



# Survey of Capital Market Assumptions

## 2015 Edition



Horizon Actuarial Services, LLC is proud to serve as the actuary to more than 80 multiemployer defined benefit pension plans across the United States and across various industries. As actuary to these plans, we must develop assumptions regarding future investment returns on plan assets. We then use those assumptions as we determine the actuarial values of the benefits promised by these plans to their participants and beneficiaries.

At Horizon Actuarial, we are actuaries, not investment professionals. Therefore, when developing assumptions as to what returns a pension plan's assets might be expected to earn in the future, we look to our colleagues in the investment advisory community. For each of the past five years, we have surveyed different investment advisors and asked them to provide their "capital market assumptions" – their expectations for future risk and returns for different asset classes in which pension plans commonly invest.

The information gathered from this survey can help answer the commonly-asked question: "Is my plan's investment return assumption still reasonable?" Of course, there are many factors to consider when evaluating a plan's investment return assumption, such as its asset allocation and the maturity of its participant population. Any of these factors can make the expected return for one plan very different from others. Therefore, this report does not opine on the reasonableness of any one plan's investment return assumption. Nevertheless, we hope this report will be a useful resource for trustees, actuaries, and investment professionals alike.

***Horizon Actuarial sincerely thanks the 29 investment advisors who participated in this survey.***

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# Survey of Capital Market Assumptions: 2015 Edition

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## Summary

When Horizon Actuarial first conducted this survey in 2010, 8 investment advisors responded with their capital market assumptions. In 2011, there were 12 respondents. Over the past few years, the survey has expanded considerably. This 2015 edition of the survey includes 29 respondents.

In general, expected returns have come down in recent years. When we focus on the 11 advisors who participated in all five surveys from 2011 to 2015, we see that expected returns for equity investments generally decreased from 2012 to 2015, after a slight increase from 2011 to 2012. We also see expected returns for fixed income investments have generally decreased from 2011 to 2015, though they did increase from 2013 to 2014. Expected volatilities have remained relatively flat in the past few years.

We also see that expected returns are generally lower over the short term than over the long term. This trend is apparent when we focus on the 8 advisors who provided assumptions for both the short term (up to 10 years) and long term (20 years or more). The difference is more pronounced for fixed income investments, possibly due to the expectation that bond yields (currently near historic lows) will rise over time.

For most pension plans, we believe a horizon of 20 years or more is appropriate for evaluating the reasonableness of the long-term investment return assumption. However, it is also important to understand the potential impact of lower expected returns over the short term. Therefore, this survey constructs separate return expectations over horizons of both 10 years and 20 years.

For illustration, this report also constructs an asset allocation for a hypothetical multiemployer pension plan and uses the results from the survey to develop expected returns for the plan. In general, expected returns for the hypothetical plan were slightly lower based on the results for this 2015 edition of the survey than they were under the 2014 edition. The decrease was driven by lower expected returns for equities (as noted above), partially offset by higher expected returns for fixed income investments. Changes to the survey respondents also had a small effect on the results.

If you have any questions about how this survey relates to your multiemployer pension plan, please contact your consultant at Horizon Actuarial or visit the “contact us” page on our website, [www.horizonactuarial.com](http://www.horizonactuarial.com).

For general questions about the survey, please contact Jason Russell at [jason.russell@horizonactuarial.com](mailto:jason.russell@horizonactuarial.com).

*Horizon Actuarial Services, LLC does not provide investment, legal, or tax advice. Please consult with your investment advisor, legal counsel, or tax advisor for information specific to your plan's investment, legal, or tax implications.*

*Horizon Actuarial Services, LLC is an independent consulting firm specializing in providing actuarial and consulting services to multiemployer benefit plans. For more information, please visit our website at [www.horizonactuarial.com](http://www.horizonactuarial.com).*

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## Survey Respondents

Exhibit 1 below lists the 29 investment advisors whose capital market assumptions are included in the 2015 survey. This report will not attribute specific assumptions to individual advisors, which was a precondition of the survey.

Originally, this survey was exclusive to the multiemployer plan community; it included only assumptions from investment advisors to multiemployer pension plans. The survey has expanded over the past few years, and it now includes assumptions from investment advisors outside of the multiemployer plan community.

Specifically, of the 29 sets of capital market assumptions included in the 2015 edition of the survey, 21 were provided by investment advisors to multiemployer plans, 5 were obtained from published white papers, and 3 were provided by investment advisors who do not consult with multiemployer plans. The different types of survey respondents are indicated in Exhibit 1 below.

### Exhibit 1

2015 Survey Respondents	
<i>AJ Gallagher</i>	<i>Morgan Stanley Wealth Management</i>
<i>Alan Biller</i>	
<i>Aon Hewitt</i>	<i>New England Pension Consultants (NEPC)</i>
<i>Bank of New York Mellon*</i>	<i>Pavilion Advisory Group**</i>
<i>Bogdahn Group</i>	<i>Pension Consulting Alliance (PCA)</i>
<i>Callan Associates</i>	
<i>CapTrust*</i>	<i>The PFM Group</i>
<i>Envestnet**</i>	<i>RV Kuhns (RVK)</i>
<i>Graystone Consulting</i>	<i>Segal Rogerscasey</i>
<i>Investment Performance Services, LLC (IPS)</i>	<i>SEI</i>
<i>J.P. Morgan Asset Management*</i>	<i>Sellwood Consulting</i>
	<i>Towers Watson**</i>
<i>Marco Consulting Group</i>	<i>UBS</i>
<i>Marquette Associates</i>	<i>Verus (Wurts &amp; Associates)</i>
<i>Meketa Investment Group</i>	<i>Voya Investment Management*</i>
<i>Merrill Lynch Global Institutional Consulting</i>	<i>Wells Fargo Investment Institute*</i>

\* Assumptions obtained from published white paper  
 \*\* Respondent outside multiemployer community

## Investment Horizons

When evaluating the expected return assumption for an active, ongoing multiemployer pension plan, the plan actuary will usually consider investment returns over a long-term investment horizon of 20 years or more. A shorter time horizon, 10 years or shorter, may be more appropriate when evaluating the return assumption for a very mature plan that has unusually high negative cash flows relative to its asset value.

It is also important to understand the sensitivity of plan funding to changes in future investment returns. For example, the actuary for an active, ongoing pension plan will typically set the plan's investment return assumption based on expectations over a long-term horizon. However, it would still be instructive for the actuary to evaluate the sensitivity of funding results to the extent that investment returns over the short term are expected to be higher or lower than the long-term assumption.

The survey respondents were requested to provide their most recent capital market assumptions: expected returns for different asset classes, standard deviations for those expected returns, and a correlation matrix. The survey respondents were also requested to indicate the investment horizon(s) to which their assumptions apply. If the respondent developed separate assumptions for different time horizons, they were requested to provide each set of assumptions.

