.20%
2006	($26,487)	$1,520	$35,969	$8,391	5.75%
2005	($24,967)	$5,126	$44,360	($2,449)	5.53%
2004	($19,840)	$4,934	$41,911	$14,591	5.75%
2003	($14,907)	$18,180	$56,502	($21,411)	6.13%
2002	$3,273	$9,318	$35,091	($24,732)	N/A
2001	$12,592	($1,264)	$10,359	$1,571	N/A
2000	$11,327	N/A	$11,930	N/A	N/A

FIGURE 19: ASSET ALLOCATIONS (BY PERCENTAGE)

	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
Equity Allocation	36.05	36.18	37.43	38.15	41.70	40.30	38.91	45.04	45.69	43.80	54.90	60.59	61.72
Change From Prior Year	-0.35	-3.36	-1.88	-8.51	3.48	3.57	-13.61	-1.42	4.32	-20.23	-9.39	-1.82	N/A
Fixed Allocation	45.16	44.02	42.55	42.03	38.82	39.55	40.68	35.41	35.76	41.52	33.05	29.04	28.61
Change From Prior Year	2.60	3.46	1.23	8.28	-1.87	-2.76	14.88	-0.98	-13.88	25.64	13.80	1.52	N/A
Other Allocation	18.79	19.81	20.02	19.82	19.48	20.15	20.41	19.55	18.55	14.68	12.05	10.37	9.68
Change From Prior Year	-5.13	-1.07	1.02	1.73	-3.30	-1.30	4.40	5.38	26.37	21.84	16.25	7.11	N/A

FIGURE 20: 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
2017	$62,149	$6,575	$195,980	($3,133)	($133,831)	$9,708	31.7%	3.8%
2016	$55,574	($2,040)	$199,113	($8,327)	($143,539)	$6,303	27.9%	0.1%
2015	$57,614	($4,696)	$207,441	($27,270)	($149,842)	$22,558	27.8%	1.2%
2014	$62,310	($1,328)	$234,710	$14,306	($172,400)	($14,027)	26.5%	-2.3%
2013	$63,639	$4,383	$220,404	($40,139)	($158,373)	$44,397	28.9%	6.1%
2012	$59,256	$4,180	$260,543	$11,689	($202,770)	($7,511)	22.7%	0.6%
2011	$55,076	($3,582)	$248,854	$2,589	($195,259)	($5,549)	22.1%	-1.7%
2010	$58,657	$6,309	$246,265	$9,400	($189,710)	($5,193)	23.8%	1.7%
2009	$52,348	($6,818)	$236,865	($42,925)	($184,517)	$36,107	22.1%	1.0%
2008	$59,166	($30,336)	$279,790	($42,549)	($220,624)	$12,213	21.1%	-6.6%
2007	$89,501	$4,622	$322,339	($10,786)	($232,837)	$15,409	27.8%	2.3%
2006	$84,879	$6,125	$333,125	($17,373)	($248,246)	$23,498	25.5%	3.0%
2005	$78,754	$6,999	$350,498	$15,006	($271,744)	($8,008)	22.5%	1.1%
2004	$71,756	$15,214	$335,492	$16,953	($263,736)	($1,739)	21.4%	3.6%
2003	$56,542	N/A	$318,539	N/A	($261,997)	N/A	17.8%	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 2017 annual report was released by March 12, 2018.

This 2018 report is Milliman's 18th annual study. The total value of the pension plan assets of the Milliman 100 companies was more than $1.55 trillion at the end of 2017.

About the study

The results of the Milliman 2018 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 2018 fiscal year and for previous fiscal years. These figures represent the 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.

Thirteen of the companies in the 2018 Milliman Pension Funding Study had fiscal years other than the calendar year. The 2018 study includes three new companies to reflect mergers, acquisitions, and other corporate transactions during 2017. Figures quoted from 2017 reflect the 2018 composition of Milliman 100 companies and may not necessarily match results published in the 2017 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 2018 study will be used to update the Milliman 100 PFI as of December 31, 2017, the basis of which will be used for projections in 2018 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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