In the 2015 edition of the survey, 19 respondents provided one set of assumptions: of those, 17 specified a time horizon of 10 years and 2 specified a time horizon of 10 to 15 years. The remaining 10 respondents provided assumptions over both shorter-term (5 to 10 years) and longer-term (20 to 30 years) horizons.

Exhibit 2 below summarizes the time horizons specified by each survey respondent, grouped by type of respondent. Note that of the 10 respondents who provided both short-term and long-term assumptions, 9 of them are advisors to multiemployer pension plans.

### Exhibit 2

Investment Time Horizons				
Respondent Type	(A)	(B)	(C)	Total
10 Years	11	4	2	17
10 to 15 Years	1	1	-	2
<u>Both Short and Long-Term</u>	<u>9</u>	<u>-</u>	<u>1</u>	<u>10</u>
Total	21	5	3	29

(A) Multiemployer plan advisors  
 (B) Published white papers  
 (C) Respondents outside multiemployer community

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## Short-Term vs. Long-Term

As noted in the previous section, survey respondents provided expected returns over different time horizons. Given current market conditions, many investment advisors may expect returns for certain asset classes to be different in the short term than over the long term.

For comparability, this survey groups expected returns into two time horizons: 10 years and 20 years. We often refer to the 10-year expected returns as “short-term” and the 20-year expected returns as “long-term.”

When comparing the expected returns for the 10 respondents who provided both short-term and long-term assumptions,<sup>1</sup> we see some interesting differences. See Exhibit 3 below. Expected returns shown below are annualized (geometric) over the indicated time horizon.

### Exhibit 3

Average Expected Returns: Short-Term vs. Long-Term			
<i>Subset of 10 Survey Respondents</i>			
Asset Class	10-Year Horizon	20-Year Horizon	Difference
US Equity - Large Cap	6.93%	7.81%	0.89%
US Equity - Small/Mid Cap	7.03%	8.18%	1.14%
Non-US Equity - Developed	7.48%	8.07%	0.59%
Non-US Equity - Emerging	8.78%	9.00%	0.22%
US Corporate Bonds - Core	3.32%	4.41%	1.09%
US Corporate Bonds - Long Dur.	3.66%	4.55%	0.89%
US Corporate Bonds - High Yield	5.30%	6.33%	1.03%
Non-US Debt - Developed	2.38%	3.39%	1.01%
Non-US Debt - Emerging	5.55%	6.13%	0.58%
US Treasuries (Cash Equivalents)	2.14%	3.11%	0.97%
TIPS (Inflation-Protected)	2.82%	3.43%	0.62%
Real Estate	6.32%	6.41%	0.09%
Hedge Funds	5.37%	6.04%	0.67%
Commodities	4.46%	4.74%	0.28%
Infrastructure	6.75%	7.32%	0.57%
Private Equity	9.55%	10.09%	0.54%
Inflation	2.20%	2.29%	0.09%

*The 10-year and 20-year returns shown above are the averages for the 10 advisors who provided both short-term and long-term assumptions. Expected returns are annualized (geometric).*

The consensus among these 10 advisors was that returns are expected to be lower in the short term compared to the long term. In general, the difference between long term and short term returns is more pronounced for US equity and fixed income investments.

As noted earlier, the results shown in Exhibit 3 are based on a subset of 10 advisors. If we include all 29 survey respondents, the short-term and long-term expected returns do not change dramatically. See Exhibit 4 below.

### Exhibit 4

Average Expected Returns: Short-Term vs. Long-Term			
<i>All Survey Respondents</i>			
Asset Class	10-Year Horizon	20-Year Horizon	Blended (10-20 Yrs)
US Equity - Large Cap	6.79%	7.81%	7.09%
US Equity - Small/Mid Cap	6.91%	8.18%	7.31%
Non-US Equity - Developed	7.28%	8.07%	7.48%
Non-US Equity - Emerging	8.60%	9.00%	8.68%
US Corporate Bonds - Core	3.31%	4.41%	3.69%
US Corporate Bonds - Long Dur.	3.72%	4.55%	4.01%
US Corporate Bonds - High Yield	5.58%	6.33%	5.96%
Non-US Debt - Developed	2.34%	3.39%	2.72%
Non-US Debt - Emerging	5.74%	6.13%	5.95%
US Treasuries (Cash Equivalents)	2.02%	3.11%	2.36%
TIPS (Inflation-Protected)	2.88%	3.43%	3.07%
Real Estate	6.29%	6.41%	6.32%
Hedge Funds	5.54%	6.04%	5.75%
Commodities	4.28%	4.74%	4.37%
Infrastructure	6.93%	7.32%	7.09%
Private Equity	9.26%	10.09%	9.47%
Inflation	2.20%	2.29%	2.23%

*Expected returns are annualized (geometric).  
10-year horizon results are based on 29 survey respondents.  
20-year horizon results are based on 10 survey respondents.*

The 10-year expected returns shown above include responses from all 29 respondents, while the 20-year expected returns include responses from only the 10 respondents who provided longer-term assumptions.

The “blended” assumptions shown above represent the average of the 20-year expected returns from the 10 advisors who provided longer-term assumptions and the 10-year expected returns from the other 19 advisors.

For simplicity, certain exhibits in this report focus on the blended assumptions. A benefit to using the blended assumptions is that they include all 29 survey respondents rather than a subset. A drawback is that they may understate expected returns when considering an investment horizon of 20 years or more.

<sup>1</sup> In cases where a respondent indicated a time horizon shorter than 10 years (for example, 5 or 7 years), the shorter-term expected returns were combined with the longer-term expected returns to achieve a 10-year horizon. Similarly, if a respondent indicated a time horizon longer than 20 years (for example, 30 years), the longer-term expected returns were combined with the shorter-term expected returns to achieve a 20-year horizon.

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## Differing Opinions

Exhibit 5 below shows the ranges of expected annual returns provided by the survey respondents for each asset class. Note the wide range between the minimum and maximum expected returns. As the saying goes, “reasonable people may differ.”

To illustrate the distribution of expected returns, the exhibit below also shows the range of the middle 50 percent of survey results: the range between the 25<sup>th</sup> and 75<sup>th</sup> percentiles. It also shows the median expected return for each asset class: the 50<sup>th</sup> percentile.<sup>2</sup> Expected returns are annualized (geometric), and they are blended over investment horizons of 10 and 20 years.

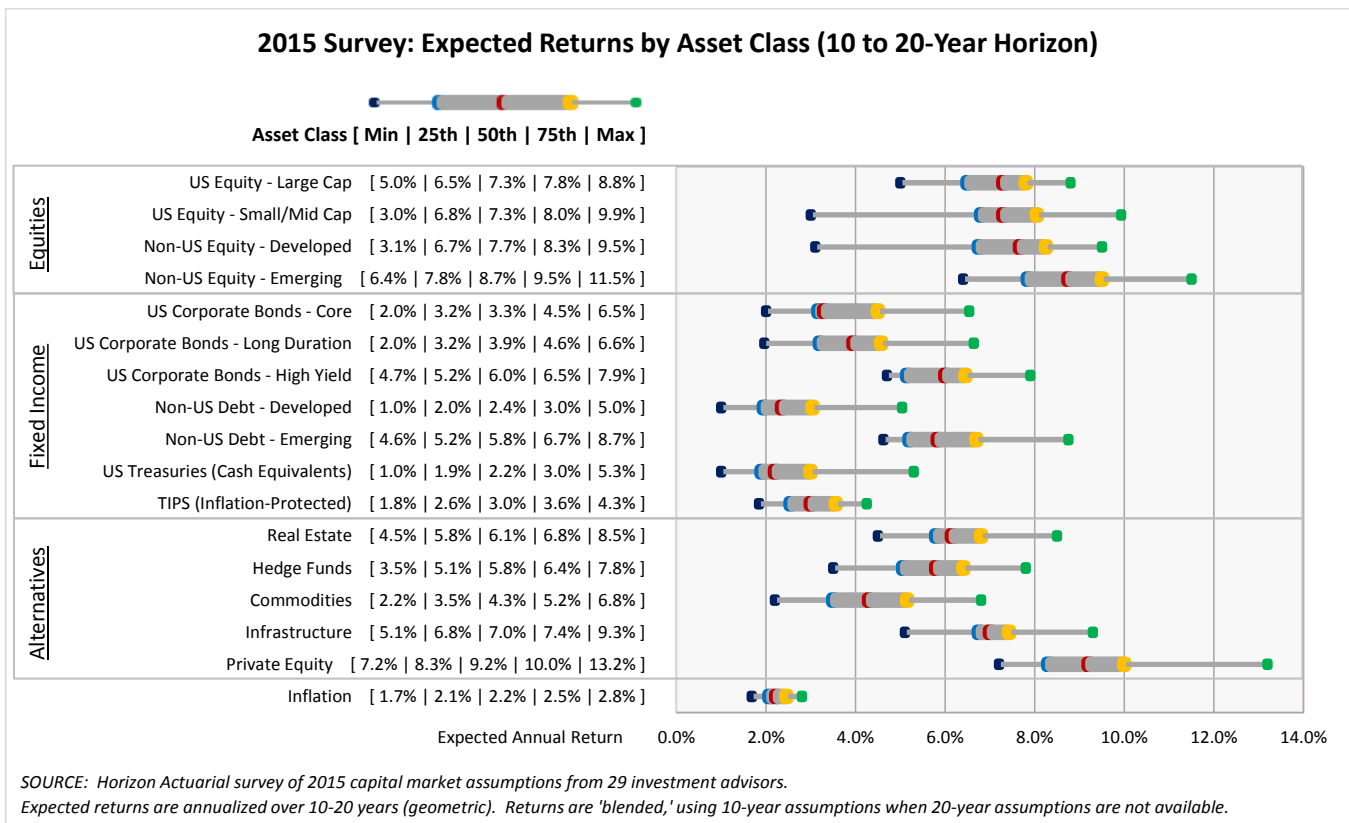
For example, focusing on US large cap equity, the most conservative investment advisor expects annualized returns of 5.0% per year, while the most optimistic advisor expects annualized returns of 8.8% per year. The middle 50 percent of expected returns spans from 6.5% to 7.8%, and the median expected annual return is 7.3%.

For some asset classes, there are big differences in the expected returns from advisor to advisor. As described later in this report, one reason for the wide ranges is that some investment advisors focus on relatively short investment horizons, while others consider longer-term horizons. Regardless of the different investment horizons, however, it is apparent that advisors have varying opinions regarding future investment returns.

A summary of the average assumptions from the survey can be found in the appendix to this report (Exhibit 14). This summary includes expected returns, standard deviations, and a correlation matrix.

The appendix also contains supplemental exhibits showing distributions of expected returns with respect to a 20-year horizon (Exhibit 15) and a 10-year horizon (Exhibit 16). The expected returns in these supplemental exhibits are more internally comparable than those shown below, as they apply to the same investment horizons.

Exhibit 5



<sup>2</sup> In the exhibit above showing expected returns by asset class, prior editions of this survey showed *average* results instead of *median* results. In general, the differences between average and median expected returns are relatively small. See Exhibit 14 for a summary of *average* expected returns by asset class.

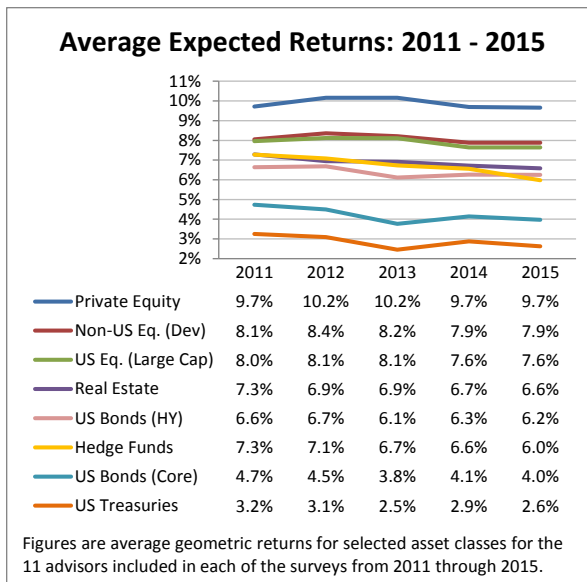
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## Changing Outlooks

In recent years, there has been much discussion about whether it is reasonable for pension plans to expect future investment returns to be as high as they have been historically. When people look at the market collapse of 2008, high unemployment rates, continuing economic uncertainty, and historically low interest rates, it is understandable if they have a gloomy outlook for future investment returns.

Exhibit 6 below shows average expected returns for the 11 advisors who participated in each of our surveys from 2011 to 2015. The selected asset classes shown below are those for which at least 9 of the 11 advisors provided expected returns.

**Exhibit 6**

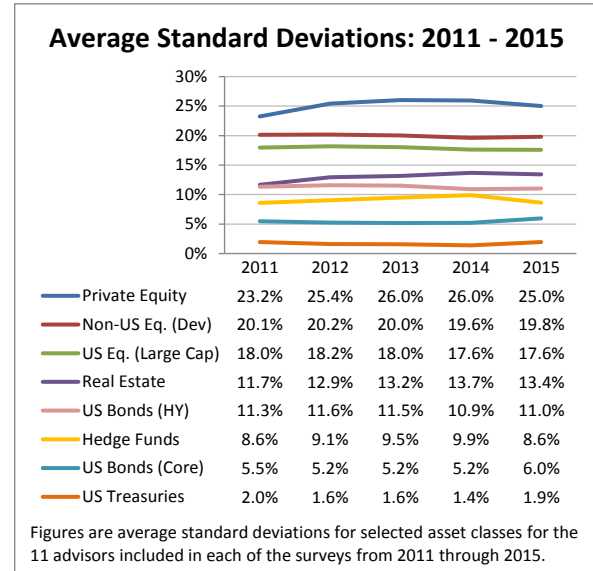


For this subset of respondents, average expected returns for equity-type investments such as US large cap equity, non-US equity, and private equity generally increased from 2011 to 2012, decreased slightly from 2012 to 2014, and stayed relatively flat from 2014 to 2015.

On the other hand, advisors typically lowered their expected returns for fixed income-type investments like core bonds, high yield bonds, and US Treasuries from 2011 through 2013. Perhaps anticipating rising interest rates, many consultants increased their expected returns for fixed income investments from 2013 to 2014. From 2014 to 2015, however, average expected returns for fixed income investments came down again.

In addition to expected returns, it is also important to consider expected volatility (standard deviation). Changes in average standard deviations from 2011 to 2015 are shown in Exhibit 7 below.

**Exhibit 7**



In general, average standard deviations have stayed relatively flat from 2011 to 2015. This may imply that, on average, these 11 advisors expect the financial markets to remain volatile, but they do not necessarily expect volatility to increase.

Note that average standard deviations increased slightly from 2011 to 2013 for alternative asset classes such as private equity, real estate, and hedge funds. This was due to a few advisors significantly increasing their volatility expectations for these asset classes, while the other advisors kept them essentially level.

From 2013 to 2015, average standard deviations stayed relatively flat or perhaps decreased slightly for most asset classes. Exceptions are US core bonds and US Treasuries, for which there were noticeable increases in average standard deviations from 2014 to 2015.

As with Exhibit 5, the assumptions shown in Exhibits 6 and 7 are "blended." That is, they reflect expected returns over 20-year horizon when available, and over a 10-year horizon for advisors who did not provide longer-term assumptions.<sup>3</sup>

<sup>3</sup> Of the 10 survey respondents who provided both shorter-term and longer-term assumptions, 8 of them indicated no difference in the standard deviations of the expected returns over the short term versus the long term. For the other 2 respondents, the differences between short-term and long-term standard deviations were very minor.

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## Evaluating the Return Assumption

Multiemployer pension plans are usually invested in a well-diversified mix of stocks, bonds, real estate, and alternative investments structured to maximize returns over the long term while minimizing return volatility.

The actuary of a multiemployer pension plan must evaluate the plan's asset allocation and, based on expectations of future returns, develop an assumption for what plan assets are projected to earn over the long term. This assumption is then used (along with others) to determine the actuarial value of the benefits promised by the plan to its participants and beneficiaries.

The actuary will often rely on the future return expectations of the plan's investment advisor in developing the plan's investment return assumption. However, as noted earlier, different investment advisors often have very differing opinions on what future returns will be. Therefore, it can be beneficial to keep in mind other advisors' expectations when setting the investment return assumption.

In the following exhibits, we will evaluate the investment return assumption for a hypothetical multiemployer pension plan. Exhibit 8 below shows the asset allocation for this hypothetical plan. The asset allocations are completely arbitrary, except for the fact that we made sure to include at least a small allocation to every asset class in the survey.

### Exhibit 8

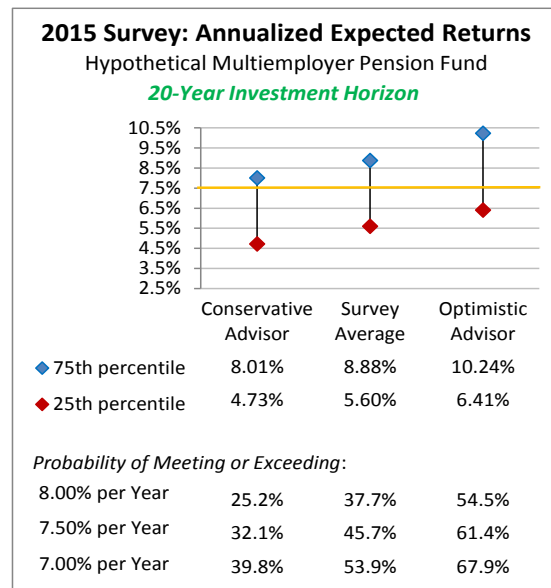
Hypothetical Multiemployer Plan	
Asset Class	Weight
US Equity - Large Cap	20.0%
US Equity - Small/Mid Cap	10.0%
Non-US Equity - Developed	7.5%
Non-US Equity - Emerging	5.0%
US Corporate Bonds - Core	7.5%
US Corporate Bonds - Long Duration	2.5%
US Corporate Bonds - High Yield	5.0%
Non-US Debt - Developed	5.0%
Non-US Debt - Emerging	2.5%
US Treasuries (Cash Equivalents)	5.0%
TIPS (Inflation-Protected)	5.0%
Real Estate	10.0%
Hedge Funds	5.0%
Commodities	2.5%
Infrastructure	2.5%
Private Equity	5.0%
<b>TOTAL PORTFOLIO</b>	<b>100.0%</b>

The following exhibits show expected annualized (geometric) returns for the hypothetical multiemployer pension plan over two different investment horizons.

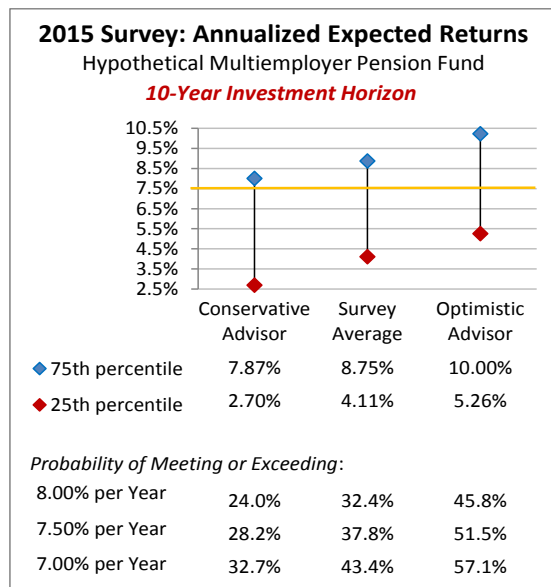
Exhibit 9 evaluates the return expectations for the hypothetical plan over a 20-year horizon based on assumptions from the 10 respondents who provided longer-term assumptions. These results may be more appropriate for evaluating the long-term investment return (interest rate) assumption.

Exhibit 10 shows the results over a 10-year horizon based on assumptions from all 29 respondents. These results may be more appropriate for evaluating the sensitivity of funding results to short-term investment returns.

### Exhibit 9



### Exhibit 10



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It is important to keep in mind that the expected returns shown in Exhibits 9 and 10 apply only to the hypothetical asset allocation shown in Exhibit 8. The expected returns will be different – perhaps very significantly – for different asset allocations.

Exhibit 13 in the appendix to this report shows more detail regarding the derivation of the expected returns for this hypothetical pension plan.

The following are points to consider when reviewing the results in Exhibits 9 and 10:

**Reasonable Range:** When setting the interest rate assumption for pension valuations, actuaries traditionally constructed a “reasonable range” of assumptions and then selected a best-estimate point within that range. Actuaries would often consider the reasonable range to be bounded by the 25<sup>th</sup> and 75<sup>th</sup> percentiles of possible results – the range in which actual annualized returns are more likely to fall than not.

The 2013 update to the applicable actuarial standards of practice de-emphasized use of the reasonable range when setting the interest rate assumption. Nevertheless, considering this range remains instructive; it may be difficult for an actuary to justify an interest rate assumption outside of this range.

Based on the average assumptions in this 2015 survey, the reasonable range for this hypothetical pension plan is very wide: 5.60% to 8.88% over the next 20 years. Note that the reasonable range is wider for a 10-year horizon (4.11% to 8.75%) than for a 20-year horizon. This is due to the fact that, while annual returns may be volatile from one year to the next, deviations will be lower when returns are annualized over longer horizons.

**Probability of Meeting/Exceeding the Benchmark:** For example, say that the actuary for this hypothetical pension plan expects its investment returns to be 7.50% per year, represented by the gold lines in Exhibits 9 and 10. Based on the average assumptions in the 2015 survey, there is a 45.7% probability the plan will meet or beat its 7.50% benchmark on an annualized basis over a 20-year period. The probability is lower, 37.8%, that the plan will meet or beat its benchmark over the next 10 years.

Also note that over a 20-year period, the probability that the annualized investment return will exceed 8.00% (arbitrarily, 50 basis points above the benchmark return) is 37.7%. The probability that the annualized return will exceed 7.00% (50 basis points below the benchmark) is 53.9%. These probabilities are a bit lower when focusing on a 10-year horizon rather than a 20-year horizon.

**Optimistic and Conservative Assumptions:** As previously noted, different investment advisors have sometimes widely varying future capital market expectations. Therefore, it may also be interesting to consider the range of expected returns based on the assumptions provided by the most conservative and most optimistic respondents to the survey.

For this hypothetical asset allocation, the assumptions from the most conservative advisor indicate that the probability of beating the 7.50% benchmark assumption over the next 20 years is 32.1%. However, using assumptions from the most optimistic advisor results in a probability of 61.4%. Again, reasonable people may differ.

**Limitations:** The following are some important limiting factors to keep in mind when reviewing these results:

- The asset classes in this survey do not always align perfectly with the asset classes provided by the investment advisors. Adjustments were made to standardize the different asset classes from the respondents.
- Many of the advisors develop their future assumptions based on investment horizons of no more than 10 years, and some returns are generally expected to be lower in the short term. The typical multiemployer pension plan will have an investment horizon that is much longer than 10 years.
- The return expectations included in the survey are based on indexed returns. In other words, they do not reflect any additional returns that may be earned due to active asset managers outperforming the market (“alpha”), net of investment expenses.
- The return expectations do not adjust for plan size. Specifically, they do not take into account the fact that certain investment opportunities are more readily available to larger plans, as well as the fact that larger plans may often receive more favorable investment fee arrangements than smaller plans.
- The ranges of expected annualized returns were constructed using basic, often simplified, formulas and methodologies. More sophisticated investment models – which may consider various economic scenarios, non-normal distributions, etc. – could produce significantly different results.

In most cases, adjustments made to account for these limitations tended to slightly lower the expected returns in the survey, for the sake of conservatism.



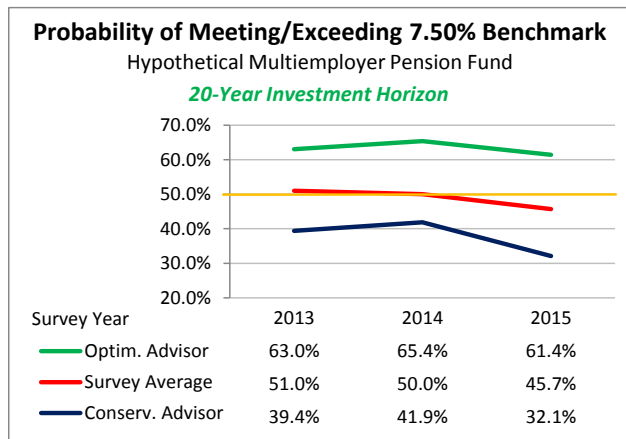
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## Comparison with Prior Surveys

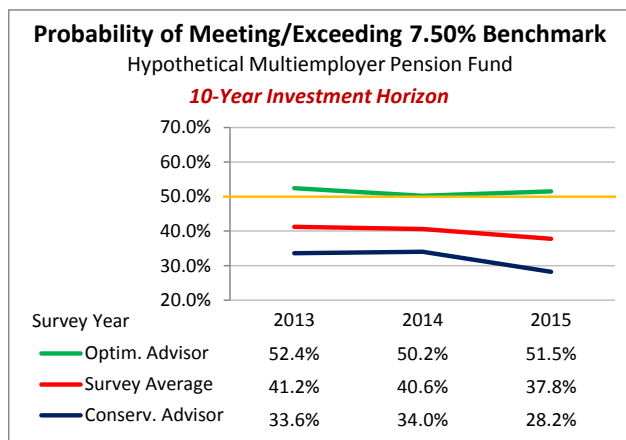
Exhibits 6 and 7 showed how expected returns and standard deviations for certain asset classes have changed over the past few years. Similarly, Exhibits 11 and 12 below show how return expectations for the hypothetical multiemployer pension plan whose asset allocation is shown in Exhibit 8 have changed from 2013 to 2015. (Note that 2013 was the first year the survey grouped expected returns by 10-year and 20-year investment horizons.)

Both exhibits show the probabilities that the hypothetical pension plan will meet or exceed its 7.50% benchmark return on an annualized basis over the given time horizon. Exhibit 11 focuses on expected returns over a 20-year period, and Exhibit 12 focuses on expected returns over a 10-year period. Probabilities are shown for the survey average for 2013, 2014, and 2015. For comparison, probabilities are also shown for the most conservative and optimistic survey respondents in each survey.

### Exhibit 11



### Exhibit 12



As shown in Exhibits 11 and 12, the probabilities that this hypothetical pension plan would meet or beat a benchmark return of 7.50% have come down from 2013 to 2015. In other words, based on the average assumptions in the 2015 survey, there is a slightly lower chance that the hypothetical pension plan will earn at least 7.50% per year on its investments over the next 10 or 20 years, compared to the average assumptions from the 2013 and 2014 surveys.

For example:

- The probability of the hypothetical plan meeting or exceeding an annualized return of 7.50% over the next 20 years is 45.7% based on the 2015 survey, compared to 50.0% based on the 2014 survey or 51.0% based on the 2013 survey.
- The probability of the hypothetical plan meeting or exceeding an annualized return of 7.50% over the next 10 years is 37.8% based on the 2015 survey, compared to 40.6% based on the 2014 survey or 41.2% based on the 2013 survey.

Other points of note when comparing the results from the 2015 survey to those from prior years:

- The most conservative advisor was a first-time respondent in the 2013 survey. This advisor provided only short-term assumptions, it has remained the most conservative advisor in each year it has participated in the survey. Its 10-year expected return for our hypothetical pension plan has decreased by about 0.25% from 2013 to 2015.
- The most optimistic advisor significantly lowered its return expectations from 2012 to 2013, and it has made adjustments (both upward and downward) each year from 2013 to 2015. From 2014 to 2015, this advisor's expected 10-year annualized returns for our hypothetical pension plan increased by about 0.10%, but its expected 20-year annualized returns decreased by about 0.10%.
- The addition of new survey respondents have had relatively small effects on the expected returns since 2013. To contrast, the addition of new respondents with more conservative outlooks caused significant drops in expected returns from the 2012 survey to the 2013 survey.

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## **Glossary**

The following are basic definitions of some of the investment terminology used in this report.

### Expected Return

The *expected return* is the amount that an individual asset class – or the total portfolio of plan assets – is expected to earn on its investments over a period of time. Returns are expressed as a percentage of plan assets and are assumed to be net of investment fees.

### Arithmetic vs. Geometric Returns

In very simple terms, an *arithmetic* return is the average return in any one year; in other words, it has a one-year investment horizon. A *geometric* return is the annualized return over a multi-year period. In general, when evaluating longer-term investment horizons, we find it more appropriate to focus on geometric returns.

Since 2013, the survey has focused on geometric returns. Editions prior to 2013 focused more on arithmetic returns. Please note the change when comparing results from this survey to results from surveys prior to 2013.

Most advisors provided both arithmetic and geometric expected returns in response to the survey. For advisors who provided only arithmetic returns, we made adjustments to convert them to geometric returns.

### Standard Deviation

The *standard deviation* is a measure of the expected volatility in the returns. Generally, the standard deviation expresses how much returns may vary in any one year. Assuming that returns are “normally distributed,” there is about a 68% probability that the actual return for a given year will fall within one standard deviation (higher or lower) of the expected return. There is about a 95% probability that the actual return will fall within two standard deviations of the expected return.

### Correlation

An important aspect of capital market assumptions is the degree to which the returns for two different asset classes move in tandem with one another – this is their *correlation*. For example, if two asset classes are perfectly correlated, their correlation coefficient will be 1.00; in other words, if one asset class has a return of X% in a given market environment, then the other asset class is expected to also have a return of X%. A portfolio becomes better diversified as its asset classes have lower (or even negative) correlations with each other.

## **Methodology**

The following is a high-level description of the methodology used in compiling the survey results.

### Standardized Asset Classes

Not all investment advisors use the same asset classes when developing their capital market assumptions. Some are very specific (more asset classes), while others keep things relatively simple (fewer asset classes).

We exercised judgment in classifying each respondent’s capital market assumptions into a standard set of asset classes. In the event that a respondent did not provide assumptions for a given asset class, the average assumptions from the other respondents was used when developing expected returns for that respondent.

### Investment Horizons

This survey considers “short-term” expected returns to apply to 10-year investment horizon, and “long-term” expected returns to apply to a 20-year horizon.

In the 2015 survey, 19 of the 29 respondents provided only short-term assumptions, indicating a horizon of 10 years. Included in this group are 2 respondents who provided assumptions over a horizon of 10 to 15 years.

All 10 respondents in the 2015 survey who provided long-term assumptions over horizons of 20 years or more also provided short-term assumptions. In cases where such a respondent indicated a time horizon shorter than 10 years, the shorter-term expected returns were combined with the longer-term expected returns to achieve a 10-year horizon. If a respondent indicated a time horizon longer than 20 years, the expected returns were assumed to also apply to a 20-year horizon.

### No Adjustment for Alpha

No adjustment was made to reflect the possibility or expectation of an active investment manager outperforming market returns (earning “alpha”).

### Normally-Distributed Returns

This survey assumes that investment returns will be normally distributed according to the capital market assumptions provided. The survey also assumes that the investment return in one year does not affect the investment return in the following year.

### Equal Weighting

Each respondent was given equal weight in developing the average assumptions for the 2015 survey, regardless of factors such as total assets under advisement, number of clients common with Horizon Actuarial Services, LLC, etc.

# Survey of Capital Market Assumptions: 2015 Edition

## APPENDIX

### Exhibit 13

The following exhibit evaluates the investment return assumption for a hypothetical multiemployer pension plan. It reflects the same hypothetical asset allocation as shown in Exhibit 8, and it provides more detail than Exhibits 9 and 10. Note that the most conservative and optimistic advisors for the 10-year horizon are not necessarily the same as the most conservative and optimistic advisors for the 20-year horizon. This hypothetical pension plan has a benchmark return of 7.50% per year, which is indicated by the gold line in the exhibit below.

Hypothetical Multiemployer Plan 2015 Capital Market Assumption Survey					10-Year Horizon			20-Year Horizon			
Asset Class	Weight	Expected Returns: 10-20 Years (Geometric)			Expected Returns	Conservative	Survey	Optimistic	Conservative	Survey	Optimistic
		Minimum	Average	Maximum		Advisor	Average	Advisor	Advisor	Average	Advisor
US Equity - Large Cap	20.0%	5.00%	7.09%	8.80%	Average Annual Return (Arithmetic)	5.98%	6.98%	8.20%	6.92%	7.79%	9.06%
US Equity - Small/Mid Cap	10.0%	3.00%	7.31%	9.93%	Annualized Return (Geometric)	5.29%	6.43%	7.63%	6.37%	7.24%	8.32%
Non-US Equity - Developed	7.5%	3.10%	7.48%	9.50%	Annual Volatility (Standard Deviation)	12.13%	10.88%	11.12%	10.89%	10.88%	12.70%
Non-US Equity - Emerging	5.0%	6.40%	8.68%	11.50%							
US Corporate Bonds - Core	7.5%	2.00%	3.69%	6.54%	<b>Range of Expected Annualized Returns</b>						
US Corporate Bonds - Long Duration	2.5%	1.96%	4.01%	6.64%	◆ 75th Percentile	7.87%	8.75%	10.00%	8.01%	8.88%	10.24%
US Corporate Bonds - High Yield	5.0%	4.70%	5.96%	7.90%	◆ 25th Percentile	2.70%	4.11%	5.26%	4.73%	5.60%	6.41%
Non-US Debt - Developed	5.0%	1.00%	2.72%	5.04%	<b>Probabilities of Exceeding Certain Returns</b>						
Non-US Debt - Emerging	2.5%	4.62%	5.95%	8.75%	8.00% per Year, Annualized	24.0%	32.4%	45.8%	25.2%	37.7%	54.5%
US Treasuries (Cash Equivalents)	5.0%	1.00%	2.36%	5.30%	7.50% per Year, Annualized	28.2%	37.8%	51.5%	32.1%	45.7%	61.4%
TIPS (Inflation-Protected)	5.0%	1.84%	3.07%	4.25%	7.00% per Year, Annualized	32.7%	43.4%	57.1%	39.8%	53.9%	67.9%
Real Estate	10.0%	4.50%	6.32%	8.50%							
Hedge Funds	5.0%	3.50%	5.75%	7.80%							
Commodities	2.5%	2.20%	4.37%	6.80%							
Infrastructure	2.5%	5.10%	7.09%	9.30%							
Private Equity	5.0%	7.20%	9.47%	13.20%							
Inflation	N/A	1.68%	2.23%	2.80%							
<b>TOTAL PORTFOLIO</b>	<b>100.0%</b>										

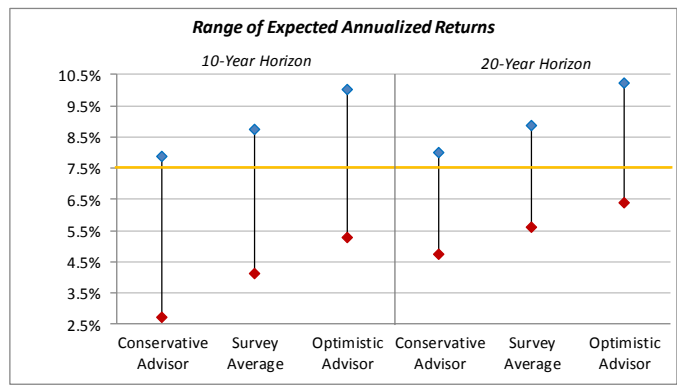
  

**Considerations and Limitations**

- Allocations may be approximated if certain asset classes are not included in the survey.
- Many investment advisors provided only shorter-term assumptions (10 years or less).
- Assumptions are based on indexed returns and do not reflect anticipated alpha.
- Assumptions do not reflect investment opportunities or fee considerations available to larger funds.

**SOURCE:** Horizon Actuarial survey of 2015 capital market assumptions from 29 investment advisors.

- Expected returns over a 10-year horizon are based responses from all 29 respondents.
- Expected returns over a 20-year horizon are based a subset of 10 respondents who provided longer-term assumptions.



# Survey of Capital Market Assumptions: 2015 Edition

## APPENDIX (Cont.)

### Exhibit 14

The following exhibit provides the average capital market assumptions for all 29 investment advisors in the 2015 survey. Each of the 29 respondents was given equal weight in determining the average assumptions. For reference, expected returns are shown over 10-year and 20-year horizons, in addition to the "blended" expected returns (10 to 20-year horizon). Expected returns are also provided on both an annualized (geometric) and average (arithmetic) basis.

Horizon Actuarial 2015 Survey of Capital Market Assumptions							
Average Survey Assumptions							
Asset Class	Expected Returns						Standard Deviation
	Annualized (Geometric)			Average (Arithmetic)			
	10-Year	20-Year	'Blended'	10-Year	20-Year	'Blended'	
1 US Equity - Large Cap	6.79%	7.81%	7.09%	8.16%	9.18%	8.46%	17.12%
2 US Equity - Small/Mid Cap	6.91%	8.18%	7.31%	8.98%	10.15%	9.36%	20.99%
3 Non-US Equity - Developed	7.28%	8.07%	7.48%	9.07%	9.80%	9.27%	19.57%
4 Non-US Equity - Emerging	8.60%	9.00%	8.68%	11.86%	12.26%	11.94%	26.61%
5 US Corporate Bonds - Core	3.31%	4.41%	3.69%	3.47%	4.58%	3.85%	5.60%
6 US Corporate Bonds - Long Duration	3.72%	4.55%	4.01%	4.29%	5.27%	4.59%	10.84%
7 US Corporate Bonds - High Yield	5.58%	6.33%	5.96%	6.19%	6.93%	6.57%	11.20%
8 Non-US Debt - Developed	2.34%	3.39%	2.72%	2.64%	3.70%	3.02%	7.43%
9 Non-US Debt - Emerging	5.74%	6.13%	5.95%	6.40%	6.85%	6.61%	11.66%
10 US Treasuries (Cash Equivalents)	2.02%	3.11%	2.36%	2.11%	3.14%	2.44%	2.77%
11 TIPS (Inflation-Protected)	2.88%	3.43%	3.07%	3.08%	3.65%	3.27%	6.31%
12 Real Estate	6.29%	6.41%	6.32%	7.22%	7.42%	7.26%	13.56%
13 Hedge Funds	5.54%	6.04%	5.75%	5.89%	6.40%	6.09%	8.34%
14 Commodities	4.28%	4.74%	4.37%	5.83%	6.32%	5.92%	17.96%
15 Infrastructure	6.93%	7.32%	7.09%	7.78%	8.39%	7.93%	13.10%
16 Private Equity	9.26%	10.09%	9.47%	11.91%	12.85%	12.12%	23.55%
Inflation	2.20%	2.29%	2.23%	2.20%	2.30%	2.23%	1.81%

Correlation Matrix																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.00															
2	0.91	1.00														
3	0.82	0.76	1.00													
4	0.74	0.72	0.80	1.00												
5	0.19	0.13	0.17	0.14	1.00											
6	0.17	0.11	0.18	0.16	0.91	1.00										
7	0.64	0.64	0.62	0.63	0.38	0.38	1.00									
8	0.17	0.12	0.34	0.20	0.60	0.55	0.22	1.00								
9	0.54	0.50	0.58	0.65	0.44	0.42	0.61	0.35	1.00							
10	(0.17)	(0.37)	(0.09)	(0.16)	0.38	0.34	(0.13)	0.30	0.14	1.00						
11	0.04	(0.01)	0.11	0.16	0.72	0.62	0.26	0.53	0.39	0.35	1.00					
12	0.38	0.38	0.36	0.31	0.12	0.13	0.37	0.11	0.26	0.11	0.13	1.00				
13	0.64	0.63	0.67	0.71	0.15	0.08	0.55	0.13	0.51	(0.02)	0.13	0.27	1.00			
14	0.32	0.31	0.43	0.46	0.11	0.09	0.33	0.23	0.33	0.01	0.25	0.23	0.46	1.00		
15	0.50	0.48	0.53	0.47	0.26	0.23	0.48	0.21	0.35	0.08	0.16	0.23	0.44	0.30	1.00	
16	0.78	0.75	0.73	0.65	0.04	0.10	0.55	0.12	0.44	(0.11)	(0.09)	0.41	0.64	0.31	0.45	1.00

SOURCE: Horizon Actuarial survey of 2015 capital market assumptions from 29 investment advisors.

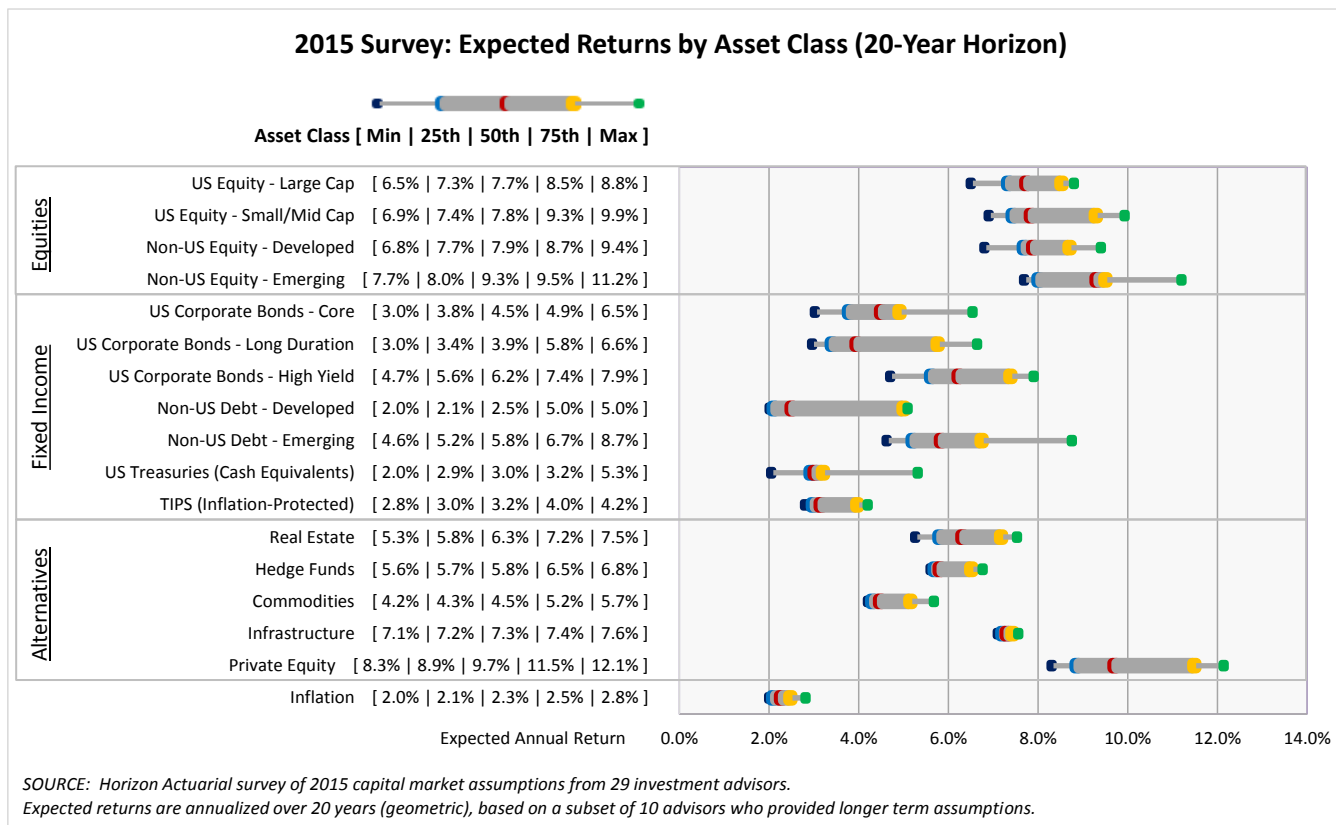
- Expected returns over a 10-year horizon are based responses from all 29 respondents.
- Expected returns over a 20-year horizon are based a subset of 10 respondents who provided longer-term assumptions.
- 'Blended' expected returns apply to a 10 to 20-year horizon and include assumptions from all 29 respondents. Blended returns use 10-year assumptions when 20-year assumptions are not available.

# Survey of Capital Market Assumptions: 2015 Edition

## Exhibit 15

The exhibit below shows the ranges of expected annual returns for different asset classes over a 20-year investment horizon. Earlier in this report, Exhibit 5 showed the ranges of expected annual returns over a “blended” investment horizon of 10 to 20 years. The ranges shown below are based on the assumptions of a subset of 10 survey respondents who provided longer-term assumptions (20 years or more). Note that the ranges of expected returns are somewhat narrower when the investment horizon is longer.

Expected returns shown below are annualized (geometric). To illustrate the distribution of expected returns, the exhibit shows the range of the middle 50 percent of results: the range between the 25th and 75th percentiles. It also shows the median expected return for each asset class: the 50th percentile. Note that the expected returns for the median respondent (shown below) are not the same as the average expected returns (shown in Exhibit 14).



# Survey of Capital Market Assumptions: 2015 Edition

## Exhibit 16

The exhibit below shows the ranges of expected annual returns for different asset classes over a 10-year investment horizon. Earlier in this report, Exhibit 5 showed the ranges of expected annual returns over a “blended” investment horizon of 10 to 20 years. The ranges shown below reflect the shorter-term (horizons of up to 10 years) assumptions provided by the 29 respondents to the 2015 survey. The expected returns shown below are more internally comparable than those shown in Exhibit 5, as they all apply to the same investment horizon.

Expected returns shown below are annualized (geometric). To illustrate the distribution of expected returns, the exhibit shows the range of the middle 50 percent of results: the range between the 25th and 75th percentiles. It also shows the median expected return for each asset class: the 50th percentile. Note that the expected returns for the median respondent (shown below) are not the same as the average expected returns (shown in Exhibit 14).

